

Biomedical Engineering Terminology

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سرشناسه : مهدوی ساعی، ملیکا، ۱۳۷۷-

-Mahdavi Saei, Melika, 1998

عنوان و نام پدیدآور : Biomedical engineering terminology [Book] / Melika Mahdavi Saei .

مشخصات نشر : تهران: متخصصان، ۱۴۰۳ = ۲۰۲۴م.

مشخصات ظاهری : ۱۹۷ ص.: مصور.

شابک: ۹۷۸-۶۲۲-۳۹۰-۳۰۶-۹

وضعیت فهرست نویسی : فیپا

یادداشت : زبان: انگلیسی.

موضوع : زبان انگلیسی -- کتاب‌های قرائت -- مهندسی پزشکی

موضوع : English language -- Readers -- Biomedical engineering

موضوع : زبان انگلیسی -- راهنمای آموزشی (عالی)

موضوع : English language -- Study and teaching (Higher)

رده بندی کنگره : ۱۱۲۷PE

رده بندی دیویی : ۶۴/۴۲۸

شماره کتابشناسی ملی : ۹۶۴۴۵۸۱

Biomedical Engineering Terminology

نویسنده: ملیکا مهدوی ساعی

ویراستار: ملیکا مهدوی ساعی

طراح جلد: مهرین ساعی

صفحه آرا: مهرین ساعی

نوبت چاپ: اول (تابستان ۱۴۰۳)

شابک: ۹۷۸-۶۲۲-۳۹۰-۳۰۶-۹

کلیه حقوق محفوظ است

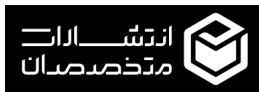
ناشر: تهران، نشر متخصصان ۱۴۰۳

نشانی دفتر مرکزی تهران: تهران - خیابان دماوند -

میدان امام حسین (ع) - نیش کوچه طباطبایی -

پلاک ۲ - ساختمان نگین - طبقه دوم - واحد ۶

تلفن: ۰۲۱-۹۱۰۹۱۱۲۸



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فرآیند فنی اثر (ویراستاری، صفحه آرایی و طراحی جلد) از سوی مؤلف انجام شده است

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Unit1

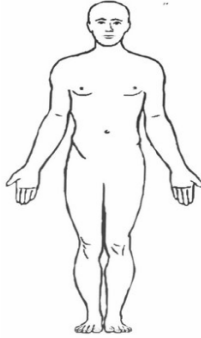
What is anatomy

Anatomy includes those structures that can be seen grossly (without the aid of magnification) and microscopically (with the aid of magnification). Typically, when used by itself, the term anatomy tends to mean gross or microscopic anatomy that is, the study of structures that can be seen without using a microscope. Microscopic anatomy, also called histology, is the study of cells and tissues using a microscope .

Anatomy forms the basis for the practice of medicine. Anatomy leads the physician toward an understanding of a patient's disease, whether he or she is carrying out a physical examination or using the most advanced imaging techniques. Anatomy is also important for dentists, chiropractors, physical therapists, and all other involved in any aspect of patient treatment that begins with an analysis of clinical signs. The ability to interpret a clinical observation correctly is therefore the endpoint of a sound anatomical understanding. Observation and visualization are the primary techniques a student should use to learn anatomy. Anatomy is much more than just memorization of lists of names. Although the language of anatomy is important, the network of information needed to visualize the position of physical structures in a patient goes far beyond simple memorization. Knowing the names of the various branches of the external carotid artery is not the same as being able to visualize the course of the lingual artery from its origin in the neck to its termination in the tongue. Similarly, understanding the organization of the soft palate, how it is related to the oral and nasal cavities, and how it moves during swallowing is very different from being able to recite the names of its individual muscles and nerves. An understanding of anatomy requires an understanding of the context in which the terminology can be remembered.

The anatomical position

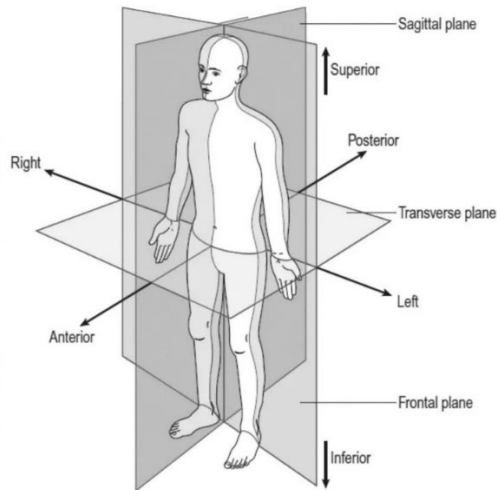
Erect standing position with all body parts facing forward considered the starting point for all body segment movement the body is in the anatomical position when standing upright with feet together hands by the side and face looking forward. the mouth is closed and the facial expression is neutral. the rim of bone under the eyes is in the same horizontal plane as the top of the opening to the ear and the eyes are open and focused on something in the distance. the palm of the hands, face forward with the fingers straight and together with a pad of the thumb turned 90 degrees to the pad of the fingers. the toes point forward.



Anatomical planes

Three major groups of planes pass through the body in the anatomical position.

- Coronal planes are oriented vertically and divide the body into anterior and posterior parts.
- Sagittal planes also are oriented vertically, but are at right angles to the coronal planes and divide the body into right and left parts. The plane that passes through the center of the body dividing it into equal right and left halves is termed the median sagittal plane .
- Transvers, horizontal or axial planes divide the body into superior and inferior parts.



Terms to describe location

Three major pairs of terms are used to describe the location of structures relative to the body as a whole or to other structures.

- Anterior (or ventral) and posterior (or dorsal) describe the position of structures relative to the front and back of the body. For example, the nose is an anterior (ventral) structure whereas

the vertebral column is a posterior (dorsal) structure. Also, the nose is anterior to the ears and the vertebral column is posterior to the sternum.

- Medial and lateral describe the position of structures relative to the median sagittal plane and the sides of the body. For example, the thumb is lateral to the little finger. The nose is in the median sagittal plane and is medial to the eyes, which are in turn medial to the ears.
- Superior and inferior describe structures in reference to the vertical axis of the body. For example, the head is superior to the shoulders and the knee joint is inferior to the hip joint.
- Proximal and distal are used with reference to being closer to or farther from a structure's origin, particularly in the limbs. For example, the hand is distal to the elbow joint.
- Cranial (toward the head) and caudal (toward the tail) are sometimes used instead of superior and inferior, respectively.
- Rostral is used, particularly in the head to describe the position of a structure with reference to the nose. For example, the forebrain is rostral to the hindbrain.
- Superficial and deep are two other terms used to describe the position of structures in the body are superficial and deep. These terms are used to describe the relative positions of two structures with respect to the surface of the body. For example, the sternum is superficial to the heart, and the stomach is deep to the abdominal wall .

Body posture

Posture is the position in which we hold our bodies while standing, sitting or lying down good posture is the correct alignment of the body parts supported by the right amount of muscles tension against gravity. Postural muscles also maintain our posture and balance during movement.

Posture is defined as the position of the body at one point in time and influence by each of the joints the body proper posture is achieved when the body is aligned in such a way that the least amount of stress and muscle activation is possible.

Good posture involves training your body to stand, walk, sit and lie so as to place to least strain on muscles and ligament while you are moving or performing weight bearing activities. Good posture helps you in the following ways.

Superior closer to the head

Inferior farther away from the head

Medial toward the midline of the body

Lateral away from the midline of the body

Ipsilateral refers to a body part that is on the same side as another part with respect to an imaginary midline dividing the body into equal right and left halves (the right arm and the right leg are ipsilateral).

Contralateral refers to a body part that is on the opposite side of another part with respect to an imaginary midline dividing the body into equal right and left halves (the right arm and the left leg are contralateral)

Anterior toward the front of the body

Posterior toward the back of the body

Proximal closer to the trunk

Distal farther away from the trunk

Superficial toward the surface of the body

Deep inside the body away from the surface

Cranial toward the head

Caudal toward the tail

Rostral is used particularly in the head to describe the position of a structure with reference to the nose. (The forebrain is rostral to the hindbrain)

Planes and related axis

1-Mediolateral axis -sagittal plane

2-Anterior-posterior axis-frontal\coronal plane

3-Longitudinal axis-transverse plane

*Movement takes place in a plane about an axis

*sagittal+frontal=vertical

*Horizontal+frontal=frontal

*sagittal+horizontal=sagittal

Reference planes

Sagittal plane in which forward and backward movements occur. *Also are oriented vertically but are at right angles to the coronal planes and divide the body into right and left parts. the plane that passes through the center of the body dividing it into equal right and left halves is termed the median sagittal plane.

Frontal\coronal plane in which lateral movements occur.* are oriented vertically and divide the body into anterior and posterior parts

Transverse\Horizontal plane in which rotational movements occur.* divide the body into superior and inferior parts.

Reference axis

Mediolateral axis around which rotations in the sagittal plane occur

Anterior-posterior axis around which rotations in the frontal plane occur.

Longitudinal axis around which rotational movements occur.

Flexion anteriorly directed sagittal plane rotations of the head /trunk/ upper arm/ fore arm/ hand and thigh. Posteriorly directed sagittal plane rotations of the lower leg

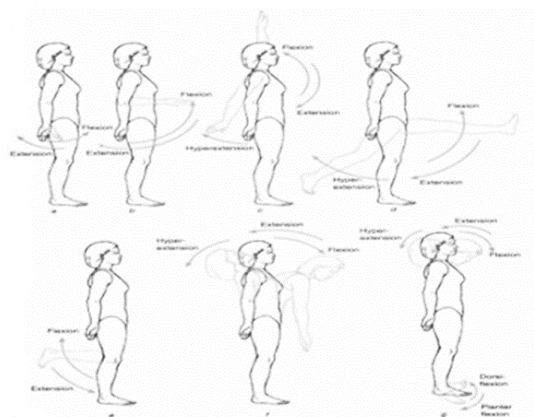
Bending movement in which the relative angle of the joint between two adjacent segment decreases.

Extension straightening movement in which the relative angle of the joint between two adjacent segment increases as the joint return to the reference position.

Hyper flexion movement that goes beyond the normal range of flexion.

Hyper extension movement that goes beyond the anatomical reference position and opposite of hyper flexion .Dorsi flexion bringing the top of the foot toward the tibia angle between the leg and foot decrease.

Plantar flexion opposite motion of dorsi flexion bottom of the foot moves down and the angle between the leg and foot increase.



Movement in the frontal plane

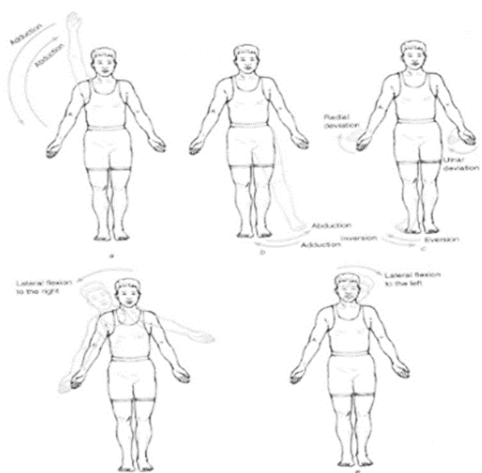
Abduction and adduction move a body segment away from a closer to a midline of the body respectively.

Lateral flexion bending to one side the term lateral flexion is used to describe motions of the trunk and neck.

Elevation and depression movement of shoulder girdle in the superior and inferior direction.

Inversion and eversion inward and outward rotation of the sole of the foot respectively.

Radial and ulnar deviation side to side movement of the hand at the wrist toward and away from the thumb respectively.



Movement in the transverse plane

Rotation bones revolve around its own longitudinal axis

Medial rotation is turning of anterior surface into wards the midline

Lateral rotation is turning of anterior surface away from the midline

*At ball and socket and pivot type joints

Left and right rotation the movement of head and neck and trunk occur

Medial(internal) and lateral(external) rotation

Toward midline and away from midline respectively Supination

outward

upward(Frontal plane) rotation of a body part usually the hand and fore arm so that the palm

is down (transverse plane) rotation of the fore arm outward and inward

In the foot (subtalar joint) it is a combination of motion resulting in a position such that the foot is abducted and everted

Pronation

inward

downward

*opposite of the supination

Horizontal abduction and adduction

Adduction from lateral to anterior position (also called horizontal flexion)

Abduction from anterior to lateral position (also called horizontal extension)

Circumduction movement of a distal end of a body part in a circle

Combination of flexion and extension and adduction and abduction

Special hand and foot movements:

Inversion

Eversion
Dorsiflexion
Plantar flexion
Pronation
Supination

Supination – Outwards or Upwards

Frontal plane: Rotation of a body part, usually the hand and fore arm so that the palm is down. Transverse plane: Rotation of the fore arm, outwards and inwards.

In the foot (Subtalar joint), it is a combination of motions resulting in a position such that the foot is abducted and everted.

Pronation – Inwards or Downwards: Oppose the supination.

Horizontal Abduction and Adduction

Adduction: From lateral to anterior position. (Also called horizontal flexion)

Abduction: From anterior to lateral position. (Also called horizontal extension)

Circumduction: Movement of a distal end of a body part in a circle .

Combination of flexion, extension, adduction and abduction. Occurs at ball and socket, saddle and condyloid joints.

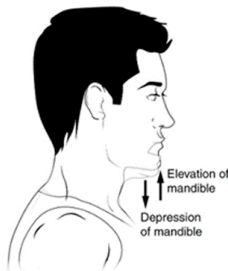
Special movement of mandible

Elevation (upward)

Depression (downward)

Pronation (forward)

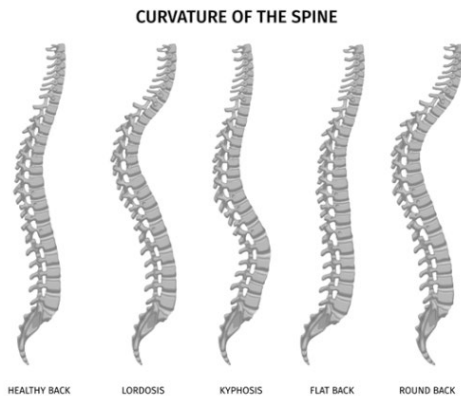
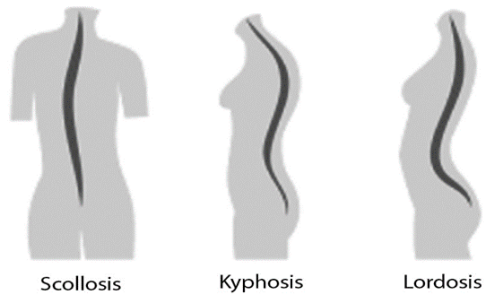
Retraction (backward)



Some of deformity of the body posture

Scoliosis is an abnormal lateral curvature of the vertebral column. A true scoliosis involves not only the (right or left sided) curvature but also a rotational element of one vertebra upon another. Kyphosis is abnormal curvature of the vertebral column in the thoracic region producing a hunchback deformity. this condition occurs in certain disease states.

Lordosis is abnormal curvature of the vertebral column in the lumbar region. Producing a swayback deformity.



The abdomen is the part of the trunk inferior to the thorax. It's Musculo membranous walls surround a large cavity (abdominal cavity) which is bounded superiorly by the diaphragm and inferiorly by the pelvic inlet. The abdominal cavity may extend superiorly as high as the fourth intercostal space and is contains the peritoneal cavity and the abdominal viscera.

Surface topography

Topographical divisions of the abdomen are use to describe the location of abdominal organs and the pain associated with abdominal problems. The two schemes most often used are

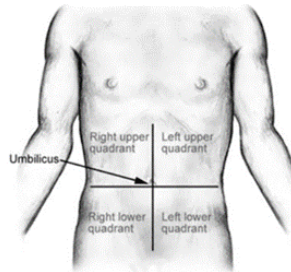
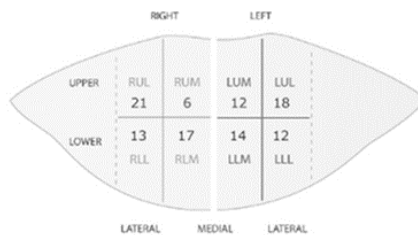
-A four-quadrant pattern

-A nine- region pattern

Four-quadrant pattern

A horizontal tans umbilical plane passing through the umbilicus and the intervertebral disc between vertebra L3 and L4 and intersecting with the vertical median plane divides the abdomen inti four –quadrants the

- right upper quadrant
- Left upper quadrant
- Right lower quadrant
- Left lower quadrant

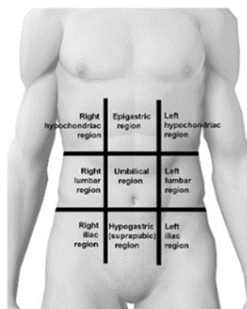


Nine-region pattern

The nine-region pattern is based on two horizontal and two vertical planes. The superior horizontal plane (the subcostal plane) is immediately inferior to the costal margins which places it at the lower border of the costal cartilage of rib 10 and passes posteriorly through the body of vertebra L3. The inferior horizontal plane (the intertubercular plane) connects the tubercles of the iliac crests which are palpable structures 5cm posterior to the anterior superior iliac spines and passes through the upper part of the body of vertebra L5. The vertical planes pass from the midpoint of the clavicles inferiorly to a point midway between the anterior superior iliac spine and pubic symphysis. *This four plane establish the topographical divisions in the nine-region organization. the following designations are used for each region superiorly.

- the right hypochondrium

- the epigastric region
- the left hypochondrium
- inferiorly the right groin (inguinal region)
- pubic region
- the left groin (inguinal region)
- the middle the right flank (lateral region)
- the umbilical region
- the left flank (lateral region)



Using the abdominal quadrant to locate

The abdomen can be divided into quadrants by a vertical median plane and a horizontal trans umbilical plane which passes through the umbilicus;

- The liver and gallbladder are in the right upper quadrant
- The stomach and spleen are in the left upper quadrant
- The cecum and appendix are in the right lower quadrant
- The end of the descending colon and sigmoid colon are in the left lower quadrant

Organs and organ system

Tissues are arranged into organs, which serve specific functions, and organs, in turn, are grouped into systems. Grouped according to functions, the body systems are;

- Circulation;
- Cardiovascular system, consisting of the heart and blood vessels.

- Lymphatic system, organs, and vessels that aid circulation and help protect the body from foreign materials.
- Nutrition and fluid balance;
- Respiratory system, which obtains the oxygen needed for metabolism and eliminates carbon dioxide, a byproduct of metabolism.
- Digestive system, which takes in breaks down, and absorbs nutrients and eliminates undigested waste.
- Urinary system, which eliminates soluble waste. And balances the volume and composition of body fluids.
- Production of offspring; the male and female reproductive systems
- Coordination and control;
- Nervous system, consisting of the brain, spinal cord, and nerves, and including the sensory system .
- Endocrine system, consisting of individual glands that produce hormones.
- Body structure and movement;
- Skeletal system, the bones and joints.
- Muscular system, which moves the skeleton and makes up organs. (The muscular system and skeleton protect vital organs.)
- Body covering; the integumentary system, which includes the skin and its associated structures, such as hair, sweat glands, and oil glands. This system functions in protection and also helps to regulate body temperature.

A

Abducent	دور کننده
Abduction	دور کردن یک عضو از خط میانی بدن
Aberration	ناهنجاری، انحراف از حالت طبیعی
Ability to undergo pain	میزان تحمل درد
Abiotic	فاقد حیات
Abnormality	ناهنجاری
Above elbow	بالای آرنج
Abrade	ساییده شدن

Abrasion resistant مقاوم در برابر پارگی

Addition جمع

Adduct نزدیک کردن

Adduction injury آسیب ناشی از نزدیک کردن

Abduct دور شدن از ، عمل دور کردن

Abduction injury آسیب

Ability توانایی

Abiosis نقص در حیات

Abnormal غیر طبیعی

Aboral اطراف دهان

Above knee بالای زانو

Abrasion ساییدگی

Across داخل، درون

Additional اضافی، به علاوه

Adduction نزدیک کردن یک عضو به خط میانی بدن

Adolescent scoliosis اسکولیوز جوانان

Ambi lateral هر دو طرف

Ankle dislocation در رفتگی مچ پا

Ankle foot orthosis اورتز مچ پا

Anomia از دست دادن و فقدان

Anterior قدامی، جلویی

Anterior or transverse arch قوس عرضی یا قدامی

Axial alignment راستایی محوری بدن

Axillary مربوط به زیر بغل

Axis of rotation محور چرخشی

Albus سفید، مربوط به رنگ سفید

Adverse مضر

Ankle disk حرکت مچ پا در جهت گوناگون

Ankle dorsiflexors خم کننده مچ پا به عقب

Anomaly غیرطبیعی، غیرعادی

Anomie ناهنجاری

Anterior chamber حفره جلو چشم

Anterior posterior جلویی پشتی (خلفی)

Axilla زیربغل

Axis محور

Axisymmetric تقارن محوری

Abdomen /o , Abdominal مربوط به ناحیه شکم

B

Body alignment راستای بدن

Body dimensions ابعاد بدن

Body posture وضعیت بدن، وضعیت (قامت) بدن

Body tilt twist چرخش جانبی بدن

Body fluids مایعات بدن

Body heights اندازه گیری قد بدن

Body buffer zone محدوده حایل بدن

Body positioning حالت بدن

Body surface area ناحیه سطحی بدن

Body fat چربی بدن

Body girths اندازه گیری های بدن

Body weight وزن بدن

C

Cephalad به طرف سر

Cervical گردنی

Cheilo- مربوط به لب

Cnemial منسوب به ساق پا

Costro- دنده

Cyano- مربوط به رنگ آبی

Chondro- مربوط به غضروف

Cephalo- مربوط به سر

Cervico- مربوط به گردن

Cheiro- مربوط به دست

Costo- دنده، مربوط به دنده

Cutaneous پوستی، مربوط به پوست

Circumduction حرکت دورانی

D

Dacryo- مربوط به اشک

Dactylo- مربوط به انگشتان دست یا پا

Depression پایین آوردن

Depressions تورفتگی ها

Derm- مربوط به پوست

Digit مربوط به انگشت

Dactyl مربوط به انگشت

Dento- مربوط به دندان

Depression of mandible پایین آوردن فک تحتانی

Depressor پایین برنده

Dermal پوستی

Dorsum مربوط به پشت

Dorsiflexion خم شدن مچ پا

Dorsal خلفی، به طرف پشت بدن

Dorsum مربوط به پشت

E

Elavation بالا کشیدن

-emia , -hemia مربوط به خون

Encephalo- مربوط به مخ
 Episio- مربوط به دستگاه خارجی تناسلی زنانه
 External rotation چرخش بیرونی
 Extro- خارج
 Elavator بالابرنده
 Encephalo مغزی
 Entero- مربوط به روده
 Erythema مربوط به رنگ قرمز
 Extra- خارج
 Extrophy حالت وارونه بودن یک عضو

F

Facio مربوط به چهره و صورت
 Fibro- مربوط به بافت رشته ای
 Fixation تثبیت
 Focal مرکزی
 Femoral مربوط به ران
 First class lever اهرم نوع اول
 Fixator تثبیت کننده
 Fore foot abduction دور کردن جلو پا

G

Gastro مربوط به معده، معده-ای
 Gibbosity گوزپشتی
 Gibbsite قوز، گوز
 Gloss /o مربوط به زبان
 Genu- مربوط به زانو
 Gibbous قوز
 Gingiva- مربوط به لثه
 Gnatho- مربوط به فک

H

Hem / o , hemat / o مربوط به خون

Hystero- مربوط به رحم

I

Inflamed ملتهب شدن

Internal rotation چرخش داخلی

Iso- یکسان، مساوی

Inflammation التهاب

Invertor چرخاننده پا به داخل

Inversion چرخش به طرف داخل

J

Juxta- مجاور، نزدیک

K

Kyphoscoliosis گوز پشتی همراه با انحنای طرفین ستون مهره ها

Knee prostheses پروتز زانو

Knock knee زانو ضربدری

Knee, Internal Derangement صدمه داخلی زانو

Kyphosis گوز پشتی

L

Labio- مربوط به لب

Lateral abdominal شکم مربوط به پهلو

Ligament رباط

Local abnormality ناهنجاری های موضعی

Lorabsis تورفتگی کمر

Lumbo- مربوط به قفسه صدری و کمری

Lympho- مربوط به سیستم لنفاوی

Lateral flexion خم شدن به پهلو

Levo- مربوط به قسمت چپ

Lobectomy برداشتن قسمتی از ریه یا کبد

Longitudinal axis محور طولی

Lumbar curve انحنای کمری

Luxation دررفتگی

M

Malposition وضعیتی غلط

Manual therapy درمان، استفاده از دستها

Macro-, Magna- مربوط به قسمتهای بزرگ

Malpostures ناهنجاری های وضعیتی

Manually به طور دستی

Metro- مربوط به رحم

Mouth cavity حفره دهانی

Mouth دهان

N

Nasal cavity حفره بینی

Nasio مربوط به بینی

O

Occipitalis پس سری

Odonto- مربوط به دندان

Onco- مربوط به تومور

Optic بینایی، مربوط به چشم

Oro- دهان

Orchio مربوط به سفید

Occipital مربوط به پس سر

Occiput پس سر، پشت سر

Omphalo- مربوط ناف

Ophthalm- مربوط به چشم

Oral مربوط به دهان

Orbital مربوط به حفره چشم

-ous مربوط به ورید

P

Palato- مربوط به کام

Pectineal مربوط به شانه

Periton, Peritonexo مربوط به جناق

Palpebra- مربوط به پلک

Pectoral مربوط به ناحیه سینه

Peritoneum حفره جناق

Plantar flexion خم کردن کف پا به داخل

Pes, Pod مربوط به پا

Phlebo- مربوط به ورید

-pnea مربوط به تنفس

Procto- مربوط به رکتوم

Pyelo- مربوط به لگنچه کلیوی

Pharyngo- مربوط به حلق

Pilo- مربوط به مو

Principle axis محور اصلی

Pulmo- مربوط به ریه

Pyloro- مربوط به باب المعده (پیلور)

R

Rachio- مربوط به مهره های پشتی

Renal کلیوی

Rotation downward چرخشی پایین

Rotation outward چرخش به خارج

Rotation to right چرخش به راست

Rotational چرخشی، دورانی

Reno- مربوط به کلیه

Rhino- مربوط به بینی

Rotation inward چرخش به داخل

Rotation to left چرخش به چپ

Rotation upward چرخش بالایی

Round back کیفوز پشتی

S

Sacro- مربوط به ساکروم

Sacral, Sacrum ناحیه خاجی

Salpingo- مربوط به لوله اوستایی یا لوله رحمی

Scoliosis کجی ستون مهره ها

Spondylo- مربوط به مهره های پشت

Steth- , Stetho- مربوط به سینه

Supine به پشت خوابیده

Sangui- مربوط به خون

Spleno- مربوط به طحال

Steato- مربوط به چربی

Supination به سمت بیرون گرداندن

Supinus- چرخش عضو به طرف بالا

T

Tarsus varus چرخش پاشنه به داخل

Thoraco-cervical پشتی، گردنی

Throat حلق

Thyro- مربوط به غده تیروئید

Thoraco- مربوط به قفسه سینه

Thoraco-lumbar پشتی، کمری

Thymo- مربوط به غده تیموس

Tibial torsion چرخش تیبیا

U

Umbilical مربوط به ناحیه ران

Uro- , Urino- مربوط به دستگاه ادراری

Upper extremity اندام فوقانی

Urethra- مربوط به پیشابراه

V

Valvul/ o- , Valvo- مربوط به دریچه

Varico ورید متورم

Ven/ o, Ven/ l, Phleb/ o مربوط به ورید، وریدی

Ventricul/ o حفره، بطن

Vesico- مربوط به مثانه

W

Wadding gait راه رفتن اردکی

Wry neck کج گردن

X

Xantho- مربوط به رنگ زرد

Z

Zygoma زائده استخوان گیجگاهی

Zone ناحیه

Superior / Cranial (فوقانی) نزدیک شدن اندام به سر

Inferior (تحتانی) دور شدن اندام از سر

Anterior (حرکت به سمت جلویی بدن) قدامی

Posterior (حرکت به سمت عقبی بدن) خلفی

Medial (حرکت به سمت میان بدن) میانی

Lateral (دور شدن از خط میانی بدن) جانبی

Proximal نزدیکتر به قسمت موضعی اندام

Distal دورتر از قسمت موضعی اندام

Superficial سطحی (نزدیک به سطح)

Deep (profunda) عمقی (نزدیک به مرکز بدن و دورتر از سطح)

Caudal (کاذل یا دمی)

Dorsal (posterior) جهت مخالف

Ventral (پشتی)

Rostal به سمت بینی

Bilateral در دو طرف

Ipsilateral در همان طرف

Contralateral در طرف مقابل

Ventral (Anterior) شکمی، به سمت شکم (جلو)

Retraction به عقب کشیده شدن، منقبض شدن

Protraction به جلو کشیده شدن، منبسط شدن

Extension

اصطلاحات آناتومی حرکت های بدن

باز شدن قسمت موضعی بدن (اکستنشن)

Flexion تا شدن قسمت موضعی بدن (فلکشن)

Hyper Extension گردش در موقعیت آناتومیک مرجع، در جهت خلاف فلکشن

Dorsi Flexion (Tibia) بالا آوردن سرپنجه پا به سمت استخوان تیبیا

Plantar Flexion حرکت دادن سرپنجه پا به سمت دور از ساق (حرکتی عکس دورسی فلکشن)

Abduction دور شدن از محور میانی بدن (ابداکشن)

Adduction نزدیک شدن به محور میانی بدن (ادداکشن)

Lateral Flexion چرخش طرفی تن و گردن (لترال فلکشن)

Elevation [حرکت رو به بالا (کتف)]الویشن

Depression [حرکت رو به پایین (کتف)] دپرشن

Palmar flexion [حرکت به سمت جلو مچ دست (داخل)] پالمارفلکشن

Radial diviation انحراف رادیال

چرخش دست در ناحیه صفحه قدامی اگر به سمت استخوان زند زیرین (Radius) از سمت شست صورت گیرد.

Ulnar diviation انحراف اولنار

چرخش دست در ناحیه صفحه قدامی اگر به سمت استخوان زند زیرین (ulnar) از سمت انگشت کوچک صورت گیرد.

Inversion چرخش کف پا به سمت داخل (اینورژن)

Eversion چرخش کف پا به سمت خارج (اورژن)

Supination

Pronation چرخش ساعد به سمت خارج (سوپینیشن)

Medial rotation / Internal rotation

Lateral rotation / External rotation چرخش به سمت خارج

Left rotation چرخش به چپ

Right rotation چرخش به راست

Supine خوابیدن افقی طوری که صورت رو به بالا باشد (طاق باز)

Prone خوابیدن افقی طوری که صورت رو به پایین باشد (دمر)

Horizontal adduction ادداکشن افقی

Horizontal abduction ابداکشن افقی

Horizontal flexion تا شدن افقی

Horizontal extension باز شدن افقی

Outward rotation چرخش خارجی

Inward rotation چرخش داخلی

Upward rotation چرخش بالایی

Downward rotation چرخش پایینی

Circumduction چرخش مخلوطی

ترکیبی از حرکات میباشد این حرکت در سطوح چندگانه یا حول محورهای چندگانه صورت می گیرد. (ترسیم دایره ای فرضی در فضا با نوک انگشت سبابه در حالی که تکیه گاه دست ثابت باشد).

Axis:

I . محور میانی – طرفی (Frontal – Horizontal / mediolateral)

خط فرضی استاکر گردش های سطح ساجیتال حول آن انجام می شود. این محور بر سطح ساجیتال عمود است.

II . محور قدامی – خلفی (Sagittal – Horizontal / anterior posterior)

خط فرضی است که حرکات چرخشی سطح فرونتال حول آن انجام می گیرد. این محور جلو به عقب امتداد دارد و به همین دلیل به عنوان محور قدامی – خلفی شناخته می شود. محور قدامی – خلفی بر سطح فرونتال عمود است.

III . محور طولی یا عمودی (Longitudina / Vertical)

خط فرضی است که چرخش های سطح Transverse حول آن واقع می شوند .

مطالعات آناتومیک بدن

Cephalic, capit مربوط به سر

Cranial جمجمه

Axillary زیر بغل

Brachial بازو

Nasal بینی

Abdomen شکم

Femoral ران

Vertebral column ستون فقرات (مهره ها)

Prineal پرینه (بین مقعد و اندام تناسلی خارجی)

Occiptal پشت سر، پس سر

Umblical ناف

Inguinal (groin) کشاله ران

Thoracic مهره پشتی

Sacral مهره خاجی

Stom- , oro- (mouth) مربوط به دهان

Odont, dent- (tooth) مربوط به دندان

Bucc- (cheek) مربوط به گونه

Ophthalm-, ocul (eye)	چشمی، مربوط به چشم
Cervical	مربوط به گردن، گردنی
Frontal	پیشانی
Pelvic	لگن
Oral	دهان
Costal	دنده
Lumbar	کمر
Breast (mammary)	پستان
Gluteal (Sorein)	باسن
Ophthalmic	چشم ها
Chest (pectoral, thoratic)	قفسه سینه
Pubic	عانه، استخوان شرمگاهی
Mediastinal	بین سینه ای
Coccyx	دنبالیچه ای
Cheil, labi (lip)	لب
Glosso-, glott-, lingua- (tongue)	زبان
Encephalo-, cerebro- (brain)	مغزی، مربوط به مغز
Ot-, auri (ear)	مربوط به گوش
Frons (for head)	پیشانی، مربوط به پیشانی
Cyst-, vesic- (Bladder)	مثانه، مربوط به مثانه
Nephro-, ren- (kidney)	کلیه ای، مربوط به کلیه
Ureter- (ureter)	حالبی، مربوط به حالب و میزنای
Urino- (urine)	ادراری، مربوط به ادرار
Aorto- (aorta)	آئورتی، مربوط به آئورت
Artrio- (artery)	شریانی، مربوط به شریان
Hemo-, Sanguio- (blood)	خونی، مربوط به خون
Thrombo- (blood clot)	مربوط لخته خون
Angio-, vaso- (blood vessel)	رگ خونی، مربوط به رگ خونی

Cardio- (heart)	قلبی، مربوط به قلب
Phlebo-, veno- (vein)	وریدی، مربوط به ورید
Abdomino-, laparo- (abdomen)	شکمی، مربوط به شکم
Brachio- (arm)	بازویی، مربوط به بازو
Masto-, mammo- (breast)	پستانی، مربوط به پستان
Thoraco-, stetho- (chest)	مربوط به قفسه سینه
Dactylo- (finger)	مربوط به انگشت دست
Podo-, pedo- (foot)	پا، مربوط به پا (بخش انتهایی اندام تحتانی)
Chiro- (hand)	دستی، مربوط به دست
Pleuro-, cost- (rib)	دنده ای، مربوط به دنده
Carpo- (wrist)	مچ دست، مربوط به مچ دست

مناطق شکمی: شامل سه ناحیه میانی و شش ناحیه کناری

نواحی میانی :

-ناحیه اپی گاستری که بالای معده واقع است.

-ناحیه نافی (امبلیکال) که به خاطر قرار گرفتن ناف در این منطقه به این نام خوانده می شود.

-ناحیه هیپوگاستریک که زیر معده واقع است.

نواحی کناری در سمت راست و چپ نام های مشابهی دارند و عبارتند از:

-نواحی هیپوکندریک راست و چپ که به علت واقع شدن در نزدیکی دنده ها و خصوصاً غضروف دنده ها این نام را دارد .

-نواحی کمری (لومبار) راست و چپ که نزدیک ناحیه کوچک کمر واقع می باشند.

-نواحی ایلیاک راست و چپ که به خاطر نزدیکی به استخوان فوقانی لگن به نام ایلیوم این نام را به خود اختصاص می دهد.

Unit2

Cartilage

Cartilage is an avascular form of connective tissue consisting of extracellular fibers embedded in a matrix that contains cells localized in small cavities.

The amount and kind of extracellular fibers in the matrix varies depending on the type of cartilage.

In heavy weight bearing areas or areas prone to pulling forces the amount of collagen is greatly

Increased and the cartilage is almost inextensible.

In contrast in areas where weight bearing demands and stress are less cartilage containing elastic fibers and fewer collagen fibers in common.

The functions of cartilage are to;

- Support soft tissues
- Provide a smooth and gliding surface for bone articulations at joint
- Enable the development and growth of long bones.

There are three types of cartilage;

- Hyaline- most common; matrix contains a moderate amount of collagen fibers (articular surfaces of bones)
- Elastic; matrix contains collagen fibers along with a large number of elastic fibers (external ear)
- Fibrocartilage; matrix contains a limited number of cells and ground substance amidst a substantial amount of collagen fibers (intervertebral discs)

* cartilage is nourished by diffusion and has no blood vessels, lymphatics, or nerves.

Joints

The joints or articulations are classified according to the degree of movement they allow;

- A suture is an immovable joint held together by fibrous connective tissue, as is found between the bones of the skull.
- A symphysis is a slightly movable joint connected by fibrous cartilage. Examples are the joints between the bodies of the vertebrae and the joint between the pubic bones.
- A synovial joint is a freely movable joint. Such joints allow for a wide range of movements. Tendons attach muscles to bones to produce movement at the joints.

Freely movable joints are subject to wear and tear, and they therefore have some protective features. The cavity contains synovial fluid, which cushions and lubricates the joint. This fluid is produced by the synovial membrane that lines the joint cavity. The ends of the articulating bones are cushioned and protected by cartilage. A fibrous capsule, continuous with the periosteum, encloses the joint. Synovial joints are stabilized and strengthened by ligaments, which connect the articulating bones. A bursa is a small sac of synovial fluid that cushions the area around a joint. Bursae are found at stress points between tendons, ligaments, and bones.

Types of joint

The sites where two skeletal elements come together are termed joints.

The two general categories of joints are those in which;

- The skeletal elements are separated by a cavity (synovial joints)
- There is no cavity and the components are held together by connective tissue (solid joints)

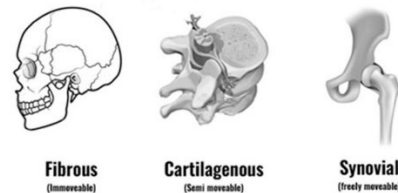
Synovial joints

Synovial joints are connections between skeletal components where the elements involved are separated by a narrow articular cavity.

In addition to containing an articular cavity, these joints have a number of characteristic features. First, a layer of cartilage usually hyaline cartilage, covers the articulating surfaces of the skeletal elements.

A second characteristic feature of synovial joints is the presence of a joint capsule consisting of an inner synovial membrane and outer fibrous membrane.

- The synovial membrane attaches to the margins of the joint surfaces at the interface between the cartilage and bone and encloses the articular cavity.
The synovial membrane is highly vascular and produces synovial fluid, which percolates into the articular cavity and lubricates the articulating surfaces.
Closed sacs of synovial membrane also occur outside joints where they form synovial bursae or tendon sheaths.
(bursae often intervene between structures, such as tendons and bone, tendons and joints, or skin and bone, and reduce the frictions of one structure of moving over the other.
Tendon sheaths surround tendons and also reduce friction.
- The fibrous membrane is formed by dense connective tissue and surrounds and stabilized the joint. parts of the fibrous membrane may thicken to form ligaments, which further stabilize the joint. Ligaments outside the capsule usually provide additional reinforcement.



Joint capsule

The synovial membrane of the joint capsule lines all non-articular surfaces of the upper and lower compartments of the joint and is attached to the margins of the articular disc.

The fibrous membrane of the joint capsule encloses the temporomandibular joint complex and is attached;

- Above along the anterior margin of the articular tubercle
- Laterally and medially along the margins of the articular fossa
- Below around the upper part of the neck of mandible

The articular disc attaches around its periphery to the inner aspect of the fibrous membrane.

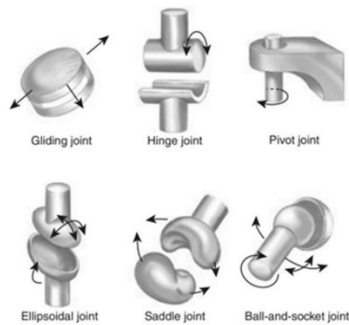
Descriptions of synovial joints based on shape and movement

Synovial joints are described based on shape and movement;

- Based on the shape of their articular surfaces, synovial joints are described as plane(flat), hinge, pivot, bicondylar (two sets of contact points) , condylar(ellipsoid), saddle, ball and socket.
- Based on movement, synovial joints are described as uniaxial (movement in one plane), biaxial (movement in two planes), and multi-axial (movement in three planes)

Specific types of synovial joints

- Plane joints- allow sliding or gliding movements when one bone moves across the surface of another (acromioclavicular joint)
- Hinge joints- allow movement around one axis that passes transversely through the joint; permit flexion and extension.
- Pivot joints- allow movement around one axis that passes longitudinally along the shaft of the bone; permit rotation
- Bicondylar joints- allow movement mostly in one axis with limited rotation around a second axis
- Condylar (ellipsoid) joints- allow movement around two axes that are at right angles to each other; permit flexion, extension, abduction, adduction and circumduction (limited)
- Saddle joints- allow movement around two axes that are at right angles to each other; The articular surfaces are saddle shaped; permit flexion, extension, abduction, adduction and circumduction.
- Ball and socket joints- allow movement around multiple axes; permit flexion, extension, abduction, adduction, circumduction and rotation.



Solid joints

Solid joints are connections between skeletal elements where the adjacent surfaces are linked together either by fibrous connective tissue or by cartilage.

Movements at these joints are more restricted than at a synovial joint.

Fibrous joints include sutures, gomphoses and syndesmoses.

- Sutures occur only in the skull where adjacent bones are linked by a thin layer of connective tissue termed a sutural ligament.
- Gomphoses occur only between the teeth and adjacent bone. In these joints, short collagen tissue fibers in the periodontal ligament run between the root of the tooth and the bony socket.
- Syndesmoses are joints in which two adjacent bones are linked by a ligament.
- Synchondroses occur where two ossification centers in a developing bone remain separated by a layer of cartilage, for example the growth plate that occurs between the head and shaft of developing long bones. These joints allow bone growth and eventually become completely ossified.
- Symphyses occur where two separated bones are interconnected by cartilage. Most of these types of joints occur in the midline and include the pubic symphysis between the two pelvic bones, and intervertebral discs between adjacent vertebrae.

Ligaments

Joints between vertebrae are reinforced and supported by numerous ligaments, which pass between vertebral bodies and interconnect components of the vertebral arches.

MEDICAL DEVICE

Synovial fluid analysis

is a series of tests performed on synovial (joint) fluid to help diagnose and treat joint-related abnormalities. To obtain a synovial fluid sample, a needle is inserted into the knee between the joint space. When the needle is in place the synovial fluid is then withdrawn.

Synovial fluid, also known as joint fluid, is a thick liquid located between your joints. The fluid cushions the ends of bones and reduces friction when you move your joints. A synovial fluid analysis is a group of tests that checks for disorders that affect the joints. The tests usually include the following:

- *An exam of physical qualities of the fluid, such as its color and thickness*
- *Chemical tests to check for changes in the fluid's chemicals*
- *Microscopic analysis to look for crystals, bacteria, and other substances*

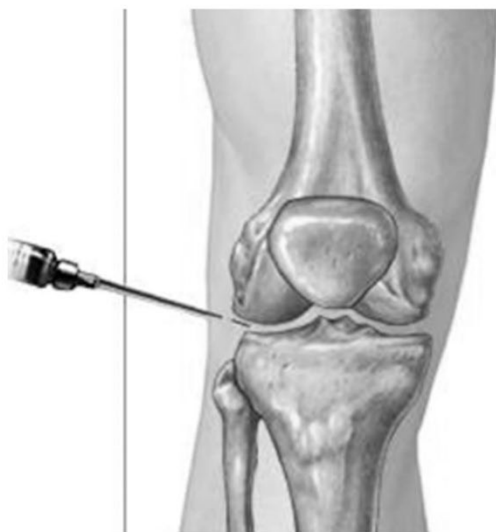
Other names: joint fluid analysis

A synovial fluid analysis is used to help diagnose the cause of joint pain and inflammation. Inflammation is the body's response to injury or infection. It can cause pain, swelling, redness, and loss of function in the affected area. Causes of joint problems include:

- *Osteoarthritis, the most common form of arthritis. It is a chronic, progressive disease that causes joint cartilage to break down. It can be painful and lead to loss of mobility and function.*
- *Gout, a type of arthritis that causes inflammation in one or more joints, usually in the big toe*
- *Rheumatoid arthritis, a condition in which the body's immune system attacks healthy cells in your joints*
- *Joint effusion, a condition that happens when too much fluid builds up around a joint. It often affects the knee. When it affects the knee, it may be referred to as knee effusion or fluid on the knee.*
- *Infection in a joint*
- *Bleeding disorder, such as hemophilia. Hemophilia is an inherited disorder that can cause excessive bleeding. Sometimes the excess blood ends up in the synovial fluid.*

You may need this test if you have symptoms of a joint disorder. These include:

- *Joint pain*
- *Joint swelling*
- *Redness at a joint*
- *Joint that feels warm to the touch*



A

Ankle joint	مفصل مچ پا
Achilles triangle	مثلث آشیل
Achilles tendinitis	التهاب تاندون آشیل
Acromio clavicular joint	مفصل ترقوه و کتف
Active range of motion	دامنه حرکتی فعال
Ambulant	متحرک
Anconitis	التهاب مفصل آرنج
Anterior cruciate ligament injury	آسیب دیدگی رباط متقاطع قدامی زانو
Arthritis	تورم و التهاب مفاصل (ورم)

Arthrology	مفصل شناسی
Arthropynosis	ایجاد چرک در فضای مفصلی
Abarticulation Achilles	مفصل سینوریال آشیل
Acromio clavicular	اھرمی، ترقوہای
Active assistive range of motion	دامنه حرکتی فعال کمکی
Affixment	متصل سازی
Amphiarthrodial joint	مفصل نیمه متحرک
Ankylosis	بی حرکتی مفصل
Aponeurosis	مسطح شدن تاندون‌ها در اتصال به بافت‌های عضلانی
Arthralgia	درد مفاصل
Arthroplasty	ایجاد مفصل جدید
ARTHROSCLEROSIS	سفت شدن مفاصل
Arthroscopy	مفصل بینی
Articular capsule	کپسول مفصلی
Articulus	مفصل
Ball of foot	محیط پا در سطح مفصلی متاتارسوفالانژ
Cartilage	غضروف
Charcot joint	مفصل شارکو

Chondral	غضروفی
Chostochondral	دنده‌ای غضروفی
Condyl	برآمدگی نرم و دایره‌ای شکل در یک مفصل
Condylloid joint	مفصل لقمه مانند
Coxal	مربوط به مفصل ران
Degenerative joint disease	بیماری استحالیه مفصل
Arthrosis	بیماری مفصلی
Articular surface	سطح مفصلی
Ball & socket joint	مفصل گوی و حفره
Biaxial joint	مفاصل دو محوری
Cartilaginous joint	مفصل غضروفی
Cheer	التهاب مفاصل دست و انگشتان
Chondro-	مربوط به غضروف
Clippoid joint	مفاصل بیضوی
Condylar joint	مفصل کندیلی
Coxa	مفصل ران
Deep tendon reflex	رفلکس عمقی تاندون
Distal interphalangeal joint	مفصل بین انگشتی انتهایی

Facet	رویه، سطح مفصلی
Fibrosis	فیبروزی، لیفی
Fibrous joint	مفصل تازی
Fibrous tissue	بافت رشته‌ای (لیفی)
Golgi tendon organ	اندام تاندون گلزی
Hist /o, histi /o	بافت، مرتبط به بافت
Interphalangeal joint	مفاصل بین انگشتان پا
Isometric muscle contraction	غضروف هیالین یا مفصلی
Joint angle	زاویه مفصلی
Joint stiffness	سفتی مفصل
Joints	محل اتصال
Meta carpophalangeal	مفصل بین کف دست و انگشتان
Facet joint	مفصل بین مهره‌ای
Fibrous	فیبروز، لیف
Fibrous layer	لایه رشته‌ای
Gliding joint	مفصل لغزان
Hinge joint	مفصل لولایی
Inflammation of tendon	بیرون‌زدگی تاندون
Intertarsal joint	مفاصل بین استخوان‌های تارسی (تارسال)

Jerk	تکان پرش عضلانی
Joint capsule	کپسول مفصلی
Joint stress	فشار مفصلی
Ligament sprain	کشیدگی رباط
Patellar tendon bearing	تحمل روی تاندون پتلا
Pivot joint	مفصل استوانه‌ای
Posterior longitudinal ligament	لیگامنت طولی - خلفی
Prismatic joint	مفصل لغزشی
Revolute joint	مفصل لولایی
Rheumatoid arthritis	آرتریت مفصلی
Synarthroses	مفصل غیر متحرک
Synchondrosis	غضروفی
Synovial bursa	کیسه زالی سینوویال
Synovial fluid	مایع مفصلی
Synovial membrane	غشاء مفصلی
Temporo mandibular	مفصل گیجگاهی، فکی
Popliteal space	فضای پشت مفصل زانو
Posterior cruciate ligament (PCL)	لیگامنت صلیبی شکل خلفی
Psoriatic arthritis	روماتیسم مفصلی موجود در مفصل بند انگشتان

Rheum arthritis	روماتیسم مفصلی
Saddle joint	مفصل زینی
Synarthrosis	چسبندگی مفصلی
Synov / i	مایع سینوویال
Synovial cavity	حفره سینوویال
Synovial joint	مفاصل متحرک
Teitze's disease	التهاب غضروف دنده‌ای
Tendinitis	التهاب تاندون
White fibro cartilage	غضروف تار سفید

مفصل شناسی Joint knowledge

+ مفاصل برحسب دامنه آزادی حرکت:

Fibrous Joints	I. مفاصل لیفی (فیبروزی): بدون حرکت
Cartilaginous Joints	II. مفاصل غضروفی: کم حرکت (غیر متحرک)
Synovial Joints	III. مفاصل سنوویال: دامنه حرکت زیاد (متحرک)

+ مفاصل بر حسب نوع حرکت:

Uniaxial Joints	مفاصل تک محوره
Biaxial Joints	مفاصل دو محوره
Triaxial Joints	مفاصل سه محوره

* نکته: سه محوره (حول سه محور حرکتی سهمی، عرضی و افقی)

Traxial: Sagittal, vertical, frontal [Axis]

Non axial Joints مفاصل بدون محور

مفاصل متحرک از نظر چگونگی شکل سطح مفصل:

Ball & socket joint	I. مفصل کروی
Condylloid joint	II. مفصل لقمه‌ای (کندیلی)
Saddle joint	III. مفصل زینی
Hinge joint	IV. مفصل قرقره‌ای (لولایی)
Pivot joint	V. مفصل استوانه‌ای
Gliding joint	VI. مفصل مسطح (صاف)
Ellipsoid joint	VII. مفصل بیضی

تقسیم بندی مفاصل بدن دامنه آزادی حرکت:

Fibrous joints مفاصل بیضی یا فیبروزی

Gomphoses II. مفاصل Syndesmoses I. مفاصل

Cartilaginous - مفاصل غضروفی

- مفاصل متحرک سینوویال از نظر ساختمانی

I. رویه مفصلی

II. کپسول مفصلی

III. پرده سینوویال

IV. رباط‌های مفصلی

انواع مفصل بدن از نظر محدوده حرکتی:

I. مفصل غیرقابل حرکت Synar throsis

مفصل بین استخوان‌های جمجمه

II. مفصل با حرکت پذیری کم Amphiarthrosis

مفصل بین نازک نی و درشت نی

مفصل بین مهره‌های ستون فقرات

III. مفصل با حرکت‌پذیری زیاد Diarthrosis

مفصل بین انتهای استخوان‌های بلند مانند مفصل زانو و آرنج و لگن و مچ پا و ...

* در این مفصل‌بندی دو سطح استخوانی توسط غضروف پوشیده شده است.

یک لایه سیال سینوویال (Synovial fluid) بین دو سطح قرار دارد ماتریس غضروف را رای آب است. درباره فشاری به بیرون فشرده می‌شود. Squeezed
out و یک لایه روغن‌کاری روی سطح مشترک ایجاد می‌کند. این لایه نازک اصطکاک را کم کرده و تنش فشاری را به طور یکنواخت توزیع می‌کند.

تقسیم‌بندی مفاصل بدن از نظر مکانیکی:

- مفصل تک محوری Pivot joint ← اجازه چرخش حول یک محور

+ مفصلی که در مهره اول گردنی Cervical ← چرخش سر به راست و چپ

+ مفصل بین دو استخوان زندزیرین و زندزیرین در ساعد (قابلیت حرکت Supination , Pronation)

- مفصل تک لولایی Hinge joint

اجازه Flexion و Extension در صفحه Sagittal مفصل زانو و آرنج

- مفصل کروی Ball & socket joint

اجازه چرخش حول چند محور مثل شانه و لگن

مفاصل ترقوه - کتف

مفصل ترقوه و جناغ Sternal Clavicular Joint

مفصل ترقوه کتف Acromio Clavicular Joint

نوع حرکت: سه محوره (حول ۳ محور حرکتی سهمی، عرضی و افقی)

Traxial: Sagittal, vertical, frontal [Axis]

مفاصل مچ و انگشتان دست

Radi Carpal Joint	مفاصل ساعد و مچ دست
Inter Carpal joint	مفاصل مچ دست
Corpometa Carpal Joint	مفاصل استخوان‌های کف دست با استخوان‌های مچ
Meta Carpo Phalangeal Joint	مفاصل استخوان کف دست: سربالایی بند اول انگشتان

مفاصل مچ، کف و انگشتان پا

مفصل وصل کننده استخوان مچ پا به استخوان پاشنه قاپ و ناوی.

Inter Tarsal Joint

مفاصل میانی استخوان‌های مچ پا وصل کننده پاشنه تاسی و قاپ و ناوی.

Medi Tarsal Joint

متصل کننده مفاصل میانی استخوان‌های مچ، کف و مفاصل استخوان‌های کف پا با یکدیگر.

Tarsomela Tarsal Joint

متصل کننده استخوان‌های کف پا با بند اول انگشتان.

Meta Tarso Phalangeal Joint

متصل کننده بند انگشتان پا.

Inter Phalangeal Joint

ساختار لیگامنتی زانو

Patellar ligament	لیگامنت کشککی
Tibial collateral ligament	لیگامنت درشت نی جانبی (داخلی)
Fibular collateral ligament	لیگامنت نازک نی جانبی (خارجی)
Oblique popliteal ligament	لیگامنت مایل رکیبی

Cruciate ligament	لیگامنت متقاطع
Anterior cruciate ligament	لیگامنت متقاطع قدامی
Posterior cruciate ligament	لیگامنت متقاطع خلفی
Transverse ligament	لیگامنت عرضی
The iliotibial tract	نوار ایلئوتیبیال

UNIT3

Muscular system

The main characteristic of muscle tissue is its ability to contract. When stimulated, muscles shorten to produce movement of the skeleton, vessel walls or internal organs. Muscles may also remain partially contracted to maintain posture. In addition, the heat generated by muscle contraction is the main source of body heat.

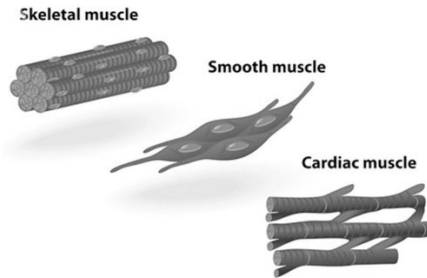
The muscular system is generally regarded as consisting of one type of muscle found in the body-skeletal muscle.

However, there are two other types of muscle tissue found in the body smooth muscle and cardiac muscle that are important components of other systems.

Types of muscles

These three types of muscle can be characterized by whether they are controlled voluntarily, whether they appear striated or smooth, and whether they are associated with the body wall or with organs and blood vessels .

- Skeletal muscle forms the majority of the muscle tissue in the body. It consists of parallel bundles of long multinucleated fibers with transvers stripes, is capable of powerful contractions, and is This muscle is used to move bones and other structures, and provides support and gives form to the body . individual skeletal muscles are often named on the basis of shape, attachments, function, position or fiber orientation.
- Skeletal muscle is attached to bones and is responsible for voluntary movement. It also maintains posture and generates a large proportion of body heat. All of these voluntary muscles together make up the muscular system.
- Cardiac muscle is striated muscle found only in the walls of the heart(myocardium) and in some of the large vessels close to where they join in the heart . It consists of a branching network of individual cells linked electrically and mechanically to work as a unit . its contractions are less powerful than those of skeletal muscle and it is resistant to fatigue. Cardiac muscle is innervated by visceral motor nerves.
- Cardiac muscle makes up the myocardium of the heart wall. It functions involuntarily and is responsible for the heart's pumping action.
- Smooth muscle consists of elongated or spindle-shaped fibers capable of slow and sustained contractions . it is found in the wall of blood vessels, associated with hair follicles in the skin, located in the eye ball, and found in the walls of various structures associated with the gastrointestinal, respiratory, genitourinary, and urogenital systems. Smooth muscle is innervated by visceral motor nerves.
- Smooth (visceral) muscle makes up the walls of the hollow organs, such as the stomach, intestine, and uterus, and the walls of ducts, such as the blood vessels and bronchioles.



Skeletal muscle

The discussion that follows describes the characteristics of skeletal muscle, which has been the most extensively studied of the three types.

Muscle structure

Muscles are composed of individual cells, often referred to as fibers because they are so long and thread-like. These cells are held together in fascicles (bundles) by connective tissue. Covering each muscle is a sheath of connective tissue or fascia. These supporting tissues merge to form the tendons that attach the muscle to bone.

Muscle action

Skeletal muscles are stimulated to contract by motor neurons of the nervous system. At the neuromuscular junction (NMJ), the synapse (junction) where a branch of a neuron meets a muscle cell.

Two special protein filaments in muscle cells, actin and myosin, interact to produce the contraction. ATP (the cell's energy compound) and calcium are needed for this response.

Most skeletal muscles contract rapidly to produce movement and then relax rapidly unless stimulation continues. Sometimes muscles are kept in a steady partially contracted state to maintain posture. For example this state of firmness is called tonus or muscle tone.

Naming of muscles

A muscle can be named by its location, by the direction of its fibers, or by its size, shape or number of attachment points (heads).

Back musculature

- The superficial group consists of muscles related to and involved in movements of the upper limb
- The intermediate group consists of muscles attached to the ribs and may serve as a respiratory function.

Superficial group of back muscles

Trapezius each trapezius muscle is flat and triangular, with the base of the triangle situated along the vertebral column and the apex pointing toward the tip of the shoulder the muscles on both sides together form a trapezoid.

Latissimus dorsi is a large, flat, triangular muscle that begins in the lower portions of the back and tapers as it ascends to a narrow tendon that attaches to the humerus anteriorly .

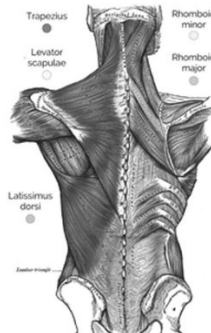
As a result, movements associated with this muscle include extension, adduction and medial rotation of the upper limb .

Latissimus dorsi can also depress the shoulder, preventing its upward movement.

Levator scapulae is a slender muscle that descends from the transverse processes of the upper cervical vertebrae to the upper portion of the scapula on its medial border at the superior angle . it elevates the scapula and assist other muscle in rotating the lateral aspect of the scapula inferiorly.

Rhomboid minor is superior to rhomboid major, and is a small cylindrical muscle that arises from the ligamentum nuchae of the neck and spinous processes of vertebrae C7 and T1 and attaches to the medial scapular border opposite the root of the spine of the scapula .

Rhomboid major originates from the spinous processes from the upper thoracic vertebrae and attaches to the medial scapular border inferior to rhomboid minor.

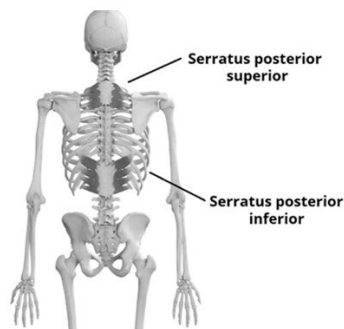


Intermediate group of back muscles

The muscles in the intermediate group of back muscles consists of two thin muscular sheets in the superior and inferior regions of the back, immediately deep to the muscles in the superficial group . Fibers from these two serratus posterior muscles(serratus posterior superior and serratus posterior inferior) pass obliquely outward from the vertebral column to attach to the ribs .

This positioning suggests a respiratory function, and at times these muscles have been referred to as the respiratory group.

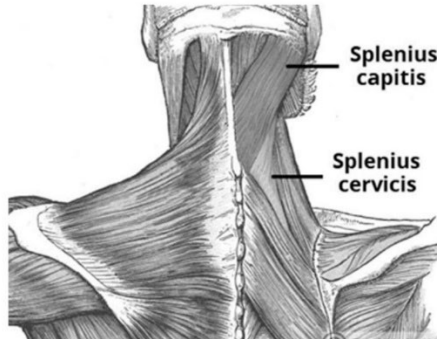
Serratus posterior superior is deep to the rhomboid muscles, whereas serratus posterior inferior is deep to latissimus dorsi . these two muscles therefore elevate and depress the ribs.



Deep group of back muscles

The deep or intrinsic muscles of the back extend from the pelvis to the skull and are innervated by segmental branches of the posterior rami of spinal nerves. They include;

- The extensor and rotators of the head and neck – the splenius capitis and cervicis (spinotransversales muscles)
- The extensors and rotators of the vertebral column – the erector spinae and transversospinales
- The short segmental muscles – the interspinales and intertransversale.



Spinotransversales muscles

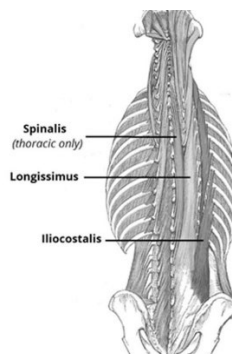
- Splenius capitis is a broad muscle attached to the occipital bone and mastoid process of the temporal bone
- Splenius cervicis is a narrow muscle attached to the transverse processes of the upper cervical vertebrae

Together the spinotransversales muscles draw the head backward, extending to the neck
Individually each muscle rotates the head to one side the same side as the contracting muscle.

Erector spinae muscles

The erector spinae is the largest group of intrinsic back muscles. The muscles lie posteriolaterally to the vertebral column between the spinous processes medially and the angles of ribs laterally

- The outer or most laterally placed column of the erector spinae muscles is the iliocostalis.
- The middle or intermediate column is the longissimus.
- The most medial muscle column is the spinalis.

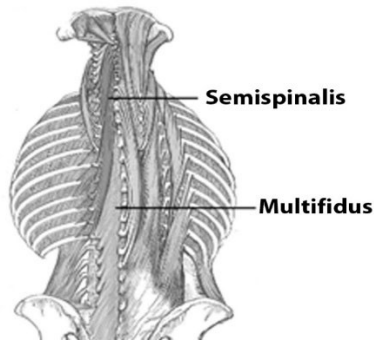


Transversospinales muscles

The transversospinales muscles run obliquely upward and medially from transverse processes to spinous processes .

They are deep to the erector spinae and consist of three major subgroups ;

- The semispinalis muscles are the most superficial collection of muscle fibers in the transversospinales group.
- Deep to semispinalis is the second group of muscles the multifidus.
- The small rotators muscles are the deepest of the transversospinales group.



Suboccipital muscles

A small group of deep muscles in the upper cervical region at the base of the occipital bone move the head .

- Rectus capitis posterior major
- Rectus capitis posterior minor
- Obliquus capitis inferior
- Obliquus capitis superior

Contraction of the suboccipital muscles extends the head at the atlanto – axial joint.



Diaphragm

The musculotendinous diaphragm seals the inferior thoracic aperture. Generally muscle fibers of the diaphragm arise radially from the margins of the inferior thoracic aperture and converge into a large central tendon. because of the oblique angle of the inferior thoracic aperture the posterior attachment of the diaphragm is inferior to the anterior attachment.

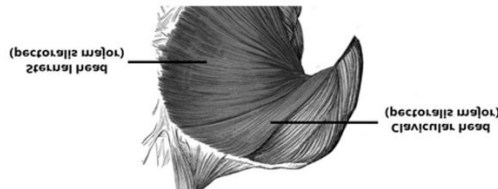


Muscles of the pectoral region

Each pectoral region contains the pectoralis major, pectoralis minor, and subclavius muscles . All originate from the anterior thoracic wall and insert into bones of the upper limb.

Pectoralis major the pectoralis major muscle is the largest and most superficial of the pectoral region muscles . it directly underlies the breast and is separated from it by deep fascia and the loose connective tissue of the retromammary space .

Pectoralis major adducts, flexes and medially rotates the arm.



Subclavius and pectoralis minor

The subclavius and pectoralis minor muscles underlie pectoralis major;

- Subclavius is small and passes laterally from the anterior and medial part of rib1 to the inferior surface of the clavicle .
- Pectoralis minor passes from the anterior surfaces of rib3 to rib5 coracoid process of the scapula. Both subclavius and pectoralis minor pull the tip of the shoulder inferiorly

Intercostal muscles

The intercostals muscles are three flat muscles found in each intercostal space that pass between adjacent ribs individual muscles in this group are named according to their position;

- The external intercostal muscles are the most superficial.
- The internal intercostal muscles are sandwiched between the external and innermost muscles.

Innermost intercostal muscles

Are the least distinct of the intercostal muscles and the fibers have the same orientation as the internal intercostals . these muscles are most evident in the lateral thoracic wall.

Subcostales are in the same plane as the innermost intercostals, span multiple ribs and are more numerous in lower region of the posterior thoracic wall .

Transversus thoracis muscles are found on the deep surface of the anterior thoracic wall and in the same plane as the innermost intercostals

The transversus thoracis muscles lie deep to the internal thoracic vessels and secure these vessels to the wall.

Anterolateral muscles

There are five muscles in the anterolateral group of abdominal wall muscles;

- The flat muscles whose fibers begin posterolaterally, pass anteriorly, and are replaced by an aponeurosis as the muscle continues towards the midline the external oblique, internal oblique and transversus abdominis muscles.
- Two vertical muscles near the midline, which are enclosed within a tendinous sheath formed by the aponeuroses of the flat muscles the rectus abdominis and pyramidalis muscles.

In addition, contraction of these five muscles assists in both quiet and forced expiration by pushing the viscera upward (which helps push the relaxed diaphragm further into the thoracic cavity) and in the coughing and vomiting .

All these muscles are also involved in any action that increases intra-abdominal pressure.

Flat muscles

- External oblique the most superficial of the three flat muscles in the anterolateral group of abdominal wall muscles is the external oblique, which is immediately deep to the superficial fascia .

Its laterally placed muscle fibers pass in an inferomedial direction

- Internal oblique deep to the external oblique muscle is the internal oblique muscle, which is the second of three flat muscles.

This muscle is smaller and thinner than the external oblique, with most of its muscle fibers passing in a superomedial direction.

- Transversus abdominis deep to the internal oblique muscle is the transversus abdominis muscle, so named because of the direction of most of its muscle fibers.

Vertical muscles

- Rectus abdominis the rectus abdominis is a long flat muscle and extends the length of the anterior abdominal wall. Along its course it is intersected by three or four transverse fibrous bands or tendinous intersections these are easily visible on individuals with a well-developed rectus abdominis
- Pyramidalis the second vertical muscle is the pyramidalis . this small, triangular muscle, which may be absent, is anterior to the rectus abdominis, has its base on the pubis.

Posterior abdominal wall muscles

Muscles forming the medial, lateral, inferior and superior boundaries of the posterior abdominal region fill in the bony framework of the posterior abdominal wall .

Medially are the psoas major and minor muscles, laterally is the quadratus lumborum muscle, inferiorly is the iliacus muscle and superiorly is the diaphragm

- Psoas major and minor medially, the psoas major muscles cover the anterolateral surface of the bodies of the lumbar vertebrae, filling in the space between the vertebral bodies and the transverse processes .

Associated with the psoas major muscle is the psoas minor muscle, which is sometimes absent. Lying on the surface of the psoas major when present.

The psoas minor is a weak flexor of the lumbar vertebral column.

- Quadratus lumborum laterally, the quadratus lumborum muscles fill the space between ribs 12 and the iliac crest on both sides of the vertebral column.

They are overlapped medially by the psoas major muscles along their lateral borders are the transversus abdominis muscles .

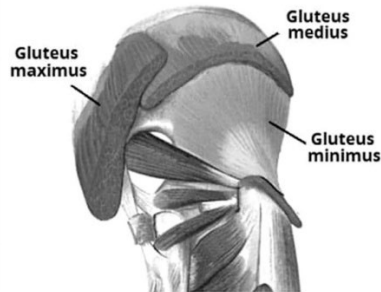
- Iliacus inferiorly an iliacus muscles fills the iliac fossa on each side. Like the psoas major muscle, the iliacus flexes the thigh at the hip joint when the trunk is stabilized and flexes the trunk against gravity when the body is supine .
- Diaphragm superiorly, the diaphragm forms the boundary of the posterior abdominal region . this musculotendinous sheet also separates the abdominal cavity from the thoracic cavity . Structurally, the diaphragm consists of central tendinous part into which the circumferentially arranged muscle fibers attach.

Muscles of the lowerlimb

Muscles from the gluteal region

Muscles of gluteal region compose mainly two groups;

- A deep group of small muscles which are mainly lateral rotators of the femur at the hip joint and include piriformis, abductor internus, gemellus superior and inferior and quadratus femoris.
- A more superficial group of larger muscles which mainly abduct and extend the hip and include the gluteus minimus, gluteus medius and gluteus maximus;



Deep group

- Piriformis the piriformis muscle is the most superior of the deep group of muscles and is a muscle of the pelvic wall and of the gluteal region.
- Obturator internus the obturator muscle, like the piriformis muscle is a muscle of the pelvic wall and of the gluteal region.(it is flat fan-shaped muscle)
- The anterolateral wall of the pelvic cavity above the pelvic floor
- The lateral wall of the ischio-anal fossa
- Gemellus superior and inferior are a pair of triangular muscles associated with the upper and lower margins of the obturator internus tendon;
- The base of the gemellus superior originates from the gluteal surface of the ischial spine
- The base of gemellus inferior originates from the upper gluteal and pelvic surface of the ischial tuberosity .
- Quadratus femoris is the most inferior of the deep group of muscles in the gluteal region . It is a flat rectangular muscle below the obturator internus muscle and its associated gemellus muscles.

Superficial group

- Gluteus minimus and medius are two muscles of the more superficial group in the gluteal region(gluteus minimus is a fan-shaped muscle)
Gluteus medius overlies gluteus minimus and is also fan-shaped.
- Gluteus maximus is the largest muscle in the gluteal region and overlies most of the other gluteal muscles (gluteus maximus is quadrangular in shape)

- Tensor fascia latae muscle is the most anterior of the superficial groups of muscles in the gluteal region and overlies the gluteus minimus and the anterior part of the gluteus medius.

Anterior compartment

Muscles in the anterior compartment act on the hip and knee joints;

- Psoas major and iliacus act on the hip joint
 - Sartorius and rectus femoris act on both the hip and knee joints
 - The vastus muscles act on the knee joint.
- Iliopsoas-psoas major and iliacus originate on the posterior abdominal wall and descend into the upper part of the anterior compartment of thigh through the lateral half of the gap between the inguinal ligament and the pelvic bone
Although the iliacus and psoas major originate as separate muscles in the abdomen, both insert by a common tendon onto the lesser trochanter of femur and together are usually referred to as the iliopsoas muscle.
 - Quadriceps femoris muscle consists of three vastus muscles (vastus medialis, vastus intermedius and vastus lateralis). The quadriceps femoris muscle mainly extends the leg at the knee joint, but the rectus femoris component also assists flexion of the thigh at the hip joint.
Because the vastus muscles insert into the margins of the patella as well as into the quadriceps femoris tendon, they stabilize the position of the patella during knee joint movement.
 - Vastus muscles originate from the femur whereas the rectus femoris muscle originates from the pelvic bone .
 - Vastus medialis originates from a continuous line of attachment on the femur. The fibers converge onto the medial aspect of the quadriceps femoris tendon and the medial border of the patella.
 - Vastus intermedius originates mainly from the upper two-thirds of the anterior and lateral surfaces of the femur and the adjacent intermuscular septum. It merges into the deep aspect of the quadriceps femoris tendon and also attaches to the lateral margin of the patella .
 - Vastus lateralis is the largest of the vastus muscles . it originates from a continuous line of attachment, which begins anterolaterally from the superior part of the intertrochanteric line of the femur and then circles laterally around the bone to attach to the lateral margins of the gluteal tuberosity and continues down the upper part of the lateral lip of the linea aspera.
Muscle fibers converge mainly onto the quadriceps femoris tendon and the lateral margin of the patella .
 - Rectus femoris unlike the vastus muscles, which cross only the knee joint, the rectus femoris muscle crosses both the hip and the knee joints.
 - Sartorius is the most superficial muscle in the anterior compartment of thigh and is a long strap-like muscle that descends obliquely through the thigh from the anterior superior iliac spine to the medial surface of the proximal shaft of the tibia.

Medial compartment

There are six muscles in the medial compartment of the thigh ; gracilis , pectineus, adductor longus, adductor brevis, adductor magnus and obturator externus.

Collectively, all these muscles except the obturator externus mainly adduct the thigh at the hip joint; the adductor longus and magnus may also medially rotate the thigh . obturator externus is a lateral rotator of the thigh at the hip joint .

- Gracilis is the most superficial of the muscles in the medial compartment of thigh and descends almost vertically down the medial side of the thigh.
- Pectineus is a flat quadrangular muscle. It is attached above the pectineal line of the pelvic bone and adjacent bone and descends laterally to attach to an oblique line extending from the base of the lesser trochanter to the linea aspera on the posterior surface of the proximal femur.
- Adductor longus is a flat fan-shaped muscle that originates from a small rough triangular area on the external surface of the body of the pubis just inferior to the pubic crest and lateral to the pubic symphysis.

- Adductor brevis lies posterior to the pectineus and adductor longus. It is a triangular muscle attach at its apex to the body of the pubis and the inferior pubic . the adductor brevis adducts the thigh at the hip joint and is innervated by the obturator nerve .
- Adductor magnus is the largest and deepest of the muscles in the medial compartment of thigh. The muscle forms the distal posterior wall of the adductor canal. Like the adductor longus and brevis muscles, the adductor magnus is a triangular or fan-shaped muscle anchored by its apex to the pelvis and attached by its expanded base to the femur.
- Obturator externus is a flat fan-shaped muscle. Its expansive body is attached to the external aspect of the obturator membrane and adjacent bone.

Obturator externus externally rotates the thigh at the hip joint and is innervated by the posterior branch of the obturator nerve.

Posterior compartment

There are three long muscles in the posterior compartment of thigh; biceps femoris, semitendinosus and semimembranosus and they are collectively known as the hamstring. All except the short head of biceps femoris cross both the hip and knee joints. As a group, the hamstring flex the leg at the knee joint and extend the thigh at the hip joint. They are also rotators at both joints.

- Biceps femoris is the lateral in the posterior compartment of thigh and has two heads
- The long head originates with the semitendinosus muscle from the inferomedial part of the upper area of the ischial tuberosity
- The short head arises from the lateral lip of the linea aspera on the shaft of the femur
- Semitendinosus is medial to the biceps femoris muscle in the posterior compartment of thigh. It originates with the long head of the biceps femoris muscle from the inferomedial part of the upper area of the ischial tuberosity.
The semitendinosus flexes the leg at the knee joint and extends the thigh at the hip joint. Working with the semimembranosus, it also medially rotates the thigh at the hip joint and medially rotates the leg at the knee joint.
- Semimembranosus lies deep to the semitendinosus muscle in the posterior compartment of thigh. It is attached above to the superolateral impression on the ischial tuberosity and below mainly to the groove and adjacent bone to the medial and posterior surfaces of the medial tibial condyle. The semimembranosus flexes the leg at the knee joint and extends the thigh at the hip joint. Working with the semitendinosus muscle, it medially rotates the thigh at the hip joint and the leg at the knee joint.

Deep group

There are four muscles in the deep posterior compartment of leg. The popliteus, flexor hallucis longus, flexor digitorum longus, and tibialis posterior. The popliteus muscle acts on the knee, whereas the other three muscles act mainly on the foot.

MEDICAL DEVICE

Electro myography (EMG)

Electromyography (EMG) is a diagnostic procedure to assess the health of muscles and the nerve cells that control them (motor neurons). EMG results can reveal nerve dysfunction, muscle dysfunction or problems with nerve-to-muscle signal transmission.

Motor neurons transmit electrical signals that cause muscles to contract. An EMG uses tiny devices called electrodes to translate these signals into graphs, sounds or numerical values that are then interpreted by a specialist.

During a needle EMG, a needle electrode inserted directly into a muscle records the electrical activity in that muscle.

A nerve conduction study, another part of an EMG, uses electrode stickers applied to the skin (surface electrodes) to measure the speed and strength of signals traveling between two or more points.

Your doctor may order an EMG if you have signs or symptoms that may indicate a nerve or muscle disorder. Such symptoms may include:

- Tingling
- Numbness
- Muscle weakness
- Muscle pain or cramping
- Certain types of limb pain

EMG results are often necessary to help diagnose or rule out a number of conditions such as:

- Muscle disorders, such as muscular dystrophy or polymyositis
- Diseases affecting the connection between the nerve and the muscle, such as myasthenia gravis
- Disorders of nerves outside the spinal cord (peripheral nerves), such as carpal tunnel syndrome or peripheral neuropathies
- Disorders that affect the motor neurons in the brain or spinal cord, such as amyotrophic lateral sclerosis or polio
- Disorders that affect the nerve root, such as a herniated disk in the spine
- EMG is a low-risk procedure, and complications are rare. There's a small risk of bleeding, infection and nerve injury where a needle electrode is inserted.
- When muscles along the chest wall are examined with a needle electrode, there's a very small risk that it could cause air to leak into the area between the lungs and chest wall, causing a lung to collapse (pneumothorax).
- When you schedule your EMG, ask if you need to stop taking any prescription or over-the-counter medications before the exam. If you are taking a medication called Mestinon (pyridostigmine), you should specifically ask if this medication should be discontinued for the examination.



A

Abdomen/ o-	شکمی، مربوط به ناحیه شکمی
Abdominal oblique muscle	عضله مایل شکمی
Abdominal obliques	مایل شکمی
Abductor digiti minimi	دور کننده انگشت کوچک پا
Abductor muscles	عضلات دور کننده
Abductor pollicis brevis	عضله دور کننده کوتاه شست دست
Acampsia	سختی عضلات
Adductor brevis muscle	عضله نزدیک کننده کوتاه
Adductor longus muscle	عضله نزدیک کننده طویل
Adductor brevis	نزدیک کننده کوتاه
Adductor digiti minimi muscle	عضله دور کننده انگشت کوچک
Adductor group muscles	گروه عضلات نزدیک کننده
Adductor longus	نزدیک کننده بلند
Adductor muscle	عضلات نزدیک کننده

Abdomen	حفره شکم و احشاء
Abdominal	مربوط به ناحیه شکمی
Abdominal muscle	عضلات شکمی
Abdominals	عضلات ناحیه شکم
Abductor hallucis	دور کننده شست پا
Adductor muscles	عضلات نزدیک کننده
Abductor pollicis longus	عضله دور کننده دراز شست
Accessory muscles of respiration	عضلات فرعی تنفس
Adductor magnum muscle	عضله نزدیک کننده بزرگ
Adductor brevis, magnus, longus	نزدیک کننده کوتاه، بزرگ، طویل
Adductor hallucis	نزدیک کننده شست پا
Adductor magnus	نزدیک کننده بزرگ
Adductor muscle strain	کشیدگی عضله نزدیک کننده
Adductor pollicis	نزدیک کننده انگشت شست دست
Adductor guinti	دور کننده انگشت کوچک
Amyostasia	لرزش عضلات
Antagonist	ماهیچه مخالف
Aponeuroses	غلاف ماهیچه

Armflexor	ناکننده بازو
Atony	فقدان قدرت عضلانی
Adductor policis brevis	نزدیک کننده کوتاه شست دست
Amyoesthesia	بی حسی عضلانی
Anconeus muscle	عضله سه گوشه آرنجی
Aponeurosis	مسطح شدن تاندن ها در اتصال به بافت های عضلانی
Ataxia	ناهماهنگی و بی نظمی در حرکات عضلات
Atonia	از دست دادن قدرت انقباضی عضلات

B

Back extensor/ muscle	عضلات باز کننده پشت
Belly	بطن عضله
Biceps femoris	دوسر رانی
Biceps muscle	عضله دو سر
Big- muscle	عضلات عمده
Brachialis muscle	عضله بازویی قدامی
Back muscles	عضلات پشت
Biarticular muscles	عضلات دو مفصلی
Biceps femoris muscle	عضلات دو سر رانی
Brachio- , brachial	مربوط به ناحیه بازو

Brachio radialis muscle	عضله بازویی زند زبرین
Brachio radialis	عضله بدون گرداننده طویل
Buttock muscle	عضلات کفل
Brachium	بازو
Buccinators	عضله شیپوری
Buttocks	کپل، سرین‌ها، کفل‌ها

C

Calf muscle	عضله پشت ساق پا
Ciliary muscle	عضله شرمگاهی

Contracting muscle	عضلات منقبض شده
Contractive	کوتاهی عضله
Cardic muscle	عضله قلبی
Cremial	مربوط به ساق پا
Contraction	انقباض، افزایش تنش عضله

D

Deltoid muscle	عضله دالی
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Distaxia	اختلال در هماهنگی عضلات
Dystonia	اختلال تونوسی ماهیچه
Delayed onset of muscle soreness	درد و آماس ماهیچه با تاخیر
Dominant muscles	عضلات اصلی

E

Electro myo graphy (EMG)	نمودار عملکردی الکتریکی عضلات
Extensibility	قابلیت کنش پذیری عضلات
Electric muscle stimulation	تحریک الکتریکی عضله
EMG (Electro myo graphy)	الکترومایوگرافی
Extensor carpi radialis	زند زیرین خلفی باز کننده مچ دست
Extensor carpi radialis brevis	عضله بازکننده مچی زند زیرین کوتاه
Extensor carpi radialis longus and brevis	باز باز کننده‌های مچ دست زند زیرین طویل و کوتاه
Extensor carpi ulnaris	زند زیرین خلفی
Extensor digiti guinti	باز کننده زند زیرین مچ
Extensor digitorum brevis	باز کننده کوتاه انگشتان
Extensor digitorum longus	باز کننده بلند انگشتان
Extensor hallucis	باز کننده طویل پشت

Extensor hallucis longus	باز کننده طویل پشت پا
Extensor carpi radialis longus	باز کننده خارجی دراز مچ دست
Extensor carpi ulnaris muscle	باز کننده مچی زند زیرین
Extensor digiti minimi	باز کننده انگشت کوچک دست
Extensor digitorum	باز کننده انگشتان دست
Extensor digitorum communis	باز کننده مشترک انگشتان
Extensor digitorum muscle	باز کننده انگشتان
Extensor hallucis brevis	باز کننده کوتاه پشت پا
Extensor indicis	عضله باز کننده انگشت سیاه
Extensor muscle	عضله باز کننده
Extensor pollicis longus	عضله باز کننده دراز شست دست
External oblique abdomi	عضله مایل بزرگ در جلو و کنار شکم
Extra ocular muscle	عضلات خارجی چشمی
Extensor pollicis brevis	باز کننده کوتاه پشت دست
External intercostals	عضلات بین دنده‌ای خارجی
External oblique abdominal muscle	عضله مایل خارجی شکمی

F

Fiber	تار عضله
Fixator muscle	ماهیچه تثبیت کننده

Flexor carpi radialis muscle	عضله تاکننده زند زیرین
Flexor carpi radialis and ulnaris	تاکننده داخلی و خارجی مچ دست
Flexor digiti minimi muscle	عضله خم کننده انگشت کوچک
Flexor digitorum brevis	خم کننده کوتاه انگشت کوچک
Fasciculus	دسته تار عضلانی
Fibromyalgia	بیماری شامل درد در عضلات
Fleshy protion	بخش شکمی عضله
Flexor carpi ulnaris muscle	عضله تاکننده زند زیرین
Flexor digiti minimi brevis	تاکننده کوتاه انگشت کوچک
Flexor digitorum	تاکننده انگشتان دست
Flexor digitorum longus muscle	عضله تاکننده طویل انگشتان پا
Flexor digitorum muscle	عضله خم کننده انگشتان دست
Flexor digitorum sublimes	تاکننده زند زیرین مچ
Flexor hallucis brevis muscle	خم کننده کوتاه پشت پا
Flexor pollicis brevis muscle	عضله خم کننده کوتاه شست دست
Flexor pollicis profundus muscle	عضله تاکننده عمقی شست دست
Flexor carpi ulnaris	تاکننده زند زیرین قدامی
Flexor digitorum profundus	تاکننده عمقی انگشتان دست
Flexor digitorum superficialis muscle	عضله تاکننده سطحی انگشتان دست

Flexor hallucis longus muscle	عضله تاکننده طویل شست پا
Flexor pollicis longus muscle	عضله تاکننده طویل شست دست
Flexor carpi radialis	زند زیرین قدامی (تاکننده)
Fusiform muscle	ماهیچه دوکی

G

Gastrocnemius and soleus	عضله پشت سرران و ساق
Gemellus superior muscle	عضله دوقلو فوقانی
Gastrocnemius – soleus	عضله دوقلو، نعلی
Gluteus maximus muscle	عضله سرینی بزرگ
Gluteus medius muscle	عضله سرینی میانی
Guiding muscles	عضله کمکی مجاور
Gluteus minimus muscle	عضله سرین کوچک

H

Hip abductor	عضلات دورکننده لگن
Hip extensor	عضلات بازکننده لگن
Hip flexor	عضلات تاکننده لگن
Hypotonia	کم تنش عضله
Hamstring muscle	عضلات پشت ران

Hip adductor	عضلات نزدیک کننده لگن
Hip medial rotator	عضلات چرخاننده میانی لگن
Hypotrophy	کاهش تدریجی قدرت تحلیل عضلانی

I

Iliotibial muscle	عضله خاصره‌ای ران
Insertion	انتهای عضله، داخل کردن
Inter costal muscle	عضله بین دنده‌ای
Interossei muscle	عضلات بین استخوان‌های کف پای
Intra muscular	داخل عضلانی
Involuntary muscle	عضله غیرارادی
Infraspinatus muscle	عضله تحت خاری کتف
Inspiratory muscle	عضلات دمی
Interferential	درمان عضله و بافت‌های آسیب دیده با گرم کردن
Inter osseus muscle	عضله بین استخوانی
Inter scapular muscle	عضلات بین کتفی
Isokinetic muscle contraction (mc)	انقباض هم‌جنبش ماهیچه

J

Jerk	تکان پرشی عضلانی
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K

Knee flexor muscle	عضلات ناکننده زانو
Laxity	شل شدگی عضلانی
Levator labii superioris	عضله بالا برنده لب فوقانی
Levator scapula muscle	عضله بالا برنده کتف
Littmussile lati	عضله پشتی کوچک
Longissimus capitis muscle	عضله طویل رأسی
Longissimus cervicis muscle	عضله طویل گردنی
Lambricalis muscle	عضله پا
Levator ani	عضله سه گوش مقعدی
Levator palpebra superioris	عضله بالا برنده پلک‌های فوقانی
Levatores castarum	عضله بالا برنده دنده‌ها
Local muscle endurance	استقامت موضعی ماهیچه
Long extensor muscle of great toe	عضله بازکننده طویل پشت پا

M

Middle hamstring muscle	عضله میان پشت پا
Multifidi	چندسری
Muscle action	عمل عضلانی
Manual muscle testing	ارزیابی عضله با دست

Multi joint muscles	عضلات چند مفصله
Multiar ticulate	عضله چند مفصلی
Muscle atrophy	تحلیل عضلانی
Muscle balance	تعادل عضلانی
Muscle biopsy	برداشت بافت زنده ماهیچه
Muscle buld	توده عضلانی
Muscle bundle	دسته عضلانی
Muscle contraction	انقباض عضلانی
Muscle cramp	اسپاسم عضلانی
Muscle endurance	استقامت عضلانی
Muscle fatigue	خستگی عضلانی
Muscle function test	تست عملکرد عضلانی
Muscle impulse	تکانه عضلانی
Muscle hypertrophy	بزرگ شدن ماهیچه
Muscle jerk	تکانه عضلانی
Muscle linkage	اتصال عضلانی
Muscle most involved	عضله عمل کننده اصلی
Muscle pump	تلمبه ماهیچه

Muscle rupture	پارگی عضله
Muscle spindle apparatus	دستگاه درکی ماهیچه
Muscle belly	عضله زیر شکمی
Muscle boudness	محدودیت عضلانی
Muscle bulk	عضله پر حجم
Muscle cell	سلول عضلانی
Muscle contusion	کوفتگی عضلانی
Muscle cramps	گرفتگی های عضلانی
Muscle exhaustion	درماندگی ماهیچه ای
Muscle fiber	تار ماهیچه
Muscle group	گروه عضلانی
Muscle growth	رشد عضلانی
Muscle hernia	فتق عضلانی
Muscle imbalance	عدم تعادل عضلانی
Muscle length	طول عضله
Muscle mass	توده عضلانی
Muscle power	توان عضلانی
Muscle pull	کشیدگی عضلانی
Muscle relaxant	شل کننده عضله

Muscle scarring	عضله صدمه دیده
Muscle soreness	درد و آماس ماهیچه
Muscle tear	پارگی عضله
Muscle tissue	بافت عضله
Muscle tremor	رعشه عضله
Muscle twitch	تکان تند و ناگهانی ماهیچه
Muscular skeletal function	کارکرد عصبی عضلانی
Muscular attachment	اتصال عضلانی
Muscular coordination	تحلیل ماهیچه
Muscular memory	حافظه عضلانی
Musculature	ساختمان عضلانی
Myalgic	عضله درد
Myatrophy	تحلیل ماهیچه
Myoblas	عضله‌ساز
Myofilament	رشته عضلانی
Myositis	التهاب ماهیچه‌ای
Myotactic reflex	بازتاب لمسی عضله
Muscle tension	تنش عضله
Muscle tonus	تونوس عضلانی

Muscle weakness	ضعف عضلانی
Muscle twitching	انقباض و کشش عضلانی
Muscular atrophy	کوچک شدگی ماهیچه
Muscular classification	هماهنگی عضلانی
Muscular imbalance	عدم تعادل عضلانی
Muscular stimulation	تحریک عضلانی
Myalgia	درد عضلانی
Myasthenia	ضعف عضلانی
Mya-	مربوط به عضله
Myofibril	تار ماهیچه
Myopathy	بیماری ماهیچه
Myotatic	کشش عضلانی
Musculocutaneous	عضلانی پوستی

N

Nagging muscle	عضله دردناک
Nasalis	عضله بینی
Neuro muscular	عصبی عضلانی
Neutralizer muscle	عضله خنثی کننده

O

Obliquus capitis inferior muscle	عضله مورب رأسی فوقانی
Obturator externus and internus	سوادی داخلی و خارجی
One headed muscle	عضلات یک سر
Obliquus caoitis superior muscle	عضله مورب رأسی تحتانی
Obliquus externus abdominis	عضله مایل شکمی خارجی
Obturator internus	چرخاننده داخلی

P

Palmaris brevis	عضله کف دستی کوتاه
Paresis	ضعف عضلانی، فلج نسبی
Pectoral girdle	عضله کمربند سینه‌ای
Pectoral muscle	عضلات سینه‌ای
Pectoralis minor muscle	عضله سینه‌ای کوچک
Perinal muscles	عضلات دور مقعدی
Peroneus longus muscle	عضله نازک‌نی بلند
Palmaris longus muscle	عضله طولانی کف دستی
Papillary muscle	عضله پستانی
Pectinus muscle	عضله شانه‌ای

Pectoralis major muscle	عضله سینه‌ای بزرگ
Perimysium	پیرا ماهیچه
Peroneal muscle atrophy	آتروفی عضلات پروناتال
Peroneus tertius muscle	عضله نازک‌نی طرفی
Pinnate muscle	ماهیچه پر مانند
Plantar interossei	عضله بین استخوانی کف پا
Popliteus muscle	عضله رکیبی
Prevertebral muscle	عضلات جلوی ستون مهره‌ها
Pronator quadrates muscle	مربع درون گرداننده
Proneus anterior muscle	عضله نازک‌نی قدامی
Psoas major	عضله سوئز بزرگ
Pulled muscle	پارگی جزئی عضلانی
Piriformis muscle	عضله هرمی
Plantaris longus muscle	عضله کف‌پایی بلند
Postural muscle	عضلات نگهدارنده قامت
Procerus	عضله هرمی بینی
Pronator teres muscle	عضله درون گرداننده مدور
Psoas-iliacus muscle	عضلات کمری - خاصره‌ای
Psoas minor	عضله سوئز کوچک

Pyramidalis muscle عضله هرمی

Q

Quadrates femoris muscle عضله مربع رانی

Quadrates plantae مربعی کف پایی

Quadratus lumborum مربع کمری

Quadriceps چهار سر ران

Quadrates lumborum muscle عضله مربع کمری

Quadrati pronator مربع دورن گرداننده

Quadrilateral muscles عضلات چهار گوشه

R

Rectus abdominis muscle عضله راست شکمی

Rectus capitis lateralis muscle عضله راست رأسی خارجی

Rectus capitis posterior minor muscle عضله راست کوچک رأسی خلفی

Resting length of muscle طول استراحتی ماهیچه

Rhombid minor muscle عضلات متوازی الاضلاع کوچک

Rectus capitis anterior muscle عضله راست رأسی قدامی

Rectus capitis posterior major muscle راستا بزرگ رأسی خلفی

Rectus femoris muscle عضله راست رانی

Rhombid major muscle	عضلات متوازی الاضلاع بزرگ
Rib muscle	عضله دنده‌ای
Rotator muscle	عضلات چرخنده
Rotator cuff	عضلات چرخنده شانه

S

Sartorius (tailor's muscle)	عضله خیاط
Scalenus posterior muscle	عضله نردبان خلفی
Semi spinalis cervicis muscle	عضله نیم خاری گردن
Serratus anterior muscle	عضله دندانه‌ای قدامی بزرگ
Scalenus anterior muscle	عضله نردبان قدامی
Semi tendinosus muscle	عضله نیم‌وتری
Semi membranosus muscle	عضله نیم غشایی
Serratus posterior superior muscle	عضله دندانه‌ای خلفی فوقانی
Shin muscle	عضلات ساق پا
Smooth muscle	عضله صاف
Spine	ستون فقرات
Spinalis capitis muscle	عضله شوکی رأسی
Spinalis dorsi muscle	عضله شوکی پشتی

Splenius cervicis muscle	عضله مهره‌ای گردنی
Sternocleido mastoid	عضله جناغی چنبری پستانی (دوسر)
Striate muscle	عضله مخطط
Stylohyoideus	عضله نیزه‌ای لامی
Sub occipital group	گروه عضلات پس سری
Supinator	عضله‌ی برون گرداننده کوتاه
Supra spinatus muscle	عضله فوق خاری
Skeleton muscle	ماهیچه اسکلتی
Soleus muscle	عضله نعلی
Spinal muscle	عضلات نخاعی
Spinalis cervicis muscle	عضله شوکی گردنی
Splenius capitis muscle	عضله خاری رأسی
Stemothyroid muscle	عضله جناغی - لامی
Strap shaped muscle	عضله نواری شکل
Subclavius	عضله تحت ترقوه‌ای
Subscapularis	عضله تحت کتفی
Sub occipitals muscles	عضلات زیر استخوان پس سری
Supporting muscles	عضلات حمایت کننده
Synergic muscles	عضلات همکار

T

Tenosynoritis	عضله گرد بزرگ
Teres major muscle	عضله گرد بزرگ
Teres minor muscle	عضله گرد کوچک
Tensor faciae latae	عضله کشیده پهن نیام
Tetanus	گرفتگی عضله
Thenar muscles	عضلات مربوط به کف دست
Tibialis anterior muscle	عضله ساقی قدامی
Tonic muscle	عضله تونوسی
Transverse abdominis muscle	عضله عرض شکمی
Trapez	عضله دوزنقه‌ای
Triangular muscles	عضلات سه گوشه یا مثلثی
The involuntary contraction of the muscle	انقباضات غیرارادی ماهیچه
Tibialis posterior muscle	عضله ساقی خلفی
Tonicity	کشیدگی طبیعی عضله
Transverses spinalis	عضلات شوکی عرضی
Trapezium	عضله دوزنقه‌ای کف دست

U

Uniceps	عضلات یک سر
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V

Vastus intermedius muscle	عضله پهن داخلی
Vastus lateralis muscle	عضله پهن جانبی
Vastus medialis muscle	عضله پهن میانی
Voluntary muscle	عضله ارادی
Voluntary muscular contraction	انقباض ارادی عضلانی

گروه‌های عضلانی

II. عضله بندی جانبی Appendicular musculature

عضلاتی که شانه، لگن و اندام‌ها را پایدار می‌کند و 40% سیستم عضلانی را تشکیل می‌دهند:

+ عضلات شانه و اندام بالایی (بازو، ساعد، دست)

+ عضلات مفصل لگن و اندام پایینی (ران، ساق، پا)

- بعضی از عضلات این گروه تنها در یک مفصل عمل می‌کنند (monoarticular) مانند عضله سرین بزرگ از گروه عضلات buttock که فقط در مفصل لگن عمل می‌کند.

+ بیشتر عضلات این گروه در دو یا چند مفصل عمل می‌کند. مانند:

- Hamstring
- Semi tendinous
- Biceps femoris
- Quads
- Calf

یکی از مزایای عضلات دو مفصلی جلوگیری از صدمات لیگامنت در شتاب‌گیری و کم کردن شتاب ناگهانی است.

عضلات صورت	Facial muscles
عضله پیشانی	Frontal muscle
عضله پس سری	Occipital muscle
عضله گیج‌گاهی	Temporal muscle
عضله حلقوی دور چشم	Orbicularis oculi muscle
عضله حلقوی دور دهان	Orbicularis oris muscle

عضلات فک تحتانی (عضلات جونده)		Mastication muscular
عضله ماخنه‌ای (ماستر)		Masstere muscle
عضله گیج‌گاهی		Temporralis muscle
عضلات پروانه‌ای (پتریگوئید)	Pterygoid	
داخلی	Medial pterygoid	
خارجی	Lateral pterygoid	
عضلات مهم گردن		

Sterno cleido mastoid (S.C.M)	عضله جناغی - چنبری - پستانی
Scalenus	عضلات نردبانی (اسکالن)
Splenius capitis	عضله کاپیتیس (اتصال به جمجمه)
Splenius cervicis	عضله سریوسوس (اتصال به مهره‌های گردن)
Erector spinae	راست کننده ستون مهره‌ها
Semi spinalis (capitio)	نیم خاری (کاپیتی)
Semi spinalis (cervicis)	نیم خاری (گردن)
Splenius (capitis & cervicis)	مهره‌ای (کاپیتی و گردن)
Multifidus	چند سر
Levator scapulae	بالا برنده استخوان کتف
Sterno cleido mastoid	جناغی چنبری پستانی
Scalenus (anterior, medius, posterior)	نردبانی (قدامی، میانی، خلفی)

عضلات مچ، کف دستان و انگشتان دست

Palmaris longus	عضله کف دستی طویل
Carpi radialis	زند زیرین قدامی
Carpi ulnar	زند زیرین قدامی
Digitorum superficialis	تاکننده سطحی انگشتان دست
Extensor carpi radialis longus	بازکننده مچ دست بلند (زند زیرین خلفی)

Extensor carpi radialis brevis	بازکننده مچ دست کوتاه (زند زیرین خلفی)
Extensor carpi ulnaris	بازکننده مچ دست (زند زیرین خلفی)
Extensor digitorum communis	بازکننده مشترک انگشتان دست
Flexor digitorum profundus	تاکنده عمقی انگشتان

عضلات ناحیه دست

Tenar	I. عضلات تنار
Hypo tenar	II. عضلات هیپوتنار

عضلات حرکت دهنده استخوان بازو

Deltoid	عضله دالی
Pectoralis major	عضله سینه‌ای بزرگ
Musculocutaneous	غرابی - بازویی
Latissimus dorsi	عضله پشتی بزرگ
Biceps brachii	عضله دو سر بازویی
Triceps brachii	عضله سه سر بازویی

Rotator cuff * چهار عضله چرخش دهنده دست

Supraspinatus	عضله فوق خاری
Infraspinatus	تحت خاری
Subscapularis	تحت کتفی

Teres minor	گرد کوچک
عضله حرکت دهنده آرنج و ساعد	
Brachio radialis	عضله بازوی زند زیرین
Brachialis	عضله بازویی قدامی
Pronator teres	عضله درون گرداننده مدور
Pronator quadratus	عضله مربع درون گرداننده
Supinator	عضله برون گرداننده کوتاه
Anconeus	عضله سه گوش آرنجی
Shoulder muscle	عضلات شانه
Trapezius muscular	عضله ذوزنقه‌ای
Deltoid muscle	عضله سرشانه (دلتوئید)
Deltoid anterior	عضله دالی
Pectoralis major	سینه‌ای بزرگ
Pectoralis minor	سینه‌ای کوچک
Biceps brachii	عضله دو سر بازویی
Triceps brachii	عضله سه سر بازویی
Coraco brachialis	غرابی - بازویی
Supras pintas	فوق خاری
Latissimus dorsi	شانه‌ای بزرگ (پشتی بزرگ)

Teres major	گرد بزرگ
Subscapularis	تحت کتفی
Triceps brachii longus	سه سر بازویی طویل
Infraspinatus	تحت خاوی
عضلات کمربند شانه‌ای	
Levator scapulae	بالا برنده استخوان کتف
Trapezius (I & II)	دورنقه‌ای (I و II)
Rhomboideus major	متوازی الاضلاع بزرگ
Rhomboideus minor	متوازی الاضلاع کوچک
Pectoralis minor	سینه‌ای کوچک
Pectoralis major	سینه‌ای بزرگ
Subclavius	تحت ترقوه‌ای
Serratus anterior	دنده‌ای قدامی

عضلات شکم و تنه Abdomen muscles

Rectus abdominalis muscle	عضله راست (مستقیم) شکم
Oblique abdominalis	عضله مایل شکم
External oblique muscle (externus)	I. عضله مایل خارجی (بیرونی)
Internal oblique muscle (internus)	II. عضله مایل داخلی (درونی)

Transveres abdominalis muscle	عضله عرضی شکم
Diaphragm muscle	عضله دیافراگم
Para vertebral muscle	عضله راسته ای ستون فقرات
Psoas major	سوئز بزرگ
Semi thoracis (semi spinalis)	نیم خاری
Erector spinae (sacro spinalis)	راست کننده ستون فقرات
Quadratus lumborum	مربع کمری
Multifidus	چند سر
Psoas minor	سوئز کوچک
عضلات اندام تحتانی	
- عضلات قدام و داخل ران	
Quadriceps	I. عضله چهار سر ران
Sartorius	II. عضله خیاطه دواری
	III. عضله نواری
- عضله ناحیه باسن (سرین = Sorein و gluteal)	
Gluteal major	I. عضله سرین بزرگ
Gluteal intermedius	II. عضله سرین متوسط
Gluteal minor	III. عضله سرین کوچک
- عضلات خلف ران	

Biceps femur	عضله دو سر ران
	-عضلات ساق پا
Tibialis anterior	I. قدامی (تی بیالیس آنتریور)
Gastrocemi	II. خلفی (سطحی، عمقی) ۳ سر خلف پا گاستروکنمیوس
	- عضلات کف پا (foot)
Popliteal fossa	حفزه خلفی (پشت زانو)
Rectus femoris	عضله راست قدامی (فلکسور)
Pectineus	عضله شانه‌ای
Psoas major	عضله سوئز (کمری) بزرگ
Iliacus	عضله خاصره‌ای
Sartorius	خیاطه (فلکسور)
Adductor brevis	نزدیک کننده کوتاه
Adductor longus	تاکنده طویل
Adductor magnus	نزدیک کننده بزرگ
Tensor faciae latae	کشنده پهن نیام
Gracilis	نازک رانی (عضله راست داخلی)
Gluteus maximus	سربینی بزرگ
Gluteus medius	سربینی میانی
Gluteus minimus	سربینی کوچک

Semi membranousus	نیم غشایی
Semi tendinasus	نیم وتری
Biceps femoris	دوسر رانی
Peri formis	عضله هرمی (گلاس شکل)
Gemelli	عضله جمیلی
Quadratus femoris	عضله مربع رانی
Obturator externus	سوادای خارجی
Obturator internus	سوادای داخلی
Popliteus	عضله رکبی
Gastrocnemius	عضله دوقلو
Plantaris	عضله کف پایی
عضلات زانو	
Biceps femoris	دوسر رانی
Semi membransis	نیم غشایی
Gastrocnemius	دوقلو
Sartorius	خیاطه
Gracilis	نازک نی
Plantaris	کف پایی
Popliteus	رکبی

Semi tendinosus	نیم وتری
Rectus femoris	راست نی
Vastus intermedius	پهن میانی
Vastus lateralis	پهن خارجی
Vastus medialis	پهن داخلی
Soleus	عضله تحتی (نعلی)
Peroneus longus	نازک نی طویل (دراز پشت ساقی)
Peroneus brevis	نازک نی کوتاه (کوتاه پشت ساقی)
Tibialis posterior	درشت نی خلفی
Flexor digitorum longus	خم کننده طویل انگشتان پا
Flexor hallucis longus	خم کننده طویل شست پا
Proneus tertius	نازک نی طرفی
Tibialis anterior	درشت نی قدامی
Extensor digitorum longus	باز کننده طویل انگشتان پا
Extensor hallucis longus	باز کننده طویل شست پا
Tibialis posterior	درشت نی خلفی
Proneus brevis	نازک نی کوتاه
Proneus longus	نازک نی بلند
عضلات مچ پا	

Tibialis anterior	ساقی قدامی
Extensor digitorum longus	عضله بازکننده طویل انگشتان پا
Extensor Hallucis longus	بازکننده شست پا
Peroneus tertius	نازک نی طرفی
Peroneus longus	نازک نی بلند
Peroneus brevis	نازک نی کوتاه
Soleus	عضله نعلی
Gastrocnemius	عضله دوقلو
Plantae	عضله کف پایی
Flexor digitorum longus	تاکننده بلند انگشتان پا
Flexor hallucis longus	تاکننده بلند شست پا
Tibialis posterior	ساقی خلفی
Flexor digitorum brevis	تاکننده کوتاه انگشتان
Abductor hallucis	دورکننده شست پا
Abductor digiti minimi	دورکننده انگشت کوچک پا
Quadratus plantae	مربع کف پایی
Lumbricalis	دودی پا
Flexor hallucis brevis	تاکننده کوتاه شست پا
Adductor hallucis	نزدیک کننده شست پا

Flexor digiti minimi brevis	تاکنده کوتاه انگشت کوچک پا
Plantar interossei	بین استخوانی کف پای
Dorsal interossei	بین استخوانی روی پای
Extensor digitorum brevis	بازکننده کوتاه انگشتان پا

عضلات عمل کننده بر ستون مهره‌ها

Prevertebral muscles	عضلات جلوپی و بالایی ستون مهره‌ها
Rectus capitis lateralis	I. راست راسی خارجی
Rectus capitis anterior	II. راست راسی قدامی
Longus capitis	III. طویل راسی
Longus colli	IV. طویل گردنی
Scalenus muscles	عضلات نردبانی
Sterno cleido mustoid	عضله جناغی چنبری (دو سر)
Levator scapula	عضله گوشه‌ای
Splenius muscles	- عضلات مهره‌ای
Splenius capitis	I. مهره‌ای راسی
Splenius cervicis	II. مهره‌ای گردنی
Suboccipitals	- عضلات زیر پشت سری

Obliquus capitis superior	I. عضلات مورب رأسی فوقانی
Obliquus capitis inferior	II. عضلات مورب رأسی تحتانی
Rectus capitis posterior major	III. راست بزرگ رأسی خلفی
Rectus capitis posterior minor	IV. راست کوچک رأسی خلفی

Erector spinae	عضلات راست کننده ستون مهره‌ها
Ilio costalis	1- خاصره‌ای
Cervicis ilio costalis	I. خاصره‌ای گردنی
Thoracis ilio costalis	II. خاصره‌ای پستی
Lumborum ilio costalis	III. خاصره‌ای کمری
Longissimus	2- طویل
Capitis longissimus	I. طویل رأسی
Cervicis longissimus	II. طویل گردنی
Thoracis longissimus	III. طویل پستی
Spinalis	3- شوکی
Cervicis spinalis	I. شوکی گردنی
Thoracis spinalis	II. شوکی پستی

	دستمبندی کلی عضلات بدن:
Facial muscles	عضلات سر و صورت
Masseter	عضله جونده
Temporal	گیجگاهی
Pterygoid lateral	عضله پتریگوئید خارجی
Pterygoid medial	عضله پتریگوئید داخلی
	عضله مهم گردن:
Sternocleidomastoid	جناغی چنبری پستانی
	عضلات اندام فوقانی: (ناحیه سینه و شانه)
Pectoralis major	سینه‌ای بزرگ
Pectoralis minor	عضله سینه‌ای کوچک
Deltoid	عضله دلتوئید
Supraspinatus	عضله فوق خاری
Infraspinatus	عضله تحت خاری
Teres major	عضله گرد بزرگ
Teres minor	عضله گرد کوچک
Subscapularis	عضله ساب اسکاپولاریس
Serratus anterior	عضله دندانهای قدامی
	عضلات ناحیه بازو (عضلات قدامی):
Biceps brachii	عضله دو سر بازو
Coracobrachialis	عضله کوراکوبراکیالیس
Brachialis	عضله براکیالیس
	عضله خلفی:
Triceps brachii	سه سر بازو
	عضلات ساعد (گروه سطحی)
Flexor carpi radialis	فلکسورکاری رادیالیس
Flexor carpi ulnaris	فلکسورکاری اولناریس
Flexor digitorum superficialis	عضله سطحی انگشتان
Pronator Teres	پرونیاتور ترس
Palmaris longus	عضله کف دستی بلند
	عضله قدامی ساعد:
Flexor digitorum profundus	فلکسور عمقی انگشتان
Flexor pollicis longus	فلکسور دراز شست
Pronator quadratus	پرونیاتور کوادراتوس

عضلات اندام تحتانی:

۱- عضلات ناحیه قدام و داخل ران

Quadriceps femoris	عضله چهار سر ران
sartorius	عضله خیاطه

	۲- عضلات ناحیه سرین (گلوتئال)
Gluteus maximus	عضله سرینی بزرگ
Gluteus medius	عضله سرینی میانی
Gluteus minimus	عضله سرینی کوچک
	۳- عضله ناحیه خلف راه:
Biceps femoris	عضله دو سر خلف ران
Semi tendinosus	عضله نیمه تاندونی
Semi membranousus	عضله نیمه غشایی
	۴- عضلات ناحیه کف پا
	بازکننده دراز انگشتان
	بازکننده دراز شست پا
	۵- عضلات ناحیه ساق پا
	بئیتال قدامی
	پروئوس بلند
	پروئوس کوتاه
Triceps surae	سه سر خلف ساق
	عضلات شکم:
Abdominis obliques externus	عضله مایل خارجی
Abdominis obliques internus	عضله مایل داخلی
Transversus abdominis	عضله عرض شکمی
Rectus abdominis	عضله مستقیم شکمی
Diaphragma	عضله دیافراگم
	عضلات ناحیه پشت و کمر
trapezius	عضله دوزنقه‌ای
Latissimus dorsi	عضله پهن پشتی

UNIT4

The skeletal system

The skeleton can be divided into two subgroups, the axial skeleton and the appendicular skeleton. The axial skeleton consists of the bones of the skull (cranium), vertebral column, ribs, and sternum, whereas the appendicular skeleton consists of the bones of the upper and lower limbs.

The skeleton forms the framework of the body, protects vital organs and works with the muscular system to produce movement at the joints. The human adult skeleton is composed of 206 bones which are organized for study into two divisions.

Divisions of the skeleton

The axial skeleton forms the central core or axis of the body's bony framework. It consists of;

- The skull, made up of 8 cranial bones and 14 bones of the face. The skull bones are joined by immovable joints, except for the joint between mandible and the temporal bone of the cranium (the temporomandibular joint)
- The spinal column consisting of 26 vertebrae. Between the vertebrae are disks of cartilage that add strength and flexibility to the spine. The five groups of vertebrae listed from superior to inferior with the number of bones in each group are;
1-cervical (7) designated C1 to C7. The first and second cervical vertebrae also have specific names the atlas and the axis, respectively.
2-thoracic (12) designated T1 to T12.
3-lumbar (5) designated L1 to L5.
4-The sacrum (S) composed of five fused bones.
5-The coccyx (Co) composed of four to five fused bones.
- The thorax, consisting of 12 pairs of ribs joined by cartilage to the sternum (breast bone). The rib cage encloses and protects the thoracic organs.

The appendicular skeleton is attached or appended to the axial skeleton. The upper division includes;

- The bones of the shoulder girdle, the clavicle and scapula.
- The bones of the upper extremities (arms), the humerus, radius, ulna, carpals (wrist bones), metacarpals, and phalanges (finger bones)

The lower division includes;

- The pelvic bones, two large bones that join the sacrum and coccyx to form the bony pelvis. Each pelvic or hip bone is formed by three fused bones; the large, flared ilium, the ischium, and the pubis. The deep socket in the hip bone that holds the head of the femur is the acetabulum. The female pelvis is wider than the male pelvis and has other differences to accommodate childbirth.
- The bones of the lower extremities (legs), the femur, patella (kneecap), tibia, fibula, tarsals (ankle bones), metatarsals (bones of the instep), and phalanges (toe bones). The large tarsal bone that forms the heel is the calcaneus.

Bone

Bone is a calcified, living, connective tissue that forms the majority of the skeleton. It consists of an intercellular calcified matrix, which also contains collagen fibers, and several types of cells within the matrix. Bones function as;

- Supportive structures for the body
- Protectors of vital organs
- Reservoirs of calcium and phosphorus
- Levers on which muscles act to produce movement
- Containers for blood-producing cells.

There are two types of bone, compact and spongy. Compact bone is dense bone that forms the outer shell of all bones and surrounds spongy bone. Spongy bone consists of spicules of bone enclosing cavities containing blood-forming cells (marrow).

Bone formation

Bone is formed by the gradual addition of calcium and phosphorus salts to cartilage, a type of dense connective tissue. This process of ossification begins before birth and continues to adulthood. Although bone appears to be inert, it is actually living tissue that is constantly being replaced and remodeled throughout life. Three types of cells are involved in these changes;

- Osteoblasts, the cells that produce bone
- Osteocytes, mature bone cells that help to maintain bone tissue
- Osteoclasts, involved in the breakdown of bone tissue to release needed minerals or to allow for reshaping and repair

The process of destroying bone so that its components can be taken into the circulation is called resorption. This activity occurs continuously and is normally in balance with bone formation. In disease states, resorption may occur more rapidly or more slowly than bone production.

Structure of long bone

A typical long bone has a shaft or diaphysis composed of compact bone tissue. Within the shaft is a medullary cavity containing the yellow form of bone marrow, which is high in fat. The irregular epiphysis at either end is made of a less dense, spongy (cancellous) bone tissue.

The spaces in spongy bone contain the blood-forming red bone marrow. A layer of cartilage covers the epiphysis to protect the bone surface at a joint. A thin layer of fibrous tissue, or periosteum, that covers the bone's outer surface nourishes and protects the bone and also generates new bone cells for growth and repair.

Between the diaphysis and the epiphysis at each end is a region called the metaphysis, is the growth region or epiphyseal plate. Long bones continue to grow in length at these regions throughout childhood and into early adulthood. Long bones are found in the arms, legs, hands, and feet.

Other bones are described as;

- Flat bone (cranial bones, ribs, scapula)
- Short bone (wrist and ankle bones)
- Irregular (facial bones, vertebrae)

Examples of long bones;

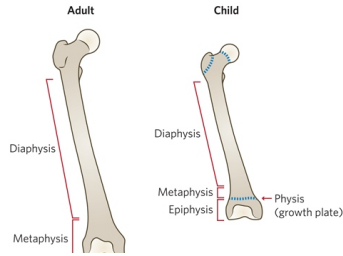
- Femur (thigh)
- Tibia and fibula (calf)
- Humerus (upper arm)
- Radius and ulna (lower arm)

Macrostructure of long bones

Diaphysis shaft of bone made up of cortical bone surrounding medullary cavity filled with bone marrow.

Epiphysis ends of bone in which trabecular bone is surrounded by cortical bone.

Metaphysis the wide part of long bone between the epiphysis and the diaphysis.



short bone

Short bones are cube-shaped and made from cancellous bone with a thin layer of compact bone.

Examples of short bone;

- Carpal bone (wrist)
- Tarsal bones (foot)

Flat bone

Flat bones consist of two plates of cortical bones with trabecular tissue in between. (flat bones are generally curved than flat)

Example of flat bones;

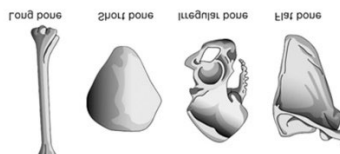
- Calvaria (top of skull)
- Scapula (shoulder blade)
- Sternum (breast bone)
- Ribs

Irregular bone

Irregular bones have various shapes, irregular bones are made up of an irregularly shaped mass of cancellous bone covered in a thin layer of compact bone.

Examples of irregular bones;

- Facial bones
- Vertebra (bones of spine)



Skeletal framework

Skeletal components of the back consist mainly of the vertebrae and associated intervertebral discs. The skull, scapulae, pelvic bones and ribs also contribute to the bony framework of the back and provide sites for muscle attachment.

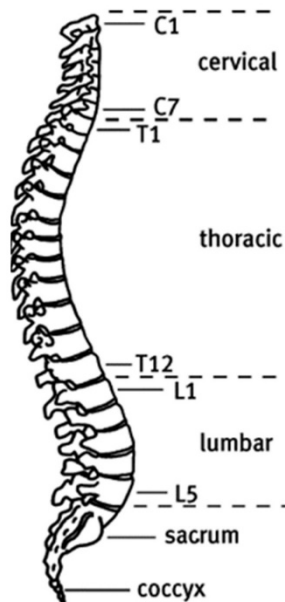
Vertebrae

There are approximately 33 vertebrae, which are subdivided into five groups based on location;

- The seven cervical vertebrae between the thorax and skull are characterized mainly by their small size and the presence of a foramen in each transverse process.
- The 12 thoracic vertebrae are characterized by their articulated ribs; although all vertebrae have rib elements. These elements are small and are incorporated into the

transverse processes in regions other than the thorax; but the thorax, the ribs are separate bones and articulate via synovial joints with the vertebral bodies and transverse processes of the associated vertebrae.

- Inferior to the thoracic vertebrae are five lumbar vertebrae, which from the skeletal support for the posterior abdominal wall and are characterized by their large size.
- Next are five sacral vertebrae fused into one single bone called the sacrum, which articulates on each side with a pelvic bone and is a component of the pelvic wall.
- Inferior to the sacrum is a variable number, usually four, of coccygeal vertebrae which fuse into a single small triangular bone called the coccyx.



MEDICAL DEVICE

Bone density scan

A bone density scan, also known as a DEXA scan, is a type of low-dose **x-ray** test that measures **calcium** and other **minerals** in your bones. The measurement helps show the strength and thickness (known as **bone density** or mass) of your bones.

Most people's bones become thinner as they get older. When bones become thinner than normal, it's known as osteopenia. Osteopenia puts you at risk for a more serious condition called **osteoporosis**. Osteoporosis is a progressive disease that causes bones to become very thin and brittle. Osteoporosis usually affects older people and is most common in women over the age of 65. People with osteoporosis are at higher risk for **fractures** (broken bones), especially in their hips, spine, and wrists.

Other names: bone mineral density test, BMD test, DEXA scan, DXA; Dual-energy x-ray absorptiometry

A bone density scan is used to:

- Diagnose osteopenia (low bone mass)
- Diagnose osteoporosis
- Predict risk of future fractures
- See if treatment for osteoporosis is working

Most women age 65 or older should have a bone density scan. Women in this age group are at high risk for losing bone density, which can lead to fractures. You may also be at risk for low bone density if you:

- Have a very low body weight
- Have had one or more fractures after the age of 50
- Have lost a half inch or more in height within one year
- Are a man over the age of 70
- Have a family history of osteoporosis

Other risk factors include:

- Lack of physical activity
- *Smoking cigarettes*
- *Heavy drinking*
- *Not getting enough calcium and vitamin D in your diet*



Apex

استخوان کشکک

Anke

قوزک

Arm	ساعد و بازو	Appendicular skeleton	استخوان بندی زائدهای
Axial skeleton	استخوان بندی محوری	Below elbow	زیر آرنج
Below knee	زیر زانو	blade	تیغه، استخوان بهن
Bone densitometry	تراکم سنج استخوانی	Bone growth stimulator	دستگاه تحریک رشد استخوان
Bone contact	تماس استخوان	Bone graft	پیوند استخوان
Bone injury	آسیب رسیده به استخوان	Bone marrow	مغز استخوان
Bone matrix	زمینه استخوان	Bone minerals	اصلاح استخوانی
Bony feature	خصوصیات استخوان	Breast bone	استرنوم، جناغ
Calcanem	استخوان پاشنه	Calcium deposit	تجمع کلسیم
Calcaneal spur	خار پاشنه	Calx	پاشنه پا
Calynx, callix	از قسمت های فجائی- شکل لگنچه کلیه کاسه	Cancellous bone	استخوان اسفنجی
Cancellous tissue	بافت اسفنجی	carpal	استخوان مچ پا
Carpal tunnel	مجرای مچ دست	carpus	استخوان های مچ دست
Clavicle	استخوان ترقوه	clavicular	ترقوهای
Coccygeal	دنبالیچه ای	coccyx	دنبالیچه
Compact bone	استخوان مtrakم	Compact tissue	بافت مtrakم
Congenital flexed toe	انگشتان خم مادرزادی	Congenital valgus of toe	نافرمی انگشتان مادرزادی
Cortical bone	استخوان مtrakم	Costae, costro	دنده
Costo	دنده ای، مربوط به دنده	Cranial	جمجمه ای
Cranium	جمجمه	Craniotomy	جمجمه بری
Crus	ساق پا	Cubital fossa	حفرة آرنجی
Cubitus	مربوط به ساعد و آرنج	Cuboid	تاسی، استخوان تاسی
Cuneiform bone	استخوان میخی	Curley toe	واروسی مادرزادی انگشتان پا
Deformation	بدشکلی، تغییر شکل	Diaphysis	بدنه ی استخوان
Dislocate endochondral	از جا در رفتن	Dislocation	در رفتگی
Femoral	مربوط به ران	Epiphysis	سر استخوان
Fibula	نازک نی	Femur	استخوان ران
Flat bone	استخوان پهن	Finger	انگشت دست
Genu-	مربوط به زانو	Fore foot	جلو پا
Genu valgus	پای پرانتری	Genu varum	پای کمائی
Hallux	انگشت شستی پا	Genu varus	پای چسبنده
Hammer toe	انگشت چکشی	Hamate bone	استخوان چنگکی
Heel bone	استخوان پاشنه	Heel base	قاعده پاشنه
Heel seat	قسمت بالای پاشنه	Heel breast	سینه پاشنه
Hydro cephalus	تجمع مایع در جمجمه	Humerus	استخوان بازو
Ilio costalis lumborum	خاصه های کمری	Hypo condric	ناحیه زیر پایین ترین دنده

Ilium	استخوان عانه خاصره	Ilio costalis thoraois	خاصره‌ای پشتی
Ingingal (liac)	مربوط به کشاله ران	Infrascapular	مربوط به قسمت پایینی استخوان ترقوه
Intrucranial	درون جمجمه‌ای	Intramembranous ossification	استخوان‌سازی درون شامه‌ای
Irregular bone	استخوان ناصاف	Ischium	استخوان نشیمن‌گاه
Ischial tuberosity	زائده‌های استخوان‌های نشیمن‌گاهی	Lateral heal and sole wedge	قسمت خارجی کف پا
Knee, internal derangement	صدمه داخلی زانو	Lateral heel wedge insert	کفی با لبه خارجی پاشنه
Lateral heel wedge	لبه خارجی پاشنه	Lateral quarter leg	کوارتز خارجی ساق پا
Lateral longitudinal	قوس طلا خارجی	Lesser tuberosity	برآمدگی کوچک استخوان بازو
Long bone	استخوان بلند	Lumber	کمری، مربوط به ناحیه کمر
Lunate bone	استخوان هلالی	Lumber lordosis	گودی کمر
Malleolus	قوزک پا	Mallet finger	انگشت چکشی
Man dibble	فک تحتانی (پایینی)	Marrow	مغز استخوان
Maxilla	فک بالایی	Maxilla of facial	فکی، مربوط به فک
Meta tarsal	استخوان دراز از مچ پا تا انگشت‌ها	Metatarsus	استخوان‌های کف پا
Myelo	مغز استخوان مربوط به مغز استخوان	Nasal	بینی، استخوان بینی
Osteo	مربوط به استخوان	Osteitis	التهاب استخوان
Osteoarthritis	ورم مفاصل، استخوان‌ها	Osteoarthritis	التهاب استخوان و مفاصل
Osteoblast	استخوان باز	Osteoclast	استخوان خوار
Osteocyte	سلول استخوانی	Osteogenesis	استخوانی شدن
Osteomalacia	فرم استخوانی	Osteoid	شبه استخوان
Osteone	ساختمان استخوان	Osteomyelitis	عفونت ماده استخوانی
Osteonecrosis	مرگ سلول استخوانی	Osteopenia	فقر استخوانی
Osteophyte	برآمدگی استخوانی	Osteoporosis	پوکی استخوان
Osteosarcoma	تومور بدخیم بافت استخوانی	Osteoarthritis	التهاب استخوان و مفصل
Osteotomy	استخوان بندی	Osteochondrit	التهاب
Patella	کشکک زانو	Pelvic	لگن خاصره
Pelvic tilt	انحراف لگن	Pelvis pes cavus	پای طاق‌دیی (پرانتری)
Periosteum	پوسته خارجی استخوان	Phalanges	بندهای انگشت
Pes planus	پای مسطح	Porosity	تخلخل
Phalanx	بندانگشت	Public bone	استخوان عانه

Porous	متخلخل	Rachitism	نرمی استخوان
Rachio	مربوط به مهره‌های پشت	Scapula	استخوان کتف
Round bone	استخوان گرد	Schemoel's dease	فتق دیسک بین مهره-ای
Scalper	مربوط به استخوان کتف	Skeletal	اسکلتی
Scoliosis	کجی ستون مهره‌ها	Skeletal muscle	ماهیچه اسکلتی
Short bone	استخوان کوتاه	Spinal column	ستون مهره‌ها
Skeleton	استخوان بندی	Spinal scapula	خار کتف
Sphenoid	استخوان پروانه‌ای	Spinal column	ستون مهره‌ها
Spina	ستون مهره‌ها	Spondyl/o	مهره
Spinal	نخاعی	Spondyl/o	مربوط به مهره‌های پشت
Spine	ستون فقرات	spondylosis	تنگ شدن فضای بین مهره‌ای
Spondylilis	التهاب مهره‌ها	Sterna	مربوط به جناغ سینه
Spondylolisthesi	تغییر مکان مهره		
Spondylolysis	شکستگی ناشی از فشار مهره‌ها	Sternocleido mastoid	جناغی چنبری پستانی
Stapes	استخوان رکابی		
Sternal	جناغی	Supra davicular	مربوط به قسمت بالایی استخوان ترقوه
Sternum	جناغ سینه		
Sub periosteal dental impact	کاشتن دندان‌های اطراف ضریع استخوان	Tarso	مچ پا، حاشیه بلک
Tarsom tatarsal	استخوان‌های پاشنه‌ای، کف پای	Talar	استخوان قاب
Talus bone	استخوان قاب پا	Thigh	استخوان ران
Thoracic	ستون مهره‌های پشتی	Thorac/o	در داخل قفسه صورت
Thoracic	ستون مهره‌های پشتی	Tibial torsion	چرخش تی بیا
Tibia	استخوان درشت نی		
Toe	پنجه پا	Trabeculae	میل‌های استخوانی
Tolus	استخوان تاپ	Vertebra	مهره ستون فقرات
Ulnar	مربوط به زند زیرین		
Vertebral column	ستون مهره‌ها	Vertebran growth Plate	صفحه رشد مهره‌ای
Vomer bone	استخوان تیغه میانی بینی	Wrist contusion	کوفتگی مچ دست
Wrist	مچ دست		
Xiphoid	استخوان خنجر	Yellow bone marrow	مغز استخوان زرد
Zygoma	زائد استخوان گیجگاهی		

بررسی خواص مکانیک و ساختار استخوانی (Bone)

• خواص مکانیکی:

- مقاوم در برابر تغییر شکل محسوس در مدت زمان کم
- در آنالیز حرکت جسم صلب در نظر گرفته می‌شود.
- شکننده Brittle
- شکست‌پذیر Fracture

• ماتریس استخوان:

- فیبرهای کلاژن: مواد پروتئینی هستند که در اثر فشار خم می‌شوند ولی در مقابل کشش مقاوم هستند.
- مواد معدنی: نمک‌های کلسیم فسفات کلسیم (به مقدار زیاد) و کربنات کلسیم (به مقدار کم) در ماتریس استخوان یافت می‌شود کریستال‌های نمک نیروهای فشاری را تحمل می‌کنند و شکننده و غیرقابل انعطافند.
- ماتریس استخوان یک کامپوزیت با ساختار مشخص است اگر موقعیت فیبرهای کلاژن با نمک‌های کلسیم عوض شود، ماده حاصل می‌تواند رفتار متفاوتی داشته باشد.

انواع بافت استخوانی:

I. بافت استخوان اسفنجی Cancellous (spongy) bone

سه استخوان‌های بلند- بافت درونی بقیه استخوان‌ها- در جاهایی که تحت تنش زیاد نیستند یا تنش در جهات مختلف توزیع شده است- صفحات رشد در این بافت قرار می‌گیرد.

II. بافت استخوان متراکم Compact bone

بخش میانی استخوان‌های بلند- سطح بیرونی بقیه استخوان‌ها- در جاهایی که تنش زیاد و در جهت خاصی اعمال می‌شود. اگر تنش زیاد باشد ضخامت این بافت نیز بیشتر می‌شود.

تقسیم‌بندی استخوان‌های بدن از نظر شکل:

- ۱- استخوان بلند: ساعد، بازو، ساق پا، کف دست، کف پا، انگشتانی دست و پا
- ۲- استخوان کوتاه: مچ دست و مچ پا و جمجمه
- ۳- استخوان صاف (flat): جمجمه، جناغ، دنده، کتف
- ۴- استخوان نامنظم: مهره‌های ستون فقرات
- ۵- استخوان متخلخل sutural: جمجمه
- ۶- استخوان کنج‌دار sesamoid، کشکک زانو patella

استخوان بندی:

I. استخوان بندی محوری Axial skeleton

- طول ستون مهره‌ها تقریباً 71 cm است، ستون مهره‌ها طناب نخاعی را محافظت می‌کند. همچنین نگهدارنده سر و بالاته است. از نظر مکانیکی یک میله انعطاف‌پذیر برای حفظ موقعیت بالاتنه محسوب می‌شود. ستون فقرات این‌کار را به کمک عضلات لیگامنت انجام می‌دهد.
- یک مهره از جسم مهره و انحاء مهره تشکیل شده است. بخش تحمل وزن یک استوانه مانا است و مهره‌ها با لیگامنت به هم وصل شده‌اند. بین مهره‌ها دیسک‌هایی (۲۳ عدد) از جنس غضروف فیبروزی وجود دارد.
- دیسک‌ها $\frac{1}{4}$ طول ستون فقرات را تشکیل می‌دهند و وظایف آنها ایجاد حرکت در مهره‌ها، جذب شوک ایجاد فضا در ستون فقرات است.

II. استخوان‌بندی جانبی Appendicular skeleton

- فمور یکی از سنگین‌ترین و بلندترین استخوان‌های جانبی است که ۷% شکست‌ها در اثر فشار در آن اتفاق می‌افتد.
- $\frac{1}{2}$ کل شکست‌ها در اثر فشار تی یا (درشت نی) اتفاق می‌افتد. شکست در اثر بارگذاری تکراری و سنگین در استخوان در دویدن و پریدن اتفاق می‌افتد.

- نیروی عکس‌العمل عضلات پا در حین دویدن به ۱۰-۵ برابر وزن بدن می‌رسد.

کشکک زانو Knee cap, patella

از آسیب در اثر نیروهای ضربهای جلوگیری می‌کند.

بزرگترین استخوان زاویه‌ای بدن است و نقش مهمی در حرکت زانو دارد.

ساختمان استخوان بلند:

Epiphysis	اپی‌فیز (سر استخوان، بخش اسفنجی استخوان بلند)
Diaphysis	دیا‌فیز (بدنه استخوان، بخش متراکم استخوان بلند)
Perios teum (core)	ضریح (پوشانده روی استخوان)
Sekeletal system	سیستم اسکلتال

I. اسکلت محوری

Skull / cranial	جمجمه
Vertebrac	ستون مهره‌ها
Sternum	استخوان جناغ سینه
Ribs / costal	دنده‌ها

II. اسکلت اندام

Upper limb	اندام فوقانی
Lower limb	اندام تحتانی
Shoulder	کمر بند شانه‌ای
Pelvic girdle	کمر بندی لگنی
	انواع سلول‌های استخوانی:

سلول استخوانی	Osteocyte
سلول استخوان خوار	Osteoclast
سلول استخوان ساز	Osteoblast

Cranum bone (skull)	استخوان‌های سر:
Frontal bone	استخوان پیشانی
Ethmoidal	استخوان غریبالی
Sphenoid	شبه‌چرخه، پروانه‌ای
Occipital	پس سری
Parictal	آهپانه
Temporal	

- گیجگاهی

I.	بخش صدفی
II.	بخش صماخی
III.	بخش نیزه‌ای
IV.	بخش خاری
V.	بخش پستانی

Facial bone	استخوان صورت:
Zygomatic bone	گونه
Lacrimal bone	استخوان اشکی
Nasal bone	بینی (استخوان تیغه میانی بینی)
Maxillary bone (maxilla)	استخوان فک فوقانی
Palatine bone	استخوان کامی

Vomer bone	استخوان خیشی
Loncha (nasalis inferior)	استخوان تحتانی بین (شاخک یا مخروطی)
(mandibul bone)	استخوان فک تحتانی
Hyoid bone	استخوان لای
Nostril	- سوراخ بینی قدامی (X2)
Choana	خلفی (X2)
Sinus	سینوس‌های صورت
Maxillary sinus	سینوس‌های فک فوقانی
Sphenoidal sirus	سینوس پروانه‌ای
Frontal sinus	سینوس پیشانی
Ethmoidal sinus	سینوس غربالی
Upper limb	استخوان‌بندی اندام فوقانی (کمر بند شانهای)
Clavicle	ترقوه
Scapula	کتف
Humerus	استخوان بازو
Fore Arm	- استخوان‌های ساعد
Radius	زند زیرین (رادیوس)
Ulnar	زند زیرین (اولنار)
	استخوان‌های دست:
Carpal bone	استخوان مچ دست
Meta carpal bone (palmar)	کف دست
Phalanx / phalanges (digit)	انگشتان دست
Bones of thoracic cage	استخوان‌بندی قفسه سینه
Sternum (breast bone)	استخوان جناغ سینه
Manubrium	I. دسته
Body	II. تنه
Xiphoid process	III. زائده خنجر
Ribs	دنده‌ها
	دنده‌های حقیقی (۷ تا اول)
	کاذب (۸، ۹، ۱۰)
	آزاد (۱۱ و ۱۲)
Vertebral column (spinal column)	ستون مهره‌ها
Cervical	مهره‌های گردنی (X7)
Thoracic	مهره‌های سینه‌ای (X12)
Lumber	مهره‌های کمری (X5)
Socral (sacrum)	مهره‌های خاجی (X5)
Coccyx (coccygeal)	مهره‌های دنبالیجه‌ای (X4)
Inter Vertebral Dis	دیسک بین مهره‌ای
	مهره (قرسی مهره‌ای):
Body	تنه
Pedicle	یک جفت پایه

Lamina	یک جفت تیغه
Transverse process	دو زائده عرضی
Spinous process	زائده شوکی
Vertebral Arch (X2) pedicles and (X2) laminae	زائده مفصلی فوقانی و تحتانی
Vertebral foramen	سوراخ مهره‌ای
Lower limb	استخوان‌های اندام تحتانی
Skeletal of pelvis	لگن
Femur bone	ران
Patella	استخوان کشکک
Knee bone	استخوان مفصل زانو
Foreleg	- استخوان ساق پا
Tibia	I. استخوان درشت نی (تی بیا)
Fibula	II. استخوان نازک نی (فیولا)
Tarsal bone	- استخوان مچ پا (X7)
Talus	I. استخوان قاپ پا
Calcaneus	II. استخوان پاشنه پا
Navicularis	III. استخوان ناوی پا
Cuboid (cabioidium)	IV. استخوان تاسی (مکعبی)
Cunei form	V. استخوان میخی (X3)
Lateral metatarsal	۱- استخوان میخی چسبیده به انگشت شماره ۳
Intermediate metatarsal	۲- استخوان میخی چسبیده به انگشتان
Medial meta tarsal	۳- استخوان میخی چسبیده به شست پا
Tarsal bone	مچ پا
Metatarsal bone	کف پا
Midtarsal bone	استخوان‌های انگشت پا (با بند اول انگشتان و مفاصل استخوان‌های کف پا متصل می‌شوند)
Trochanter	زوائد تروکانتر
Leser trochanter	۱- کوچک (داخلی)
Great trochanter	۲- بزرگ (خارجی)
Pelvis bone	استخوان‌های لگن
Hip bone	استخوان خاصره
Ilium	ایلیوم (تهی‌گاهی)
Ischium	ایکیوم (نشیمین‌گاهی)
Pubis	پوبیس (شرمگاهی)
Pelvis cavity	حفره لگن
Inlet	مرض (ورودی)
Outlet	مخرج (خروجی)
	انواع لگن
Gyne coid pelvis	لگن زنانه
Anduoid pelvis	لگن مردانه

Unit5

Cardiovascular system

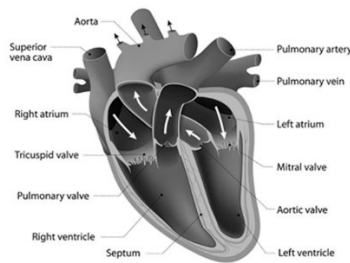
The cardiovascular system consists of the heart, which pumps blood throughout the body, and the blood vessels which are the closed network of tubes that transport the blood. There are three types of blood vessels;

- Arteries, which transport blood away from the heart
- Veins, which transport blood toward the heart
- Capillaries, which connect the arteries and veins, are the smallest of the blood vessels and are where oxygen, nutrients and wastes are exchange within the tissues.

the walls of the blood vessels of the cardiovascular system usually consist of three layers or tunics;

- Tunica externa (adventitia)- the outer connective tissue layer
 - Tunica media – the middle smooth muscle layer (may also contain varying amounts of elastic fibers in medium and large arteries)
 - Tunica intima – the inner endothelial lining of the blood vessels.
- Arteries are usually further subdivided into three classes, according to the variable amounts of smooth muscles and elastic fibers contributing to the thickness of the tunica media, the overall size of the vessels, and its function.
 - Large elastic arteries contain substantial amounts of elastic fibers in the tunica media, allowing expansion and recoil during the normal cardiac cycle. this helps maintain a constant flow of blood during diastole
 - Medium muscular arteries are composed of a tunica media that contains mostly smooth muscle fibers. This characteristic allows these vessels to regulate their diameter and control the flow of blood to different parts of the body
 - Small arteries and arterioles control the filling of the capillaries and directly contribute to the arterial pressure in the vascular system.
 - Veins also are subdivided into three classes;
 - Large veins contain some smooth muscle in the tunica media. But the thickest layer is the tunica externa. Examples of large veins are the superior vena cava, the inferior vena cava and the portal vein.
 - Small and medium veins contain small amounts of smooth muscle and the thickest layer is the tunica externa. Examples of small and medium veins are superficial veins in the upper and lower limbs and deeper veins of the leg and forearm.
 - Venules are the smallest veins and drain the capillaries
 - Although veins are similar in general structure to arteries they have a number of distinguishing features .
 - The walls of veins, superficially the tunica media, are thin.
 - The luminal diameters of veins are large.
 - There often are multiple veins (venae comitantes) closely associated with arteries in peripheral regions.
 - Valves often are present in veins, particularly in peripheral vessels inferior to the level of the heart. These are usually paired cusps that facilitate blood flow toward the heart.

More specific information about the cardiovascular system and how it relates to the circulation of blood throughout the body will be discussed, where appropriate, in each of the succeeding chapters of the text.



Cardiovascular structure and function

The cardiovascular system consists of the heart, arteries, veins, capillaries and lymphatic vessels. Lymphatic vessels are vessels which collect extra cellular fluid and return it to circulation. The most basic function of the cardiovascular system are to deliver oxygen and nutrients, to remove waste and regulate temperature.

The heart is actually two pumps; the left heart and the right heart. The amount of blood coming from the heart (cardiac output) is dependent on arterial pressure. This chapter deals with the heart and its ability to generate arterial pressure in order to pump blood.

Functional anatomy

The cardiovascular system can be further divided into three subsystems. The systemic circulation, the pulmonary circulation and the coronary circulation are subsystem that along with the heart and lungs make up the cardiovascular system.

The three system can be divided functionally based on the tissue to which they supply oxygenated blood. The systemic circulation is the subsystem supplied by the aorta that feeds the systemic capillaries. The pulmonary circulation is the subsystem supplied by the pulmonary artery that feeds the pulmonary capillaries. The coronary circulation is the specialize blood supply that perfuses cardiac muscle. (perfuse means to push or pour a substance or fluid through a body part or tissue)

The cardiovascular system has four basic functions;

- It supplies oxygen to body tissues
- It supplies nutrients to those same tissues
- It removes carbon dioxide and other wastes from the body
- It regulates temperature

Vasculatures

Arteries

The arterial supply to the spinal cord comes from two sources. It consists of;

- Longitudinally oriented vessels, arising superior to the cervical portion of the cord, which descend on the surface of the cord.
- Feeder arteries that enter the vertebral canal through the intervertebral foramina at every level; this feeder vessels or segmental spinal arteries, arise predominantly from the vertebral and deep cervical arteries in the neck, the posterior intercostal arteries in the thorax, and the lumbar arteries in the abdomen.

After entering an intervertebral foramen, the segmental spinal arteries give rise to anterior and posterior radicular arteries. This occurs at every vertebral level. At various vertebral levels, the segmental spinal arteries also give off segmental medullary arteries. These vessels pass directly to the longitudinally oriented vessels, reinforcing these.

The longitudinal vessels consist of;

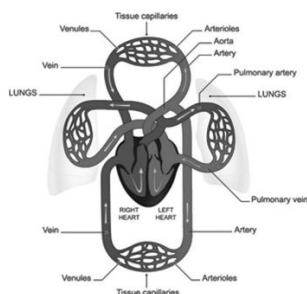
- A single anterior spinal artery, which originates within the cranial cavity as the union of two vessels that arise from the vertebral arteries

- Two posterior spinal arteries, which also originate in the cranial cavity, usually arising directly from a terminal branch of each vertebral artery.
The right and left posterior spinal arteries descend along the spinal cord, each as two branches that bracket the posterolateral sulcus and the connection of posterior roots with the spinal cord

Veins

Veins that drain the spinal cord form a number of longitudinal channels

- Two pairs of veins on each side bracket the connections of the posterior and anterior roots to the cord
- One midline channel parallels the anterior median fissure
- On midline channel passes along the posterior median sulcus.



Pulmonary arteries

The right and left pulmonary arteries originate from the pulmonary trunk and carry deoxygenated bloods to the lungs from the right ventricle of the heart.

The bifurcation of the pulmonary trunk occurs to the left of the midline just inferior to vertebral level, and anteroinferiorly to the left of the bifurcation of the trachea.

Right pulmonary artery

The right pulmonary artery is longer than the left and passes horizontally across the mediastinum. It passes;

- Anteriorly and slightly inferiorly to the tracheal bifurcation and anteriorly to the right main bronchus
- Posteriorly to the ascending aorta, superior vena cava and upper right pulmonary vein

The right pulmonary artery enters the root of the lung and gives off a large branch to the superior lobe of the lung.

Left pulmonary artery

The left pulmonary artery is shorter than the right and lies anterior to the descending aorta and posterior to the superior pulmonary vein.

Pulmonary veins

On each side a superior pulmonary veins and inferior pulmonary vein carry oxygenated blood from the lungs back to the heart.

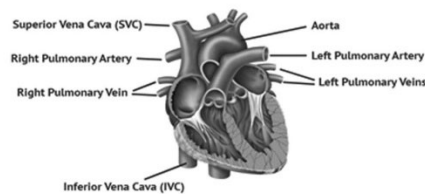
Bronchial arteries and veins

The bronchial arteries and veins constitute the nutritive vascular system of the pulmonary tissues . they interconnect within the lung with branches of the pulmonary arteries and veins.

The bronchial arteries originate from the thoracic aorta or one of its branches;

- A single right bronchial artery normally arises from the third posterior intercostal artery (but occasionally, it originates from the upper left bronchial artery)

- Two left bronchial arteries arise directly from the anterior surface of the thoracic aorta – the superior left bronchial artery arises at vertebral level and inferior one inferior to the left bronchus.
The bronchial arteries run on the posterior surfaces of the bronchi and ramify in the lungs to supply pulmonary tissues. The bronchial veins drain into;
- Either the pulmonary veins or the left atrium
- Into the azygos vein on the right or in to the superior intercostal vein or hemiazygos vein on the left.



Pericardium

The pericardium is a fibroserous sac surrounding the heart and the roots of the great vessels it consists of two components, the fibrous pericardium and the serous pericardium

The fibrous pericardium is a tough connective tissue outer layer that defines the boundaries of the middle mediastinum. The serous pericardium is thin and consists of two parts;

- The parietal layer lines the inner surface of the fibrous
- The visceral layer (epicardium) of serous pericardium adheres to the heart and forms its outer covering

The Heart

The heart is located between the lungs with its point or apex, directed toward the inferior and left. The wall of the heart consists of three layers, all named with the root cardi, meaning heart. Moving from the innermost to the outermost layer, these are the;

- Endocardium- a thin membrane that lines the chambers and valves
- Myocardium- a thick muscle layer that makes up most of the heart wall
- Epicardium- a thin membrane that covers the heart

The heartbeat

Each contraction of the heart termed systole, is followed by a relaxation phase, diastole, during which the chambers fill. Each time the heart beats, both atria contract, and immediately thereafter both ventricles contract. The number of times the heart contracts per minute is the heart rate. The wave of increased pressure produced in the vessels each time the ventricles contract is the pulse. Pulse rate is usually contented by palpating a peripheral artery such as the radial artery at the wrist or the carotid artery in the neck.

- Sinoatrial (SA) node- located in the upper right atrium and called the pacemaker because it sets the rate of the heartbeat.
- Atrioventricular (AV) node- located at the bottom of the right atrium near the ventricle. \
- AV bundle- at the top of the interventricular septum.
- Left and right bundle branches- which travel along the left and right sides of the septum.

Cardiac orientation

The general shape and orientation of heart are that of the pyramid that has fallen over and it resting on one of its sides. Placed in the thoracic cavity the apex of this pyramid projects forward, downward, and to the left whereas the basis is opposite the apex and faces in a posterior direction. The sides of the pyramid consist of;

- A diaphragmatic (inferior) surface on which the pyramid rests
- An anterior (sternocostal) surface oriented anteriorly
- A right pulmonary surface
- A left pulmonary surface

Cardiac chambers

The heart functionally consists of two pumps separated by a partition. The right pump receives deoxygenated blood from the lungs and sends it to the lungs the left pumps receives oxygenated blood from the lungs and sends it to the body. Each pump consists of an atrium and a ventricle separated by a valve.

The thin-walled atria received blood coming into the heart, whereas the relatively thick-walled ventricles pump blood out of the heart.

More force is required to pump blood through the body than through the lungs, so the muscular wall of the left ventricle is thicker than the right.

Right atrium

In the anatomical position, the right border of the heart is formed by the right atrium. This chamber also contributes to the right portion of the heart's anterior surface.

Blood returning to the right atrium enters through one of three vessels, these are;

- The superior and inferior venae cavae, which together deliver blood to the heart from the body
- The coronary sinus, which returns blood from the walls of the heart itself.

Right ventricle

In the anatomical position, the right ventricle forms most of the anterior surface of the heart and a portion of the diaphragmatic surface. The right atrium is to the right of the right ventricle and the right ventricle is located in front of and to the left of the right atrioventricular orifice. Blood entering the right ventricle from the right atrium therefore moves in a horizontal and forward direction.

There are three papillary muscles in the right ventricle. Named relative to their point of origin on the ventricular surface, they are the anterior, posterior and septal papillary muscles;

- The anterior papillary muscle is the largest and most constant papillary muscle and arises from the anterior wall of the ventricle.
- The posterior papillary muscle may consist of one, two or three structures
- The septal papillary muscle is the most inconsistent papillary muscle, being either small or absent.

Tricuspid valve

The right atrioventricular orifice is closed during ventricular contraction by the tricuspid valve (right atrioventricular valve) so named because it usually consists of three cusps or leaflets, the base of each cusp is secured to the fibrous ring that surrounds the atrioventricular orifice. This fibrous ring helps to maintain the shape of the opening. The cusps are continuous with each other near their bases at sites termed commissures.

Pulmonary valve

At the apex of the infundibulum the outflow tract of the right ventricle the opening to the pulmonary trunk is closed by the pulmonary valve which consists of three semilunar cusps with free edges projecting upward into the lumen of the pulmonary trunk.

Left atrium

The left atrium forms most of the base or posterior surface of the heart. As with the right atrium, the left atrium is derived embryologically from two structures

- The posterior half or inflow portion, receives the four pulmonary veins. It has smooth walls and derives from the proximal parts of the pulmonary veins that are incorporated into the left atrium during development.
- The anterior half is continuous with the left auricle. It contains muscoli pectinati and derives from the embryonic primitive atrium. Unlike the crista terminalis in the right atrium, no distinct structure separates the two components of the left atrium.

Left ventricle

The left ventricle lies anterior to the left atrium. It contributes to the anterior; diaphragmatic, and left pulmonary surfaces of the heart and forms the apex. Blood enters the ventricle through the left atrioventricular orifice and flows in a forward direction to the apex. The chamber itself is conical is longer than the right ventricle and has the thickest layer of myocardium.

In the anatomical position the left ventricle is somewhat posterior to the right ventricle. The interventricular septum therefore forms the anterior wall and some of the wall on the right side of the left ventricle the septum is described as having two parts;

- A muscular part
- Membranous part

The muscular part is thick and forms the major part of the septum whereas the membranous part is the thin, upper part of the septum. A third part of the septum may be considered an atrioventricular part because of its position above the septal cusps of the tricuspid valve. This superior location places this part of the septum between the left ventricle and right atrium.

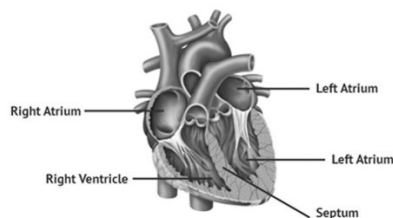
Mitral valve

The left atrioventricular orifice opens into the posterior right side of the superior part of the left ventricle. It is closed during ventricular contraction by the mitral valve (left atrioventricular valve) which is also referred to as the bicuspid valve because it has two cusps, the anterior and posterior cusps. The base of the cusps are secured to a fibrous ring surrounding the opening and cusps are continuous with each other at the commissure.

Aortic valve

The aortic vestibule or out flow tract of the left ventricle, is continuous superiorly with the ascending aorta. The opening from the left ventricle into the aorta is closed by the aortic valve. This valve is similar in structure to the pulmonary valve. It consists of three semilunar cusps with the free edge of each projecting upward into the lumen of the ascending aorta.

Between the semilunar cusps and the wall of the ascending aorta are pocket- like sinuses (the right, left, and posterior aortic sinuses) the right and left coronary arteries originate from the right and left aortic sinuses because of this the posterior aortic sinus and cusp are sometimes referred to as the non-coronary sinus and cusps. The functioning of the aortic valve is similar to that of the pulmonary valve with one important additional process; as blood recoil after ventricular contraction and fills the aortic sinuses, it is automatically forced into the coronary arteries because these vessels originate from the right and left aortic sinuses.



Cardiac skeleton

The cardiac skeleton is a collection of dense, fibrous connective tissue in the form of four rings with interconnecting areas in a plane between the atria and the ventricles. The four ring of the cardiac skeleton surround the two atrioventricular orifices, the aortic orifice and opening of the pulmonary trunks. They are the annulus fibrous. The interconnecting areas include;

- The right fibrous trigone which is a thickened area of connective tissue between the aortic ring and right atrioventricular ring
- The left fibrous trigone which is a thickened area of connective tissue between the aortic ring and the left atrioventricular ring.

The cardiac skeleton helps maintain the integrity of the opening it surrounds and provides point of attachment for the cusps. It also separate the atrial musculature from the ventricular musculature. The atrial myocardium originates from the upper border of the rings, whereas the ventricular myocardium originates from the lower border of the rings. The cardiac skeleton also serves as a dense connective tissue partition that electrically isolates the atria from the ventricle. The atrioventricular bundle, which passes through the annulus is the single connection between these two groups of myocardium.

Coronary vasculature

Two Coronary arteries arise from the aortic sinuses in the initial portion of the ascending aorta and supply the muscle and other tissues of the heart.

The returning venous blood passes through cardiac veins, most of which empty into the coronary sinus, this large venous structure is located in the coronary sulcus on the posterior surface of the heart between the left atrium and left ventricle. The coronary sinus empties in to the right atrium between the opening of the inferior vena cava and the right atrioventricular orifice.

Coronary arteries

Right coronary artery

The right coronary artery originates from the right aortic sinus of the ascending aorta. It passes anteriorly and to the right between the right auricle and the pulmonary trunk and then descends vertically in the coronary sulcus, between the right atrium and right ventricle. On reaching the inferior margin of the heart, it turns posteriorly and continuous in the sulcus on to the diaphragmatic surface and base of the heart. During this course, several branches arise from the main stem of the vessel;

- An early atrial branch passes in the groove between the right auricle an ascending aorta ,and gives off the sinu-atrial nodal branch. Which passes posteriorly around the superior vena cava to supply the sinu-atrial node
- A right marginal branch is given off as the right coronary artery approaches the inferior margin of the heart and continuous along this border toward the apex of the heart.
- As the right coronary artery continues on the base diaphragmatic surface of the heart, it supplies a small branch to the atrioventricular node before giving off its final major branch, the posterior interventricular branch, which lies in the posterior interventricular sulcus.

The right coronary ARTERY SUPPLIES the right atrium and right ventricle, the sinu-atrial and atrioventricular nodes, the interatrial septum, a portion of the left atrium, the posteroinferior one-third of the interventricular septum, and a portion of the posterior part of the left ventricle.

Left coronary artery

The left coronary artery originates from the left aortic sinus of the ascending aorta. It passes between the pulmonary trunk and the left auricle before entering the coronary sulcus. While still posterior to the pulmonary trunk, the artery divides into its two terminal branches, the anterior interventricular and the circumflex.

- The anterior interventricular branch (left anterior descending artery-LAD)

Continues around the left side of the pulmonary trunk and descends obliquely toward the apex of the heart in the anterior interventricular sulcus.

- The circumflex branch courses toward the left, in the coronary sulcus and onto the base diaphragmatic surface of the heart and usually ends before reaching the posterior interventricular sulcus. A large branch, the left marginal artery usually arises from it and continues across the rounded obtuse margin of the heart. The distribution pattern of the left coronary artery enables it to supply most of the left atrium and left ventricle and most of the interventricular septum, including the atrioventricular bundle and its branches.

General structure of artery

- Tunica intima
- Tunica media
- Tunica externa

There are three types of arteries which can be classified according to their structure and size. Elastic arteries which include the aorta have a relatively greater diameter and a greater number of elastic fibers. Muscular arteries are smaller in diameter than elastic arteries, but larger than arterioles and they have a relatively larger proportion of muscle compared to connective tissue. Arterioles are the smallest diameter arteries and have a few layers of smooth muscle tissue and almost no connective tissue.

In general, arteries are composed of three layers; the tunica intima (the inner most layer), the tunica media (middle layer), the tunica externa (the outer most layer of the artery)

The lumen of an artery is the inside of the vessels where blood flows. The lumen is lined with the endothelium which forms the interface between the blood and the vessel wall.

Types of arteries

- Elastic arteries
- Muscular arteries
- arterioles

Cardiac veins

The coronary sinus receives four major tributaries; the great, middle, small and posterior cardiac veins.

Great cardiac vein the great cardiac vein begins at the apex of the heart. It ascends in the anterior interventricular sulcus, where it is related to the anterior interventricular artery and is often termed the anterior interventricular vein.

Reaching the coronary sulcus, the great cardiac vein turns to the left and continues onto the base diaphragmatic surface of the heart. At this point, it is associated with the circumflex branch of the left coronary artery, continuing along its path in the coronary sulcus, the great cardiac vein gradually enlarges to form the coronary sinus, which enters the right atrium.

Middle cardiac vein the middle cardiac vein (posterior interventricular vein) begins near the apex of the heart and ascends in the posterior interventricular sulcus toward the coronary sinus. It is associated with the posterior interventricular branch of the right or left coronary artery throughout its course.

Small cardiac vein the small cardiac vein begins in the lower anterior section of the coronary sulcus between the right atrium and right ventricle. It continues in this groove onto the base diaphragmatic surface of the heart where it enters the coronary sinus at its atrial end. It is a companion of the right coronary artery throughout its course and may receive the right marginal vein. This small vein accompanies the marginal branch of the right coronary artery along the acute margin of the heart. If the right marginal vein does not join the small cardiac vein, it enters the right atrium directly.

Posterior cardiac vein the posterior cardiac vein lies on the posterior surface of the left ventricle just to the left of the middle cardiac vein. It either enters the coronary sinus directly or joins the great cardiac vein.

Other cardiac veins

Two additional groups of cardiac veins are also involved in the venous drainage of the heart.

- The anterior veins of right ventricle (anterior cardiac veins) are small veins that arise on the anterior surface of the right ventricle. They cross the coronary sulcus and enter the anterior wall of the right atrium. They drain the anterior portion of the right ventricle. The right marginal vein may be part of this group if it does not enter the small cardiac vein.
- A group of smallest cardiac veins (venae cordis minimae or veins of thebesinus) have also been described. Draining directly into the cardiac chambers, they are numerous in the right atrium and right ventricle, are occasionally associated with the left atrium, and are rarely associated with the left ventricle.

Venules

venules are endothelial tubes that are usually surrounded by a mono layer of vascular smooth muscles cells. Smooth muscle cells in venules are much smaller in diameter but longer than those of arterioles. The smallest venules are more permeable than capillaries. A significant amount of the diffusion that occurs in the microcirculation, therefore, occurs in the venules.

Coronary lymphatics

The lymphatic vessels of the heart follow the coronary arteries and drain mainly into;

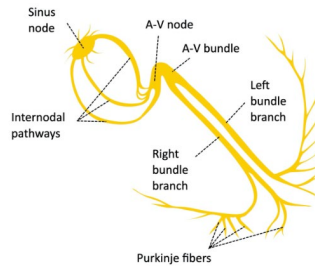
- Brachiocephalic nodes, anterior to the brachiocephalic veins
- Tracheobronchial nodes, at the inferior end of the trachea
-

Cardiac conduction system

The musculature of the atria and ventricles is capable of contracting spontaneously. The cardiac conduction system initiates and coordinates contraction. The conduction system consists of nodes and networks of specialize cardiac muscle cells organized into four basic components;

- The sinu-atrial node
- The atrioventricular node
- The atrioventricular bundle with its right and left bundle branches
- The subendocardial plexus of conduction cells (the pukinje fibers)

The unique distribution pattern of the cardiac conduction system establishes an important unidirectional pathway of excitation\contraction. Throughout its course, large branches of the conduction system are insulated from the surrounding myocardium by connective tissue. This tends to decrease inappropriate stimulation and contraction of cardiac muscle fibers. The number of functional contacts between the conduction pathway and cardiac musculature greatly increases in the subendocardial network.



Sinu-atrial node

Impulses begin at the sinu-atrial node, the cardiac pace maker. This collection of cells is located at the superior end of the crista terminalis at the junction of the superior vena cava and the right atrium. This is also the junction between the parts of the right atrium derived from the embryonic sinus venosus and the atrium proper. The excitation signals generated by the sinu-atrial node spread across the atria, causing the muscle to contract.

Atrioventricular node

Concurrently, the wave of excitation in the atria stimulates the atrioventricular node, which is located near the opening of the coronary sinus, close to the attachment of the septal cusps of the tricuspid valve, and within the atrioventricular septum. The atrioventricular node is a collection of specialized cells that forms the beginning of an elaborate system of conducting tissue, the atrioventricular bundle which extends the excitatory impulse to all ventricular musculature.

Atrioventricular bundle

The atrioventricular bundle is a direct continuation of the atrioventricular node. It follows along the lower border of the membranous part of the interventricular septum before splitting into right and left bundles.

The right bundle branch continues on the right side of the interventricular septum toward the apex of the right ventricle.

The left bundle branch passes to the left side of the muscular interventricular septum and descends to the apex of the left ventricle. Along its course it gives off branches that eventually become continuous with the subendocardial plexus of conduction cells. As with the right side, the network of specialized cells spreads the excitation impulses throughout the left ventricle.

Cardiac innervation

The automatic division of the peripheral nervous system is directly responsible for regulating;

- Heart rate
- Force of each contraction
- Cardiac output

Branches from both the parasympathetic and sympathetic system contribute to the formation of the cardiac plexus. This plexus consists of a superficial part, inferior to the aortic arch and between it and the pulmonary trunk. And a deep part, between the aortic arch and the tracheal bifurcation.

From the cardiac plexus, small branches that are mixed nerves containing both sympathetic and parasympathetic fiber supply the heart, these branches affect nodal tissue and other components of the conduction system, coronary blood vessels, and atrial and ventricular musculature.

Heart valves

Four cardiac valves help to direct flow through the heart. Heart valves cause blood to flow only in the desired direction. If a heart without these valves were to contract; it would compress the blood; causing it to flow both backward and forward.

Instead, under normal physiological conditions heart valve acts as check valves to prevent blood from flowing in the reverse direction. In addition, heart valves remain

closed until the pressure behind the valve is large enough to cause blood to move forward.

Each human heart has two atrioventricular (AV) valves which are located between the atria and the ventricles. The tricuspid valve is the valve between the right atrium and right ventricle. The mitral valve prevent blood from flowing backward into the pulmonary veins and therefore into the lungs, even when the pressure in the left ventricle is very high. The mitral valve is a bicuspid valve, which has two cusps, while a tricuspid valve has three cusps.

The other two valves in the human heart are known as semilunar valves. The two semilunar valves are the aortic valve and the pulmonic valve. The aortic valve is located between the aorta and the left ventricle, and when it closes it prevent blood from flowing backward from the aorta into the left ventricle. The pulmonic valve is located between the right ventricle and the pulmonary artery and when it closes it prevents blood from flowing backward from the pulmonary artery into the right ventricle.

Cardiac orientation

The general shape and orientation of the heart are that of a pyramid that has fallen over and is resting on one of its sides. Placed in the thoracic cavity, the apex of this pyramid projects forward, downward, and to the left, whereas the base is opposite the apex and faces in a posterior direction.

The sides of the pyramid consist of;

- A diaphragmatic (inferior) surface on which the pyramid rests
- An anterior (sternocostal) surface oriented anteriorly
- A right pulmonary surface
- A left pulmonary surface

Medical device

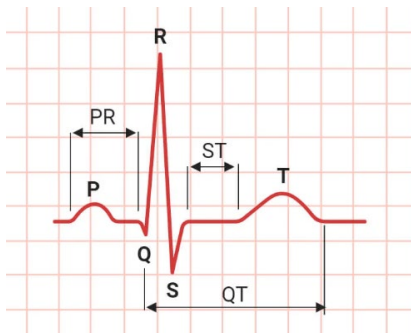
Electrocardiography

Electrocardiography (ECG) measures the heart's electrical activity as it functions.

Electrodes (leads) placed on the body's surface detect the electrical signals, which are then amplified and recorded as a tracing. A normal or sinus rhythm which originates at the SA node, the letters assigned to individual components of one complete cycle;

- The P wave represents electrical change, or depolarization, of the atrial muscles
- The QRS components shows depolarization of the ventricles.
- The T wave shows return, or repolarization of the ventricles to their resting state. Atrial repolarization is hidden by the QRS wave.
- The small U wave, if present, follows the T wave. It is of uncertain origin.

An interval measures the distance from one wave to the next; a segment is a smaller component of the tracing. Many heart disorders, some of which are described later in the chapter, appear as abnormalities in ECG components.



An electrocardiogram (ECG or EKG) is a quick test to check the heartbeat. It records the electrical signals in the heart. Test results can help diagnose heart attacks and irregular heartbeats, called arrhythmias.

ECG machines can be found in medical offices, hospitals, operating rooms and ambulances. Some personal devices, such as smartwatches, can do simple ECGs.

An electrocardiogram (ECG or EKG) is done to check the heartbeat. It shows how fast or how slow the heart is beating. ECG test results can help your care team diagnose:

- Irregular heartbeats, called arrhythmias.
- A previous heart attack.
- The cause of chest pain. For example, it may show signs of blocked or narrowed heart arteries.

An ECG also may be done to learn how well a pacemaker and heart disease treatments are working.

You may need an ECG if you have:

- Chest pain.
- Dizziness, lightheadedness or confusion.
- Pounding, skipping or fluttering heartbeat.
- Fast pulse.
- Shortness of breath.
- Weakness or fatigue.
- Reduced ability to exercise.

If you have a family history of heart disease, you may need an electrocardiogram to screen for heart disease, even if you don't have symptoms. The American Heart Association says ECG screening may be considered for those at low risk of heart disease in general, even if there are no symptoms. Most heart doctors consider an ECG as a basic tool to screen for heart disease, although its use needs to be individualized.

If symptoms tend to come and go, a regular ECG may not find a change in the heartbeat. Your healthcare team may suggest wearing an ECG monitor at home. There are several types of portable ECGs.

- Holter monitor. This small, portable ECG device is worn for a day or more to record the heart's activity. You wear it at home and during daily activities.
- Event monitor. This device is like a Holter monitor, but it records only at certain times for a few minutes at a time. It's typically worn for about 30 days.

You usually push a button when you feel symptoms. Some devices automatically record when an irregular heart rhythm occurs.

Ambulatory Blood pressure monitor	دستگاه فشارخون	Alulosis Ambulatory Infusion Pumps	قلیا خون
Anaurysm	گشاد شدن مجرای شریانی	Anemia	کم خونی
Agina pectoris	درد در سینه	Angio Cardio pathy	بیماری‌های قلیا و عروق خونی
Angiochlecystiti	التهاب کیسه صفرا و عروق صفراوی	Angio -	رگی، مجرای موجود در بدن
Angioectomy	برداشتن رگ	Angio graphy	رگ نگاری
Angioma	تومور خوش‌خیم عروق خونی	Angio plasty	ترسیم یک رگ
Anticoagulant	ضدانعقاد	Aorta	آنورت
Aortostenosis	تنگی آنورت	Apex	نوک قلب یا استخوان کشکک
Arter, Arterio	شریان	Arteries	شریان‌ها، سرخرگ‌ها
Arteriography	سرخرگ نگاری	Arteriol	شریان
Arterioscletrosis	تصلب شرائین	Arterio Venous oxygen difference	تفاوت اکسیژن سرخرگی، سیاهرگی
Arteritis	التهاب سرخرگ	Artery	سرخرگ، شریان
Artificial heart	قلب مصنوعی	Atherosclerosis	تنگی سرخرگی
Atheroma	رسوب کلسترول در جدار عروق	Atrio-	دهلیز - مربوط به دهلیز
Atria	دهلیزها	Atrium Atrio Ventricular	دهلیز
Atrio Ventrical (AV) node	گروه دهلیزی- بطنی	Valves	دریچه‌های دهلیزی- بطنی
Bacteremia	وجود باکتری در خون	Biscupid (mitral) Valve	دریچه دو لتی (میترال)
Blood acidity	اسیدی شدن خون	Blood cells	گلبول‌های خون
Blood Auto Analyzer	دستگاه اتو آنالیز خون (دستگاه تجزیه خودکار خون)	Blood cholesterol	کلسترول خون
Blood counter	شمارنده یاخته‌های خون	Blood dyscrasia	سمیت خون
Blood flow	جریان خون	Blood poisoning	مسمومیت خونی
Blood warmer	گرم کننده خون	Blood pressure	فشارخون
Brady cardia	کاهش ضربان قلب		

Capillarisation	مویرگسازى	Capillary	مویرگ
Cardiac arrest	حمله قلبى	Capillaries	مویرگ‌ها
Cardiac impulse	ضربه قلبى	Cardiac	عضله قلبى
Cardiac output	برونده قلب	Cardiac cycle	دوره قلبى
Cardia rate	ضربان قلب	Cardiac pet (co)	برونده قلبى
Cardiomalacia	نرم شدن موضعى مواد متشکله قلب	Cardio	قلبى، مربوط به قلب
Cardiomegaly	بزرگ شدن قلب	Cardiologist	متخصص قلب
Cardio vascular disease	بیمارى‌هاى قلبى- عروقى	Cardio vascular	قلبى- عروقى
Carotid artery	سرخرگ کاروتید	Cardio vascular endurance	استقامت قلبى-عروقى
Circulation	گردش خون	Circulatory system	سیستم گردش خون
Clog	مسدود شدن به وسیله چربى‌ها	Clotting	انعقاد
Coagulation	انعقاد، لخته شدن	Coarctation aorta	به هم چسبیدن آئورت در اثر فشار
Congestion	آماسى، احتقان، پرخونى	Congestive heart failure	نارسايى احتقانى قلبى
Constituents of blood	اجزای خون	Coronary thrombosis	لخته شدن خون در سرخرگ قلبى
Coronary	کرونى (عروق قلبى)	Corpuscles	گلبول، گویچه
Diameter of blood cells	قطر سلول خونى	Diastolic blood pressure	فشار خون دیاستولى
Dilation	گشادى، اتساع رگ	Embolism	انسداد نسبى یا کامل قسمتى از سیستم عروقى
Electrocardiogram (ECG)	الکتروکاردیوگرام (نوار قلبى)	Endo arteritis	التهاب پوشش داخلى شریان
-emia , -hemia	مربوط به خون	Endo cardium	اندوکاردیوم (درون قلب)
Endocarditis	التهاب و تورم پوشش داخلى قلب	Erythrocytemia	افزایش تعداد گلبول- هاى قرمز و هماتوکریٔت
Erythema multiforme	سرخى یا اریتم	Erythrocyte	گلبول قرمز
Erythro-	مربوط به گلبول قرمز	External counter pulsation (EECP)	روش درمانى غیرتهاجمى جهت درمان نارسايى قلبى و بیمارى‌هاى قلبى- عروقى

Ethylene oxide monitors	آشکارسازهای ضربان قلب جنین (جنین باب)	Ferr/o, ferr/i	آهن، مربوط به آهن بدن
Fasting blood sugar	قندخون ناشتا	Flutter	لرزشی، یک آریتمی قلبی که در آن ضربان قلب زیاد می‌شود
Fibrillation	انقباض نامنظم	Hematoma	هماتوم
Gradiation of construction	مرحله‌ای بودن انقباض	Heart rate	نرخ ضربان قلب
Hematocrit	هماتوکریت	Heart valve	دریچه‌های قلبی
Heart beat	ضربان قلب	Hemo, hemato	مربوط به خون، خونی
Heart sounds	صداهاى قلب	Heroatology analyzer	آنالیزکننده‌های خون شناسی
Heart volume	حجم قلب	Hemato phobia	ترس از خون
Hem arthrosis	وجود خون در حفره مفصلی همتوکریت	Hemo dynamic	خون پویایی
Hematoma	تجمع موضعی خون، خون‌مردگی	Hemorrhage	خون‌ریزی کردن
Heme	خون	HR (heart rate) max	حداکثر تعداد ضربان قلب
Hemodialysis	دستگاه همودیالیز	Hyperglycemia	افزایش قند در خون
Hemostasis	جریان خون	Hyperkalemia	افزایش پتاسیم خون
Hyperemia	پرخونی	Hypocalcemia	کاهش کلسیم خون
Hypernatremia	افزایش سدیم خون	Hyponatremia	کاهش سدیم خون
Hypertension	فشار خون بالا	Infectious arthritis	آرتریت عفونی
Hypoglycemia	کمبود قند در خون	Intravenous	داخل وریدی
Hypotension	فشار خون پایین	Leucopenia	کاهش گلبول‌های سفید خون
Infusion	عمل وارد کردن محلولی در سیاهرگ به منظور درمان	Leukemia, leuchemia	سرطان خون
Ischemia	کم خونی موضعی	Microcirculation	گردش خون کوچک (کمر)
Leucocytosis	افطایش تعداد گلبول‌های سفید خون	Monocytosis	افزایش تعداد مونوسیت‌های خون
Leuk/o, leukocyte/o	سلول سفید خون	Myocardium packed-cells	ماهچه قلب
Lipemia	وجود چربی در خون	Pericarditis	تورم و التهاب پریکارد قلب
Lysemia	تجزیه و تخریب خون	Perimysium	پیرامایچه

Mitral valve	دریچه میترال	Phlebitis	التهاب و تورم سیاهرگ
Monocytes	گلبول‌های سفید بزرگ تک‌هسته‌ای خون	Phlebotomy	بازکردن و برش ورید
Myocarditis	التهاب میوکارد	Polycythemia	زیاد شدن غیرطبیعی گلبول‌های قرمز در خون
Non-thrombugenic surface	سطح ضدانعقاد خون	Precapillary sphincter	اسفینکتر (عضله تنگ کننده) قبل از مویرگ‌ها
Palpitation	تپش سریع قلب	Pulmonary arteries	سرخرگ‌های ریوی
Pericardium peripheral vascular Disease	کیسه برون شامه قلب بیماری عروق محیطی	Pulmonary circulatory system	دستگاه گردش خون ریوی
Phlebo-Platlate	وریدی، مربوط به ورید پلاکت خون	Pulse	نبض
		Red blood cell (RBC)	سلول‌های قرمز خون
		Sino arterial (SA) node	گره سینوسی-دهلیزی
Portal hypertension	افزایش فشار خون	Striped cardiac	بافت راه راه قلبی
Prolapsed	عارضه افتادگی دریچه	Tacycardia	افزایش تعداد ضربان قلب
Pulmoncery blood pressure	فشارخون ریوی		
Pulmonary Veins	سیاهرگ‌های ریوی		
Radial artery	سرخرگ رادیال		
Semilunar valve	دریچه‌های نیم هلالی		
Sphygmo-	ضربان		
Stenotic valves	تنگی دریچه		
Systolic blood pressure	فشارخون سیستولی		
Telangiectasia	بروز ضایعات کانونی به علت اتساع مویرگ‌ها	Thrombo-	لخته خون
Thrombocyte	پلاکت	Thrombophlebitis	التهاب ورید همراه با ترومبوس
Thrombocytopenia	کاهش پلاکت‌های خون	Thrombosis	لخته شدن خون
Thrombose	بیماری فشار رگ‌ها	Transfusion	انتقال خون
Toxemia	مسمومیت خون	Vascular	عروقی
Varico-	ورید تورم	Vasculitis	التهاب و تورم یک رگ
Vascularization	عروقی شدن	Vasodilation	گشاد شدن رگ‌ها
Vasoconstriction	تنگ شدن رگ	Vasomotor control	کنترل و تنظیم گشادی رگ‌ها

Vasomotor center	مرکز کنترل و تنظیم گشادی رگ‌ها	Vena	ورید، سیاهرگی
Vein	سیاهرگ	Venous return Mechanism	مکانیزم بازگشت سیاهرگ
Vena cavae	سیاهرگ بزرگ	Ventricular/ o	خون، بطن
Ventricle	بطن	Vessel	رگ
Venule	سیاهرگچه	Whole blood	آنالیزکننده انعقاد خون
Vinometer control	کنترل حرکت سیاهرگی	coagulation analyzer	(پلازما به علاوه اجزای سلولی)
White blood cell (WBC)	گلبول‌های سفید خون		
Circulatory system			دستگاه گردش خون
Atrium			۲ حفرات فوقانی قلب (دهلیز)
Ventricle			۲ حفرات تحتانی قلب (بطن)
			وریدهای اصلی:
S.V.C (Superior Vena Cava)			ورید اجوف فوقانی
I.V.C (Inferior Vena Cava)			ورید اجوف تحتانی
Jugular			ورید وداجی (ژگولار): سطحی سر و گردن (اصلی)
Myocardial infection			* منکته قلبی
			دریچه‌های قلب:
Tricuspid valve			۱- دریچه تری کوسپید
Mitral valve			۲- دریچه میترال
Pulmonary valve			۳- دریچه پالموناری
			سیستم عروقی:
Arteries			شریان‌ها
Vein			وریدها
Arterioles			شریانچه‌ها
Venules			وریدچه‌ها
Capillaries			مویرگ‌ها
			لایه‌های تشریحی قلب:
Pericardium			لایه خارجی (پریکارد، اپیکارد)
Myocardium			لایه میانی (عضلانی، میوکارد)
Endocardium			لایه داخلی (مخاطی، آندوکارد)
			لایه پریکارد (سینی، سروزی)
Fibrous pricard			۱- لایه خارجی (پریکارد فیبروزی، لیبی)
Serous pricard			۲- لایه داخلی (پریکارد سروزی، اپیکارد)
Parietal layer			I. جداری
Visceral layer			II. احشایی
			ساختمان قلب:

- سطح دیافراگما یعنی مجاور به دیافراگم
 - سطح استرنوکوستال (قدامی) مجاور با دنده‌ها و جناغ
 - سطح ربوی: مجاور با ریه چپ
- شاخه‌های خارج شونده از قوس آنورت:
- تنه شریانی براکیوسفاکیس که به دو شاخه کاروتید مشترک راست و زیر ترقوه‌ای راست تقسیم می‌شود.
 - شریان کاروتید مشترک چپ که مسئول خون رسانی به نیمه‌ی چپ سر و گردن است.
 - شریان زیر ترقوه‌ای چپ که به اندام فوقانی چپ کشیده می‌شود.

Arteries

شریان‌های مهم سر و گردن:

شریان تیروئیدی

شریان زبانی

شریان صورت

پس سری

گیجگاهی

فک فوقانی

شراینین اندام فوقانی:

زیر ترقوه‌ای

Subclavis

Axillary

آگزیلاری (حفره‌ی زیربغل)

Brachial

براکیال (بازویی)

Radialis ulnaris

رادیال اولنار

شراینین حفره لگن:

Iliu lumbor

ایلیو لومبار

گلوتنئال فوقانی

گلوتنئال تحتانی

شراینین اندام تحتانی:

Femoral

شریان فمورال (رانی)

شریان پوپلیته (خم زانو)

شریان تیبال قدامی (از جلوی ساق پا تا پشت پا)

شریان تیبال خلفی (از خلف ساق پا تا کف پا)

شریان‌های مهم گردش خونی بزرگ:

Right internal carotid artery

Right external carotid artery

Right vertebral artery

Right subclavian artery

Brachio cephalic artery

Right axillary artery
 Right and left common carotid arteries
 Left subclavian artery
 Aortic arch
 Ascending aorta
 Descending (thoracic) aorta
 Right brachial artery
 Common hepatic artery
 Descending (abdominal) aorta
 Right common iliac artery
 Right external iliac artery
 Left gastric artery
 Splenic artery
 Left renal artery
 Left radial artery
 Left ulnar artery
 Left internal iliac artery
 Right femoral artery
 Right popliteal artery
 Right posterior tibial artery
 Right anterior tibial artery
 Right peroneal artery
 Right dorsal pedis artery

Veins:

Right
 Pulmonary vein
 Left pulmonary vein
 Superior Vena Cava
 Inferior Vena Cava
 Right external jugular vein
 Right internal jugular vein
 Right subclavian vein
 Superior vena cava
 Right artery vein
 Right and left brachial cephalic vein
 Left cephalic vein
 Left brachial vein
 Right hepatic vein
 Splenic vein
 Left renal vein

وریدها:

وریدهای گردی کوچک:
 وریدهای ریوی راست (X4)
 وریدهای ریوی چپ (X4)
 وریدهای گردشی بزرگ:
 ورید اجوف فوقانی (بزرگ سیاهرگ زیرین)
 ورید اجوف تحتانی (بزرگ سیاهرگ زیرین)
 وریدهای مهم بدن:

Left ulnar vein
 Left Radial Vein
 Inferior Vena Cava
 Right common iliac vein
 Right internal iliac vein
 Right external iliac vein
 Right femoral vein
 Right popliteal vein
 Right peroneal vein
 Right great seplanous vein
 Right dorsalis venous arch

انواع نبض:

- I. سیستول (زمان استراحت) Systole
 II. دیاستول (زمان پرشدن حفرات از خون) Diastole

Pulmonary valve	سیستم داخلی قلب: ۱۷- دریچه پولموناری
Right coronary	۱- شریان کرونری راست
Left anterior descending	۲- شاخه شریان کرونری
Left circumflex	۳- شاخه شریان کرونری
Superior vena cava	۴- ورید اجوف فوقانی
Inferior vena cava	۵- ورید اجوف تحتانی
Aeorta (arota)	۶- آئورت
Pulmonary artery	۷- شریان پولموناری
Pulmonary vein	۸- ورید پولموناری
Right atrium	۹- دهلیز راست
Right ventricle	۱۰- بطن راست
Left atrium	۱۱- دهلیز چپ
Left ventricle	۱۲- بطن چپ
Papillary muscles	۱۳- عضلات پاپیلاست
Chordae tendineae	۱۴- تارهای وتری
Tricuspid valve	۱۵- دریچه تری کوسپید
Mitral valve	۱۶- دریچه میترال
Arteries	سرخرگ‌های اصلی (تحتانی) شریان قمرال شریان زانو شریان خلفی تی‌بیا شریان قدامی تی‌بیا شریان پشتی پا شریان مزانتربیک فوقانی شریان مزانتربیک تحتانی

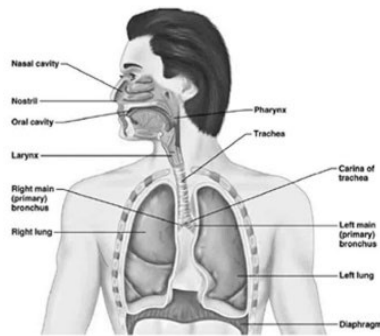
	شریان ایلیاک مشترک
	شریان ایلیاک داخلی
	شریان ایلیاک خارجی
Arteries	سرخرگ‌های اصلی (فوقانی)
	شریان تمپورال سطحی
	شریان صورت
	شریان کاروتید داخلی
	شریان کاروتید خارجی
	شریان زیر ترقوه
	قوس آئورت
	شریان سلپاک
	شریان کلیوی
	شریان کاروتید مشترک
	آئورت صورت
	آئورت نزولی (آئورت شکمی)
	شریان بازویی
	شریان رادیال
	شریان اولنار
	ساختار عمومی شریان‌ها:
Intima	اینیتما (درونی‌ترین لایه شریان)
Media	مدیا (لایه میانی شریان)
Externa	اکسترنال (بیرونی‌ترین لایه شریان)
	دریچه‌های قلب:
Mitral valve	- دریچه میترال (بین دهلیز چپ و بطن چپ)
Tricuspid valve	- دریچه سرعته (بین دهلیز راست و بطن راست)
Pulmonary valve	- دریچه ششی (بین بطن راست و سرخرگ ششی)
Aorta valve	- دریچه آئورت (بین بطن چپ و سرخرگ آئورت)

Unit6

Respiratory system

The main function of the respiratory system is to provide oxygen to body cells for energy metabolism and to eliminate carbon dioxide, a byproduct of metabolism. Because these gases must be carried to and from the cells in the blood, the respiratory system works closely with the cardiovascular system to accomplish gas exchange. This activity has two phases;

- External gas exchange occurs between the outside atmosphere and the blood.
- Internal gas exchange occurs between the blood and the tissues.



Upper respiratory passageways

The upper respiratory passageways consist of the nose and pharynx. Air can also be exchanged through the mouth, but there are fewer mechanisms for cleansing the air taken in by this route.

The nose

Air enters through the nose, where it is warmed, filtered, and moistened as it passes over the hair-covered mucous membranes of the nasal cavity. Cilia- microscopic hair-like projections from the cells that line the nasal passageways sweep dirt and foreign material toward the throat for elimination. Receptors for the sense of smell are located within bony side projections of the nasal cavity called conchae.

The pharynx

Inhaled air passes into the throat, or pharynx, where it mixes with air that enters through the mouth and also with food destined for the digestive tract. The pharynx is divided into three regions;

- The nasopharynx is the superior portion located behind the nasal cavity.
- The oropharynx is the middle portion located behind the mouth
- The laryngopharynx is the inferior portion located behind the larynx

Lower respiratory passageways and lungs

Air moves from the pharynx into the larynx, commonly called the voice box, because it contains the vocal folds, or cords.

The larynx

The larynx is shaped by nine cartilages, the most prominent of which is the anterior thyroid cartilage that forms the "adam's apple". The small leaf-shaped cartilage at the top of the larynx is the epiglottis.

The larynx contains the vocal folds, bands of tissue that are important in speech production. Vibrations produced by air passing over the vocal folds form the basis for voice production, although portions of the throat and mouth are needed for proper speech articulation. The opening between the vocal folds is the glottis (the epiglottis is above the glottis)

The trachea

The trachea is a tube reinforced with C-shaped rings of cartilage to prevent its collapse (you can feel these rings if you press your fingers gently against the front of your throat). The trachea is contained in a region known as the mediastinum, which consists of the space between the lungs together with the organs contained in this space. In addition to the trachea, the mediastinum contains the heart, esophagus, large vessels, and other tissues.

The bronchial system

At its lower end, the trachea divides into a right and a left primary bronchus, which enter the lungs. The right bronchus is shorter and wider; it divides into three secondary bronchi in the right lung. The left bronchus divides into two branches that supply the left lung. Further divisions produce an increasing number of smaller tubes that supply air to smaller subdivisions of lung tissue. As the air passageways progress through the lungs, the cartilage in the walls gradually disappears and is replaced by smooth muscle.

The smallest of the conducting tubes, the bronchioles, carry air into the microscopic air sacs, the alveoli, through which gases are exchanged between the lungs and the blood.

Breathing

One of the most important functions of the thorax is breathing. The thorax not only contains the lungs but also provides the machinery necessary the diaphragm, thoracic wall, and the ribs for effectively moving air into and out of the lungs.

Up and down movements of the diaphragm and changes in the lateral and anterior dimensions of the thoracic wall, caused by movements of the ribs, alter the volume of the thoracic cavity and are key elements in breathing.

Air is moved into and out of the lungs by the process of breathing, technically called pulmonary ventilation. This consists of a steady cycle of inspiration and expiration, separated by a period of rest. Breathing is normally regulated unconsciously by centers in the brainstem. These centers adjust the rate and rhythm of breathing according to changes in the blood composition, especially the concentration of carbon dioxide.

- The three most important functions of the respiratory system are gas exchange, acid-base balance and the production of sound. The most basic activity of the respiratory system is to supply oxygen for metabolic needs and to remove carbon dioxide. Carbon dioxide which is carried in the hemoglobin of our red blood cells, is exchanged in the lungs for oxygen, which is also carried in the hemoglobin. Fresh air which we continuously inspire into the lungs is exchanged for air that has been enriched with carbon dioxide. Increases in carbon dioxide lead to increases in hydrogen ion concentration resulting in lower pH or more acidity.

The respiratory system aids in acid-base balance by removing carbon dioxide from the body.

Phonation, or the production of sounds by air movement through vocal cords, is the third important function of the respiratory system. When you speak, the muscle of respiration cause air to move over the vocal cords and through the mouth resulting in intelligible sounds.

To understand the path of air through the respiratory system, consider the system components, which include two lungs, a trachea, bronchi, bronchioles, alveoli, and their associated blood vessels.

Air enters the respiratory system through the mouth or nose, after being filtered and heated, the air passes through the pharynx and the larynx. It then enters the trachea from where it passes to the bronchial tree. There are three generations of bronchi, which are conducting airways greater than about 0.5cm in diameter. Bronchioles are also conducting airways that have diameters greater than approximately 0.05cm. there are approximately 13 generations of bronchioles, with the last generation being known as terminal bronchioles. Beyond the terminal bronchioles, air enters the transitional zone. There are several generations of respiratory bronchioles, just beyond the bronchi.

Respiratory bronchioles have a diameter of approximately 0.05cm and a length

of about 0.1cm. at the ends of the respiratory bronchioles, air passes into alveolar ducts and finally into alveolar sacs. Alveolar ducts and alveolar sacs make up the respiratory zone of the respiratory system.

At the left, you can see the gross structure of the right lung and the conducting airways. At the upper right, the branching of a bronchiole can be seen. Finally at the lower right, at highest magnification, respiratory bronchioles, alveolar ducts, alveolar sacs,

Ventilation

Is the act of supplying air into the lungs and perfusion is the pumping of blood into the lungs.

The ratio of ventilation to perfusion is important for lung function and is represented as the ventilation\perfusion ratio.

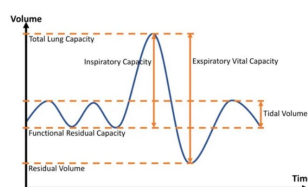
Hyper ventilation

Oxygen and carbon dioxide in blood are carried in hemoglobin, a substance inside red blood cells. Hemoglobin in oxygenated blood that is returning from areas of the lung where gas exchange has occurred is normally saturated. Therefore, hyperventilation of room air will not add much oxygen to the blood stream. If a patient suffers from low oxygen due to a mismatch in ventilation and perfusion, the patient must breathe air with a higher percentage of oxygen than that which occurs in room air.

alveolar ventilation

alveolar ventilation is the exchange of gas between the alveoli and the external environment. It can be measured as the volume of fresh air entering and leaving the alveoli each minute. Oxygen from the atmosphere enters the lungs through this ventilation and carbon dioxide from the venous blood returns to the atmosphere.

Physicians and biomedical engineers often discuss alveolar ventilation in terms of standard lung volumes.



Tidal volume

Tidal volume (TV) is the volume of ambient air entering and leaving the mouth and nose per minute during normal, unforced breathing.

(normal TV for a healthy 70Kg adult is approximately 500mL per breath, but this value can vary considerably during exercise.

Residual volume

Residual volume (RV) is the volume of air left in the lungs after maximal forced expiration. This volume is determined by a balance between muscle forces and the elastic recoil of the lungs. RV is approximately 1.5L in a healthy 70Kg individual. RV is much greater for individuals with emphysema. (is a chronic disease in which air spaces beyond bronchioles are increased)

Expiratory reserve volume

Expiratory reserve volume (ERV) is the volume of air expelled from the lungs during a maximal forced expiration that begins at the end of normal tidal expiration. The ERV plus the RV combine to make up the functional residual capacity. Normal ERV for our standard 70Kg individual is approximately 1.5L.

Inspiratory reserve volume

Inspiratory reserve volume (IRV) is the volume of air that is inhaled during forced maximal inspiration beginning at the end of normal tidal inspiration. This volume depends on muscle mal

The IRV of a healthy 70Kg individual is approximately 2.5L.

Functional residual capacity

Functional residual capacity (FRC) is the volume in the lungs at the end of normal tidal expiration. FRC depends on the equilibrium point at which the elastic inward recoil of the lungs balances the elastic outward recoil of the chest wall. FRC consists of the sum of the RV and the ERV. The FRC of a healthy 70Kg adult is approximately 3L.

Inspiratory capacity

Inspiratory capacity (IC) is the volume of air taken into the lungs during a maximal inspiratory effort that starts at the end of a normal TV expiration. IC is the sum of TV and IRV and can be represented by $IC = IRV + TV$. the IC of our healthy 70Kg adult is about 3L.

Total lung capacity

Total lung capacity (TLC) is the volume of air in the lungs after a maximal inspiratory effort. The strength of contraction of inspiratory muscle and the inward elastic recoil of the lungs and the chest wall determine the TLC. The TLC is also equal to the sum of the IRV, the TV, the ERV, and the RV.

A typical value for TLC of a healthy 70Kg male is about 6L.

Vital capacity

Vital capacity (VC) is the volume of air expelled from the lung during a maximal expiratory

effort after a maximum forced inspiration. The VC is the difference between the TLC and the RV.

VC in a normal healthy 70Kg adult is about 4.5L.

Muscles of inspiration

The rib muscles (external intercostals) raise and enlarge the rib cage when contracted. The diaphragm and the rib muscles contract simultaneously during inspiration. If they did not, the contraction of the external intercostals could cause the diaphragm to be pulled upward.

Accessory muscles are not used in normal quiet breathing. They are used, however during heavy breathing as in exercises and during the inspiratory phase of sneezing and coughing. An example of an accessory muscle is the sternocleidomastoid, which elevates the sternum to increase the anteroposterior (front to back) and the transverse (side to side) dimensions of the chest.

Muscles of expiration

Expiration is passive during quiet breathing and no muscle contraction is required. The elastic contraction, or recoil, of alveoli due to alveolar stiffness is enough to raise the alveolar pressure above atmospheric pressure, the condition required for expiration.

Active expiration occurs during exercise, speech, singing, and the expiratory phases of coughing and sneezing. Active expiration may also be required due to pathologies such as emphysema. Muscles of active expiration are the muscles of the abdominal wall including the rectus abdominis, external and internal obliques, transverse abdominis and internal intercostals.

Movement of the thoracic wall and diaphragm during breathing

One of the principal functions of the thoracic wall and the diaphragm is to alter the volume of the thorax and thereby move air in and out of the lungs.

During the breathing dimension of the thorax change in the vertical, lateral and anteroposterior direction. Elevation and depression of the diaphragm significantly alter the vertical dimensions of the thorax. Depression results when the muscle fibers of the diaphragm contract. Elevation occurs when the diaphragm relaxes.

Changes in the anteroposterior and lateral dimensions result from elevation and depression of ribs. The posterior ends of the ribs articulate with the vertebral column, whereas the anterior most of ribs articulate with the sternum or adjacent ribs.

Because the anterior ends of the ribs are inferior to the posterior ends, when the ribs are elevated, they move the sternum upward and forward.

Nasal cavities

The two nasal cavities are the upper most parts of the respiratory tract and contain the olfactory receptors. They are elongated wedge-shaped spaces with a large inferior base and a narrow superior apex and are held open by a skeletal framework consisting mainly of bone and cartilage.

The smaller anterior regions of the cavities are enclosed by the external nose, whereas the larger posterior regions are more central within the skull. The anterior apertures of the nasal cavities are the nares, which open onto the inferior surface of the nose. The posterior apertures are the choanae which open into the nasopharynx.

larynx and pharynx

the larynx is the upper part of the lower airway and is attached below to the top of the trachea and above, by a flexible membrane, to the hyoid bone, which in turn is attached to the floor of the oral cavity. A number of cartilages form a supportive frame work for the larynx, which has a hollow central channel. The dimensions of this central channel can be adjusted by soft tissue structures associated with the laryngeal wall. The most important of these are two lateral vocal folds, which project toward each other from adjacent sides of the laryngeal cavity. The upper opening of the larynx (laryngeal inlet) is tilted posteriorly and is continuous with the pharynx.

The pharynx is a chamber in the shape of a half-cylinder with walls formed by muscles and fascia. Above, the walls are attached to the base of the skull, and below to the margins of the esophagus. On each side, the walls are attached to the lateral margins of the nasal cavities, the oral cavity, and the larynx therefore open into the anterior aspect of the pharynx, and the esophagus opens inferiorly.

The part of the pharynx posterior to the nasal cavities is the nasopharynx. Those parts posterior to the oral cavity and larynx are the oropharynx and laryngopharynx respectively.

Larynx

The larynx is a hollow musculoligamentous structure with a cartilaginous frame work that caps the lower respiratory tract. The cavity of the larynx it continues below with the trachea, and above opens into the pharynx immediately posterior and slightly inferior to the tongue and the posterior opening of the oral cavity.

The larynx is both a valve (or sphincter) to close the lower respiratory tract, and an instrument to produce surround. It is composed of;

- Three large unpaired cartilage
- Three pairs of smaller cartilages
- A fibro-elastic membrane and numerous muscles

Pharynx

The pharynx is a musculofascial half-cylinder that links the oral and nasal cavities in the head to the larynx and esophagus in the neck. The pharyngeal cavity is a common pathway for air and food. The pharynx is attached above to the base of the skull and is continues below.

The walls of the pharynx are attached anteriorly to the margins of the nasal cavities, oral cavity and larynx. Based on these anterior relationships the

pharynx is subdivided into three regions, the nasopharynx, oropharynx, and laryngopharynx;

- The posterior apertures (choanae) of the nasal cavities open into the nasopharynx
- The posterior opening of the oral cavity opens into the oropharynx
- The superior aperture of the larynx opens into the laryngopharynx

In addition to these openings, the pharyngeal cavity is related anteriorly to the posterior one-third of the tongue and to the posterior aspect of the larynx. The pharyngotympanic tubes open into the lateral walls of the nasopharynx.

Nasopharynx

The nasopharynx is behind the posterior apertures of the nasal cavities and above the level of soft palate. Its ceiling is formed by the sloping base of the skull and consists of the posterior part of the body of the sphenoid bone and the basal part of the occipital bone. The ceiling and lateral walls of the nasopharynx form a domed vault at the top of the pharyngeal cavity that is always open.

The cavity of the nasopharynx is continuous below with the cavity of the oropharynx at the pharyngeal isthmus. The position of the pharyngeal isthmus is marked on the pharyngeal wall by a mucosal fold caused by the underlying palatopharyngeal sphincter, which is part of the superior constrictor muscle.

Elevation of the soft palate and constriction of the palatopharyngeal sphincter closes the pharyngeal isthmus during swallowing and separates the nasopharynx from the oropharynx.

The most prominent features on each lateral wall of the nasopharynx are;

- The pharyngeal opening of the pharyngotympanic tube
- Mucosal elevations and folds covering the end of the pharyngotympanic tube and the adjacent muscles

The opening of the pharyngotympanic tube is posterior to and slightly above the level of the hard palate, and lateral to the top of the soft palate.

Lungs

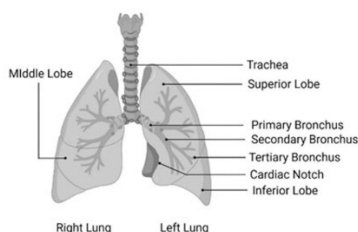
The two lungs are organs of respiration and lie on either side of the mediastinum surrounded by the right and left pleural cavities. Air enters and leaves the lung via main bronchi, which are branches of the trachea.

The pulmonary arteries deliver deoxygenated blood to the lungs from the right ventricle of the heart, oxygenated blood returns to the left atrium via the pulmonary veins.

The right lung is normally a little larger than the left lungs because the middle mediastinum, containing the heart, bulges more to the left than to the right.

Each lung has a half-cone shaped, with the base, apex, two surfaces and three borders;

- The base sits on the diaphragm the apex projects above rib1 and into the root of the neck
- The two surfaces – the costal surface lies immediately adjacent to the ribs and intercostal spaces of the thoracic wall. The mediastinal surface lies against the mediastinum anteriorly and the vertebral column posteriorly and contains the comma-shaped hilum of the lung through which structures enter and leave.
- The three borders – the inferior border of the lung is sharp and separates the base from the costal surface. The anterior and posterior borders separate the costal surface from the medial surface. Unlike the anterior and inferior borders, which are sharp, the posterior border is smooth and rounded.



Right lung

The right lung has three lobes and two fissures normally the lobes are freely movable against each other because they are separated; almost to the hilum by invaginations of visceral pleura. These invaginations from the fissures;

- The oblique fissure separates the inferior lobe (lower lobe) from the superior lobe and the middle lobe of the right lung
- The horizontal fissure separates the superior lobe (upper lobe) from the middle lobe.

Left lung

The left lung is smaller than the right lung and has two lobes separated by an oblique fissure.

The oblique fissure of the left lung is slightly more oblique than the corresponding fissure of the right lung.

Bronchial tree

The trachea is a flexible tube that extends from vertebral. The trachea is held open by C-shaped transverse cartilage rings embedded in its wall the open part of the C facing posteriorly. The lowest tracheal ring has a hook-shaped structure, the carina, that projects backward in the midline between the origins of the two main bronchi the posterior wall of the trachea is composed mainly of smooth muscle.

Each main bronchus enters the root of a lung and passes through the hilum into the lung itself.

Bronchopulmonary segments

A bronchopulmonary segment is the area of lung supplied by a segmental bronchus and its accompanying pulmonary artery branch.

Tributaries of the pulmonary vein tend to pass intersegmentally between and around the margins of segments.

Each bronchopulmonary segment is shaped like an irregular cone with the apex at the origin of the segmental bronchus and the base projected peripherally onto the surface of the lung.

A bronchopulmonary segment is the smallest, functionally independent region of a lung and the smallest area of lung that can be isolated and removed without affecting adjacent regions.

There are ten bronchopulmonary segments in each lung;

Pulmonary arteries

The right and left pulmonary arteries originate from the pulmonary trunk and carry deoxygenated blood to the lungs from the right ventricle of the heart.

- Right pulmonary artery

The right pulmonary artery is longer than the left and passes horizontally across the mediastinum. It passes;

- Anteriorly and slightly inferiorly to the tracheal bifurcation and anteriorly to the right main bronchus

- Posteriorly to the ascending aorta, superior vena cava, and upper right pulmonary vein.

The right pulmonary artery enters the root of the lung and gives off a large branch to the superior lobe of the lung. The main vessel continues through the hilum of the lung, gives off a second branch to the superior lobe, and then divides to supply the middle and inferior lobes.

- **Left pulmonary arteries**

The left pulmonary artery is shorter than the right and lies anterior to the descending aorta and posterior to the superior pulmonary vein. It passes through the root and hilum and branches within the lung.

Pulmonary veins

On each side a superior pulmonary vein and an inferior pulmonary vein carry oxygenated blood from the lungs back to the heart. The veins begin at the hilum of the lung, pass through the root of the lung, and immediately drain into the left atrium.

Bronchial arteries and veins

The bronchial arteries and veins constitute the nutritive vascular system of the pulmonary tissues (bronchial walls and glands, wall of large vessels, and visceral pleura). They interconnect within the lung with branches of the pulmonary arteries and veins.

The bronchial arteries originate from the thoracic aorta or one of its branches;

- A single right bronchial artery normally arises from the third posterior intercostal artery (it originates from the upper left bronchial artery)
- Two left bronchial arteries arise directly from the anterior surface of the thoracic aorta and the inferior one inferior to the left bronchus.

The bronchial arteries run on the posterior surface of the bronchi and ramify in the lungs to supply pulmonary tissues.

The bronchial veins drain into;

- Either the pulmonary veins or the left atrium
- Into the azygos vein on the right or into the superior intercostal vein or hemiazygos vein on the left.

Pleural cavity

Two pleural cavities one on either side of the mediastinum surround the lungs;

- Superiorly, they extend above rib 1 into the root of the neck
- Inferiorly, they extend to a level just above the costal margin
- The medial wall of each pleural cavity is the mediastinum

Pleura

Each pleural cavity is lined by a single layer of flat cells, mesothelium, and an associated layer of supporting connective tissue, together, they form the pleura.

The pleura is divided into two major types, based on location;

- Pleura associated with the walls of a pleural cavity is parietal pleura
- Pleura that reflects from the medial wall and onto the surface of the lung is visceral pleura, which adheres to and covers the lung.

Each pleural cavity is the potential space enclosed between the visceral and parietal pleurae.

They normally contain only a very thin layer of serous fluid. As a result, the surface of the lung, which is covered by visceral pleura, directly opposes and freely slides over the parietal pleura attached to the wall.

MEDICAL DEVICE

Ventilator

ventilator, sometimes called a mechanical ventilator, is a machine that helps you breathe when you're sick, injured, or sedated for an operation. It pumps oxygen-rich air into your lungs. It also helps you breathe out carbon dioxide, a harmful waste gas your body needs to get rid of.



Absence of breathing	قطع تنفسی	-pne, -pneo	مربوط به تنفس
Adam's apple	برآمدگی حنجره	Accessory muscles of respiration	عضلات فرعی تنفسی
Air conduction (AC)	راه هوایی (ادیو متری)	Acute	حاد
Apnea	ایست موقت تنفس	Alveolus	حبابچه، حبابچه‌های ریوی
Asthma	آسم	Asphyxia	خفگی، قطع تنفس
Brady pnea	کاهش تنفس	Atelectasis	روی هم خوابیدن حباب-های ریوی
Breath	تنفس، ورود و خروج هوا	Branchi	نایژه‌ها
Breathing	تنفس کردن	Breathe	تنفس کردن
Bronchiole	برونشیول	Bronch	نایژه
Bronchitis	التهاب و تورم برونش‌ها	Bronchiole	نایژک
Broncho pneumonia	ذات‌الریه	Broncho-	شش، مربوط به شش
Bronchoscopy	معاینه نایژه	Bronchos tenosis	باریک و تنگ شدن مجرای برونش
COPDC chronic obstructive pulmonary disease	بیماری انسداد مزمن ریوی	Bronchus	نایژه
Eupnea	تنفس طبیعی	Electrical artificial larynx	حنجره مصنوعی برقی

Expirations	بازدم	Excess post exercise oxygen consumption (EPOC)	مصرف زیاد اکسیژن ورزش
Expiratory reserve volume (ERV)	حجم باقی‌مانده در بازدم تنفس	Expiratory	ظرفیت بازدم
Frequency of breaths	تعداد تنفسی	Forced expiratory volume	حجم نهایی بازدم تنفسی
Gaseous exchange	تبادل گازها	Functional residual capacity (FRC)	ظرفیت باقی مانده عملی
Halitus	خارج ساختن هوای بازدمی	Glottis	دهانه حنجره
hypoventilation	کاهش تدریجی قدرت، تحلیل عضلانی	Hyperpnea	افزایش تنفسی
Inhaled air	هوای دم	Induce into	به درون رسیدن
Inspiratory capacity (IC)	ظرفیت دمی	Inspiration reserve volume	حجم ذخیره‌ای
Inspiratory reserve capacity	ظرفیت ذخیره دمی	Inspiratory muscles	عضلات دمی
Laryngitis	التهاب و تورم حنجره	Laryngology	حنجره، مربوط به حنجره
Larynx	حنجره	laryngoscope	معاینه حنجره (وسیله)
Lung capacity	ظرفیت شش	Lung	شش، ریه
		Lung squeeze	تنگی ریه‌ها
Amelia	فقدان کامل اندام‌ها	Afferent	نرون آوران
Amnesia	کاهش یا فقدان در یادآوری	Ament	ناقص العقل
Anarthria	فقدان کامل اندام‌های تولید گفتار به دلیل ضایعات اعصاب محیطی	Amnesia	فراموشی
Autonomous	خودمختار	Automatic nervous system (ANS)	دستگاه عصبی خودکار
Axillary nerve	عصب زیر بغلی	Autophonia	خودشنیداری
Brain damage	آسیب مغزی	Brain	مغز
Brain wave	موج مغزی	Brain disease	بیماری مغزی
Center nervous system (CNS)	دستگاه عصبی مرکزی	Caudal	به سمت انتهای تحتانی نخاع
Cerebellum-Cerebral	مربوز به مخچه مغزی	Cephalgia	درد مغزی
		Cerebellum	مخچه

Cerebral vascular accident (CVA)	سکته مغزی	Cerebral palsy	فلج مغزی
Cerebro spinal	مغزی نخاعی	Cerebro-	مربوط به مخ
Cerebro vascular accident	ضایعه عروقی مغز	Cerebro spinal fluid	مایع مغزی نخاعی
Cortex	قشر مغزی	Concussion	تکان مغزی
Delirium	روان آشفتگی	Cortical	قشری
Delusion	هذیان گفتن	Delocalization	عدم استقرار
Quiet breathing	تنفس آرام	Denervation	عصب برداری
Respiration	تنفس	Residual lung volume	حجم باقی مانده ششی
Respiratory bronchiole	نایژک تنفسی	Respiratory	تنفسی
Respiratory exchange ratio (RER)	نسبت تعادل تنفسی	Respiratory center	مرکز تنفسی
Respiratory quotient (RQ)	بهره تنفسی	Respiratory pump	تلمبه تنفسی
Spirometer	تنفس سنج	Respiratory therapist	درمانگر تنفسی
Tidal Volume (TV)	حجم جاری	Trachypnea	تنفس سریع
Total lung capacity	ظرفیت کل ریوی	Tissue respiration	تنفس بافت
Upper respiratory	عفونت دستگاه تنفسی فوقانی	Total lung volume	حجم کلی ریه
Vital capacity (VC)	ظرفیت حیاتی	Ventilator	تهویه کننده، ونتیلاتور
Winding	بند آمدن نفس	Vital signs	نشانه‌های حیاتی
		Wind pipes	نای

Respiratory system

دستگاه تنفسی:

دستگاه تنفسی از نظر آناتومیک

- I. دستگاه تنفسی فوقانی (از بینی تا حنجره)
- Upper respiratory tract (URT)
- II. دستگاه تنفسی تحتانی (از حنجره تا حباب- های هوایی)
- Lower respiratory tract (LRT)

Respiration	عمل تنفس
Inspiration	دم
Expiration	بازدم
Respiratory system:	اجزا دستگاه تنفس:
Nasal cavity	حفرات بینی
Pharynx	- حلق
Naso pharynx	I. نازوفارنکس (حلق بینی)
Oro pharynx	II. اوروفارنکس (حلق دهانی)
Larngo pharynx	III. لارنگو فارنکس (حلق حنجره‌ای)
Larynx	حنجره (گلوت، اپی گلوت، تارهای صوتی)
Trachea	تراشه، نای

Bronchus	نایژه (برونش)	
Bronchus principalis	I. برونش‌های اصلی	
Bronchus lobaris	II. برونش‌های لوبی	
Bronchiol	نایژک (برونشیول)	
Lung	- ریه	
Alveol	I. ریه	
Mediastan	II. حفره ریوی (میاستن)	
Pleura	III. پرده جنب (پلور)	
	- غضروف‌های تعداد فرد حنجره:	
	غضروف اپی‌گلوت	
	غضروف تیروئید	
	غضروف کریکونید (انگشتری)	
	- غضروف‌های تعداد زوج حنجره:	
	غضروف‌های آرتنوئید (هرمی)	
	غضروف‌های میخی	
	غضروف‌های شاخی	
	عمل تنفسی	
Ventilation	۱- تهویه	
Diffusion	۲- انتقال گازها	
Perfusion	۳- خون رسانی	
	ارگان‌هایی که در عمل تهویه نقش دارند:	
Cortex	۱- کورتکس مغز	
Pons	۲- پل مغزی	
Medulla oblongata	۳- بصل انخاع	
Nerves	۴- اعصاب	
Chest	۵- قفسه صورت	
	عمل تهویه از سه طریق کنترل می‌شود:	
Neurogenic control	۱- کنترل عصبی	
Voluntary	I. ارادی	
Involuntary	II. غیرارادی	
Chemical control	۲- کنترل شیمیایی	
Mechanical control	۳- کنترل مکانیکی	
	داخل ریه:	
Mocus	I. مخاط‌های تنفسی	
Stretch receptors	II. عضلات صاف جدار برونش‌ها	
Junctional receptors	III. بافت همبندی بین آلونول‌ها و مویرگ‌ها	
Surfactant	IV. مایعی که در جدار آلونول ترشح می‌شود	
Interstitial elastic tissue	V. بافت همبندی	
	خارج ریه	

Diaphragm	I. دیافراگم
Internal	II. عضلات بین دنده‌ای داخلی
External	III. عضلات بین دنده‌ای خارجی
	IV. مهره‌های پشتی
Ribs	V. دنده‌ها
Pelura	VI. پلورا
Accessory Respiratory Muscles:	عضلات فرعی تنفسی:
Anterior Scalenum	اسکالنوم قدامی
Sterno cleido mastoid	عضله جناغی حنبری پستانی
Sternum	استرنوم
	اختلالات ریه:
Ventilation Defect	- اختلالات تهویه
Diffusion Defect	- اختلالات دیفیوژن
Interstitial pneumonia	I. عفونت‌های فضای همبندی
Interstitial fibrosis	II. فیبروز در بافت همبندی
Interstitial edema	III. اجتماع مایع در بافت همبندی
Perfusion Defects	- اختلالات پرفیوژن
Dyspnea	تنگی نفس
Hemoptysis	خلط خونی
	روش‌های تشخیص اختلالات ریه:
Inspection	نگاه (مشاهده نقص ناشی از مجاری تنفسی در پاسچر بدن)
Palpation	لمس
Percussion	دق
Auscultation	سمع
Normal lung sounds	I. صداهای طبیعی
Abnormal lung sounds	II. صداهای غیرطبیعی
	بخش تنفس و ریه:
	آناتومی دستگاه تنفس (دستگاه تنفسی از نظر آناتومیک)
Nose	بینی
Nasal septum	I. غضروف بین در سوراخ بینی
Nasopharynx	II. نازوفارنکس
Lacrimal duct	III. مجاری اشک
Oropharynx	IV. اوروفارنکس
Soft plate	V. کام نرم
Larynx	VI. لارنکس
Trachea	نای
Upper division	I. لوب فوقانی
Truncus intermedius	II. لوب میانی
	III. لوب تحتانی
Lingual	IV. لینگولا
	انشعابات لوب‌ها: (طرف چپ)

	لوب فوقانی طرف چپ:
Anterior segment	۱. سگمنت قدامی
Apico posterior segment	۲. سگمنت فوقانی و خلفی
	لینگولا در طرف چپ:
Superior segment	۳. سگمنت بالایی
Inferior segment	۴. سگمنت پایینی
	لب تحتانی طرف چپ:
Basal Apical Segment	۵. سگمنت فوقانی تحتانی
Basal Anterior Segment	۶. سگمنت قدامی تحتانی
Basal Posterior Segment	۷. سگمنت خلفی تحتانی
Basal Lateral Segment	۸. سگمنت طرفی تحتانی
* در طرف چپ چون قلب قرار می‌گیرد در لوب تحتانی، سگمنت داخلی یا medial نداریم.	
انشعابات لوب‌ها (طرف راست):	
	لوب فوقانی طرف راست:
Apical Segment	۱. سگمنت فوقانی
Posterior Segment	۲. سگمنت خلفی
Anterior Segment	۳. سگمنت قدامی
	لوب میانی طرف راست:
Medial Segment	۴. سگمنت داخلی
Lateral Segment	۵. سگمنت طرفی
Cardiac Segment	۶. سگمنت قلبی
	لوب تحتانی طرف راست:
Basal Apical Segment	۷. سگمنت فوقانی تحتانی
Basal Posterior Segment	۸. سگمنت خلفی تحتانی
Basal Anterior Segment	۹. سگمنت قدامی تحتانی
Basal Lateral Segment	۱۰. سگمنت طرفی تحتانی
Basal Medial Segment	۱۱. سگمنت داخلی تحتانی
Pleura	پلورا
Parietal layer	۱. لایه جداری
Visceral layer	۲. لایه احشایی
Transverse fissure	I. شکاف مایل
Oblique fissura	II. شکاف مایل
Subpulmonic effusion	مایع پلور
Mediastinum	مدیاستین
Chest wall	قفصه سینه

۳ سوراخی که از دیافراگم عبور می‌کنند:

- ۱- سوراخ از وناگومی که شل شدن عضلات اطراف و ایجاد فتق (Hiatal Herna) می‌کند.
- ۲- Caval opening که ورید Vena cava inferior از آن عبور می‌کند.
- ۳- سوراخ آئورت که Descending Aorta از آن عبور می‌کند.

تقسیمات آناتومیکی پرونش‌ها:

Terminal Bronchiol < sub segment < segment < Lobe <

Acinus

Alveolar duct -۱

Alveolar Sacrimal -۲

Respiratory Bronchiol برونش‌های تنفسی -۳

ساختمان میکروسکوپی برونش:

- ۱- مخاط برونش که از columnar cells تشکیل شده، شرموار هستند و در سیستم دفاعی نقش دارند گاهی در لابلاهی آنها mucus secreting cells، Goblet cells دیده می‌شود، که کارشان مولکولی ترشح کردن است که ما به شکل خلط دفع می‌کنیم.
 - ۲- Basement membrane از فیبروکلژن تشکیل شده و خاصیت الاستیک دارد.
 - ۳- عضلات صاف smooth muscle همراه با submucosal gland که می‌توانند موکوسی ترشح کنند. در این لایه عصبی و رگ‌های خونی و لنفاوی وجود دارد.
- در محل آلوئول‌ها، یک طرف اپی‌تلیوم آلوئول و یک طرف اندوتلیوم مویرگ‌ها و هرکدام یک Basement membrane است که بسیار باریک است و بین این دو بافت همبندی Intersitial tissue قرار دارد.
- سیستم دفاعی ساختمان تنفسی:

Structural or general defence mechanism

Nose	بینی
Epiglottis	اپی گلوت
Vocal cords	تارهای صوتی
Trachea	نای
Cough	I. سرفه
Mucous secretion	II. ترشحات تراشه
Ciliae	III. مژک‌ها
Alveoli	آلوئول
Respiratory Infections	راه‌های ورود عفونت‌ها به ریه (عفونت‌ها به ریه (عفونت‌های ریه)
Blood	خون
Lymph	لنف
Respiratory Airway	راه تنفسی
Stomach	معده (شکمی)
Contiguity	عفونت‌های هم جوار ریه، جانبی ریه
Respiratory failure	نارسایی تنفسی
Cortex causes	کورتکس
Thoracic causes (intra thoracic)	عفونت‌های ریوی
Acute obstruction	انسداد حاد
Pulmonary edema	تجمع مایع ریه
Cardio genic edema	قلب قادر به تخلیه خونی کار دیو می‌گیرد نمی‌باشد

Unit7

Nervous system

The nervous system and the endocrine system coordinate and control the body. Together they regulate our responses to the environment and maintain homeostasis. Whereas the endocrine system functions released chemicals called neurotransmitter.

The nervous system may be divided structurally into two parts;

- The central nervous system (CNS), consisting of the brain and spinal cord.
- The peripheral nervous system (PNS), consisting of all nervous tissue outside the brain and spinal cord.

Functionally, the nervous system can be divided into the;

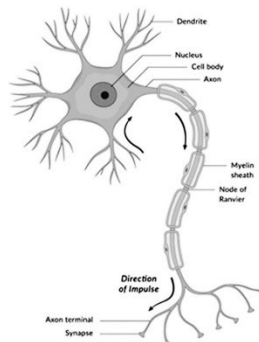
- Somatic nervous system, which controls skeletal muscles.
- Autonomic nervous system (ANS), or visceral nervous system, which controls smooth muscle, cardiac muscle, and glands; regulates responses to stress and helps to maintain homeostasis.

The neuron

The neuron is the nervous system's basic functional unit. Each neuron has two types of fibers extending from the cell body;

- A dendrite carries impulses toward the cell body.
- An axon carries impulses away from the cell body.

A synapse is the point of contact between two neurons. At the synapse, energy is passed from one cell to another, usually by means of a neurotransmitter and sometimes by direct transfer of electric current.



Nerves

Individual neuron fibers are held together in bundles like wires in a cable. If this bundle is part of the PNS, it is called a nerve. A collection of cell bodies along the pathway of a nerve is ganglion. A few nerves (sensory nerves) contain only sensory neurons, and a few (motor nerves) contain only motor neurons, but most contain both types of fibers and are described as mixed nerves.

Central nervous system

Brain

The brain is nervous tissue contained within the cranium. It consists of the cerebrum, diencephalon, brainstem, and cerebellum. The cerebrum is the largest part of the brain; it is composed largely of white matter with a thin outer layer of gray matter, the cerebral cortex. It is within the cortex that the higher brain functions of memory, reasoning, and abstract to occur.

The remaining parts of the brain are as follows;

- The diencephalon contains the thalamus, the hypothalamus, and the pituitary gland. The thalamus receives sensory information and directs it to the proper portion of the cortex. The hypothalamus controls the pituitary and forms a link between the endocrine and nervous systems.
The brainstem consists of the;
- Midbrain, which contains reflex centers for improved vision and hearing.
- Pons, which forms a bulge on the anterior surface of the brainstem. It contains fibers that connect the brain's different regions.
- Medulla oblongata, which connects the brain with the spinal cord. All impulses passing to and from the brain travel through this region. The medulla also has vital centers for control of heart rate, respiration and blood pressure.
- The cerebellum is under the cerebrum and dorsal to the pons and medulla. The cerebellum helps to control voluntary muscle movements and to maintain posture, coordination and balance.

Protecting the brain

Within the brain are four ventricles (cavities) in which cerebrospinal fluid (CSF) is formed. This fluid circulates around the brain and spinal cord.

Covering the brain and the spinal cord are three protective layers, together called the meninges. They are the;

- Dura mater; the outer most and toughest of the three
- Arachnoid mater; middle layer.
- Pia mater; the thin, vascular inner layer, attached directly to the tissue of the brain and spinal cord.

Spinal cord

The spinal cord is the part of the CNS in the superior two-thirds of the vertebral canal. It begins at the medulla oblongata and between the first and second lumbar vertebrae.

The spinal nerves are;

Thirty-one pairs of spinal nerves connect with the spinal cord. These nerves are grouped in the segments of the cord as follows;

- Cervical (8)
- Thoracic (12)
- Lumbar (5)
- Sacral (5)
- Coccygeal (1)

Each nerve joins the cord by two roots. The dorsal, or posterior, root carries sensory impulses into the cord; the ventral, or anterior, root carries motor impulses away from the cord and out toward a muscle or gland. An enlargement on the dorsal root, the dorsal root ganglion, has the cell bodies of sensory neurons carrying impulses toward the CNS.

Meninges

The meninges are three connective tissue covering that surround, protect, and suspend the brain and spinal cord within the cranial cavity and vertebral canal, respectively;

- The dura mater is the thickest and most external of the coverings
- The arachnoid mater is against the internal surface of the dura mater
- The pia mater is adherent to the brain and spinal cord

Between the arachnoid and pia mater is the subarachnoid space, which contains CSF.

Functional subdivisions of the CNS

Functionally, the nervous system can be divided into somatic and visceral parts.

- The somatic part (soma, from the Greek for body) innervates structures (skin and most skeletal muscle) and is mainly involved with receiving and responding to information from the external environment.

- The visceral part (viscera, from the Greek for guts) innervates organ systems in the body and other visceral elements, such as smooth muscle and glands, in peripheral regions of the body. It is concerned mainly with detecting and responding to information from the internal environment.
The autonomic nervous system
The ANS is the division of the nervous system that controls the involuntary actions of muscles and glands. The ANS itself has two divisions;
- The sympathetic nervous system motivates our response to stress. It increases heart rate and respiration rate, stimulates the adrenal gland, and delivers more blood to skeletal muscles.
- The parasympathetic nervous system returns the body to a steady state and stimulates maintenance activities, such as digestion of food. Most organs are controlled by both systems, and in general, the two systems have opposite effects on a given organ.

Sympathetic system

The sympathetic part of the autonomic division of the PNS leaves thoracolumbar regions of the spinal cord with the somatic components of spinal nerves T1 to L2. On each side, a paravertebral sympathetic trunk extends from the base of the skull to the inferior end of the vertebral column where the two trunks converge anteriorly to the coccyx at the ganglion impar.

Each trunk is attached to the anterior rami of spinal nerves and becomes the route by which sympathetic are distributed to the periphery and all viscera.

Parasympathetic system

The parasympathetic part of the autonomic division of the PNS leaves cranial and sacral regions of the CNS in association with;

- Cranial nerves 3,5,4 and 10,7 and 9 carry parasympathetic fibers to structures within the head and neck only, whereas 10 (the vagus nerve) also innervates thoracic and most abdominal viscera
- Spinal nerves; sacral parasympathetic fibers innervate inferior abdominal viscera, pelvic viscera, and the arteries associated with erectile tissues of the perineum. Like the visceral motor nerves of the sympathetic part, the visceral motor nerves of the parasympathetic part generally have two neurons in the pathway.

Spinal nerves

The 31 pairs of spinal nerves are segmental in distribution and emerge from the vertebral canal between the pedicles of adjacent vertebrae. There are eight pairs of cervical nerves (C1 to C8), twelve thoracic (T1 to T12), five lumbar (L1 to L5), five sacral (S1 to S5) and one coccygeal (CO).

After exiting the vertebral canal, each spinal nerve branches into;

- A posterior ramus- collectively, the small posterior rami innervate the back
- An anterior ramus- the much larger anterior rami innervate most other regions of the body except the head, which is innervated predominantly, but not exclusively by cranial nerves.

Nomenclature of spinal nerves

There are approximately 31 pairs of spinal nerves. Named according to their position with respect to associated vertebrae;

- Eight cervical nerves (C1 to C8)
- Twelve thoracic nerves (T1 to T12)
- Five lumbar nerves (L1 to L5)
- Five sacral nerves (S1 to S5)
- One coccygeal (CO)

The first cervical nerve (C1) emerges from the vertebral canal between the skull and vertebra C1.

Therefore cervical nerves C2 to C7 also emerges from the vertebral canal above their respective vertebrae.

Because there are only seven cervical vertebrae, C8 emerges between vertebrae C7 and T1.

As a consequence all remaining spinal nerves, beginning with T1. Emerge from the vertebral canal below their respective vertebrae.

Cranial nerves

The 12 pairs of cranial nerves are part of the peripheral nervous system (PNS) and pass through foramina or fissures in the cranial cavity. All nerves except one, the accessory nerve (XI) originate from the brain.

In addition to having similar somatic and visceral components as spinal nerves, some cranial nerves also contain special sensory and motor components.

The special sensory components are associated with hearing, seeing, smelling, balancing, and tasting.

Special motor components include those that innervate skeletal muscles derived embryologically from the pharyngeal arches and not from somites.

In human embryology, six pharyngeal arches are designated, but the fifth pharyngeal arch never develops. Each of the pharyngeal arches that does develop is associated with a developing cranial nerve or one of its branches. These cranial nerves carry efferent fibers that innervate the musculature derived from the pharyngeal arch. Innervation of the musculature derived from the five pharyngeal arches that do develop is as follow;

- First arch – trigeminal nerve
- Second arch – facial nerve
- Third arch – glossopharyngeal nerve
- Forth arch – superior laryngeal branch of the vagus nerve
- Sixth arch – recurrent laryngeal branch of the vagus nerve

Olfactory nerve (I)

The olfactory nerve carries special afferent (SA) fibers for the sense of smell. Its sensory neurons have;

- Peripheral processes that act as receptors in the nasal mucosa
- Central processes that return information to the brain.

The receptors are in the roof and upper parts of the nasal cavity and the central processes, after joining into small bundles, enter the cranial cavity by passing through the cribriform plate of the ethmoid bone. They terminated by synapsing with secondary neurons in the olfactory bulbs.

Optic nerve (II)

The optic nerve carries SA fibers for vision. These fibers return information to the brain from photoreceptors in the retina. Neuronal processes leave the retinal receptors, join into small bundles, and are carried by the optic nerves to other components of the visual system in the brain.

The optic nerves enter the cranial cavity through the optic canals.

Oculomotor nerve (III)

The oculomotor nerve carries two types of fibers;

- General somatic efferent (GSE) fibers innervate most of the extra-ocular muscles
- General visceral efferent (GVE) fibers are part of the parasympathetic part of the autonomic division of the PNS

The oculomotor nerve leaves the anterior surface of the brainstem between the midbrain and the pons.

It enters the anterior edge of the tentorium cerebelli, continues in an anterior direction in the lateral wall of the cavernous sinus, and leaves the cranial cavity through the superior orbital fissure.

Trochlear nerve (IV)

The trochlear nerve is a cranial nerve that carries GSE fibers to innervate the superior oblique muscle, an extra-ocular muscle in the orbit. It arises in the midbrain and is the only cranial nerve to exit from the posterior surface of the brainstem.

After curving around the midbrain, it enters the inferior surface of the free edge of the tentorium cerebelli, continues in an anterior direction in the lateral wall of the cavernous sinus, and enters the orbit, through the superior orbital fissure.

Trigeminal nerve (V)

The trigeminal nerve is the major general sensory nerve of the head, and also innervates muscles that move the lower jaw. It carries general somatic afferent (GSA) and branchial efferent (BE) fibers;

- The GSA fibers provide sensory input from the face, anterior one-half of the scalp, mucous membrane of the oral and nasal cavities and the paranasal sinuses, the nasopharynx, part of the ear and external acoustic meatus, part of the tympanic membrane, orbital contents and conjunctiva, and the dura mater in the anterior and middle cranial fossae
- The BE fibers innervate the muscles of mastication

The trigeminal nerve exits from the anterolateral surface of the pons as a large sensory root and a small motor root. These roots continue forward out of the posterior cranial fossa and into the middle cranial fossa by passing over the medial tip of the petrous part of the temporal bone.

Arising from the anterior border of the trigeminal ganglion are the three terminal divisions of the trigeminal nerve, which in descending order are;

- The ophthalmic nerve
- The maxillary nerve
- The mandibular nerve

Ophthalmic nerve (V1)

The ophthalmic nerve passes forward in the dura of the lateral wall of the cavernous sinus, leaves the cranial cavity and enters the orbit through the superior orbital fissure.

The ophthalmic nerve carries sensory branches from the eyes, conjunctiva, and orbital contents, including the lacrimal gland. It also receives sensory branches from the nasal cavity, frontal sinus, ethmoidal cells, and superior parts of the tentorium cerebelli, upper eyelid, and the anterior part of the scalp.

Maxillary nerve (V2)

The maxillary nerve passes forward in the dura mater of the lateral wall of the cavernous sinus just inferior to the ophthalmic nerve. Leaves the cranial cavity through the foramen rotundum, and enters the pterygopalatine fossa.

The maxillary nerve receives sensory branches from the dura in the middle cranial fossa, the nasopharynx, the nasal cavity, teeth of the upper jaw, maxillary sinus, and skin covering the side of the nose, the lower eyelid, the cheek, and the upper lip.

Mandibular nerve (V3)

The mandibular nerve leaves the inferior margin of the trigeminal ganglion and leaves the skull through the foramen ovale.

The motor root of the trigeminal nerve also passes through the foramen ovale and unites with the sensory components of the mandibular nerve outside the skull.

Thus the mandibular nerve is the only division of the trigeminal nerve that contains a motor component.

Outside the skull the motor fibers innervate the four muscles of mastication.

The mandibular nerve also receives sensory branches from the skin of the lower face, cheek, lower lip, anterior part of the external ear, part of the external acoustic meatus and the temporal region, the anterior two-thirds of the tongue, the teeth of the lower jaw, the mastoid air cells, the mucous membranes of the cheek, the mandible, and dura in the middle cranial fossa.

Abducent nerve (VI)

The abducent nerve carries GSE fibers to innervate the lateral rectus muscle in the orbit. It arises from the brainstem between the pons and medulla.

Continuing upward in a dural canal, it crosses the superior edge of the petrous temporal bone, enters and crosses the cavernous sinus just inferolateral to the internal carotid artery and enters the orbit through the superior orbital fissure.

Facial nerve (VII)

the facial nerve carries GSA, SA, GVE and BE fibers

- The GSA fibers provide sensory input from part of the external acoustic meatus and deeper parts of the auricle
- The SA fibers are for taste from the anterior two-thirds of the tongue
- The GVE fibers are part of the parasympathetic part of the autonomic division of the PNS and stimulate secretomotor activity in the lacrimal gland, submandibular and sublingual salivary glands, and glands in the mucous membranes of the nasal cavity, and hard and soft palates.
- The BE fibers innervate the muscles of the face (muscles of facial expression) and scalp derived from the second pharyngeal arch, and the stapedius, the posterior belly of the digastric .

Vestibulocochlear nerve (VIII)

The vestibulocochlear nerve carries SA fibers for hearing and balance and consists of two divisions;

- A vestibular component for balance
- A cochlear component for hearing

The vestibulocochlear nerve attaches to the lateral surface of the brainstem, between the pons and medulla, after emerging from the internal acoustic meatus and crossing the posterior cranial fossa.

The two division combine into the single nerve seen in the posterior cranial fossa within the substance of the petrous part of the temporal bone.

Glossopharyngeal nerve (IX)

The glossopharyngeal nerve carries GVA, SA, GVE, and BE fibers;

- The GVA fibers provide sensory input from the carotid body and sinus
- The GSA fibers provide sensory input from posterior one-third of the tongue, palatine tonsils, oropharynx, and mucosa of the middle ear
- The SA fibers are for taste from the posterior one-third of the tongue
- The GVE fibers are part of the parasympathetic part of the autonomic division of the PNS and stimulate secretomotor activity in the parotid salivary gland
- The BE fibers innervate the muscle derived from the third pharyngeal arch

Vagus nerve (X)

The vagus nerve carries GSA, GVA, SA, GVE and BE fibers;

- The GSA fibers provide sensory input from the larynx, laryngopharynx, deeper parts of the auricle, part of the external acoustic meatus, and the dura mater in the posterior cranial fossa
- The GVA fibers provide sensory input from the aortic body chemoreceptors and aortic arch baroreceptors and the esophagus, bronchi, lungs, heart
- The SA fibers are for taste around the epiglottis and pharynx
- The GVE fibers are part of the parasympathetic part of the autonomic division of the PNS and stimulate smooth muscle and glands in the pharynx, larynx, thoracic viscera
- The BE fibers innervate one muscle of the tongue, the muscles of the soft palate, pharynx and larynx

Accessory nerve (XI)

The accessory nerve is a cranial nerve that carries GSE fibers to innervate the sternocleidomastoid and trapezius muscles. It is a unique cranial nerve because its roots arise from motor neurons in the upper five segments of the cervical spinal cord. These fibers leave the lateral surface of the spinal cord and joining together as they ascend, enter the cranial cavity through the foramen magnum. The accessory nerve continues through the posterior cranial fossa and exits through the jugular foramen. It then descends in the neck to innervate the sternocleidomastoid and trapezius muscles from their deep surfaces.

Hypoglossal nerve (XII)

The hypoglossal nerve carries GSE fibers to innervate all intrinsic and most of the extrinsic muscles of the tongue. It arises as several rootlets from the anterior surface of the medulla, passes laterally across the posterior cranial fossa and exits through the hypoglossal canal.

MEDICAL DEVICE

Electro encephalography (EEG)

An electroencephalogram (EEG) is a test that measures electrical activity in the brain using small, metal discs (electrodes) attached to the scalp. Brain cells communicate via electrical impulses and are active all the time, even during asleep. This activity shows up as wavy lines on an EEG recording.

An EEG is one of the main diagnostic tests for epilepsy. An EEG can also play a role in diagnosing other brain disorders.

An EEG can find changes in brain activity that might be useful in diagnosing brain disorders, especially epilepsy or another seizure disorder. An EEG might also be helpful for diagnosing or treating:

- Brain tumors
- Brain damage from head injury
- Brain dysfunction that can have a variety of causes (encephalopathy)
- Sleep disorders
- Inflammation of the brain (herpes encephalitis)
- Stroke
- Sleep disorders
- Creutzfeldt-Jakob disease

An EEG might also be used to confirm brain death in someone in a persistent coma. A continuous EEG is used to help find the right level of anesthesia for someone in a medically induced coma.



Amelia
Amnesia

فقدان کامل اندامها
کاهش یا فقدان در
یادآوری

Afferent
Ament

نرون‌آوران
ناقص العقل

Anarthria	فقدان کامل اندام‌های تولید گفتار به دلیل ضایعات اعصاب محیطی		
Autonomous	خود مختار	Amengia	فرا موشی
Axillary nerve	عصب زیر بغلی	Automatic nervous system (ANS)	دستگاه عصبی خودکار
Brain damage	آسیب مغزی	Autophonia	خودشنیداری
Brain wave	موج مغزی	Brain	مغز
Center nervous system (CNS)	دستگاه عصبی مرکزی	Brain disease	بیماری مغزی
Cerebello-	مربوط به مخچه	Caudal	به سمت انتهای تحتانی نخاع
Cerebral	مغزی	Cephalagia	درد مغزی
Cerebral vascular accident (VCA)	سکته مغزی	Cerebellum	مخچه
Cerebro Spinal cerebrovascular	مغزی نخاعی	Cerebral palsy	فلج مغزی
Accident	ضایعه عروقی مغز	Cerebro-	مربوط به مخ
Cortex	قشر مغزی	Cerebro spinal fluid	مایع مغزی نخاعی
Delirium	روان آشفتگی	Concussion	تکان مغزی
Delusion	هذیان گفتن	Cortical	قشری
EEG (Electro Encephalo Graph)	نوار مغزی، نمودار عملکرد الکتریکی مغز	Delocalization	عدم استقرار
Encephalomyeliti	تورم مغز و نخاع	Denervation	عصب برداری
Ganglion	توده بافت عصبی	Encephalitis	تورم مغز
Humors	سطح هوشیاری	Encephalo	مغزی
Impairment	معلولیت مغزی	Encephalo-	مربوط
Interacebral	داخل مغزی	Hemiplegia	فلج نیمه بدن، نیمه فلجی
Involuntary muscle	عضو غیر ارادی	Hypoglossal	عصب زیر زبانی
Medulla	بصل النخاع	Intercostal nerve	عصب بین دنده‌ای
Meninges	پرده‌های مغز	Intercranial	درون جمجمه‌ای
Meningo-	مربوط به مغز	Medull/o	بصل النخاع
Monoplegia	فلج یک اندام	Medulla oblongata	بصل النخاع (پیاز مغز تیره)
Motor neuron pool	مجتمع نورون‌های حرکت	Meningitis	التهاب پرده‌های مغز
Nerves	اعصاب	Mid brain	مغز میانی
Nervous impulse	ضربه عصبی	Monosynaptic	تک سیناپسی
Neuritis	التهاب عصبی	Myelo-	مربوط به نخاع یا استخوان

Neuromuscular	عصبی- عضلانی	Myelin	غلات تار عصبی
Neuro science	عصب شناختی	Neuro-	مربوط به عصب
Neuro surgery	عمل مغزی	Nervous tissue	بافت عصب
Neuro transmitter	انتقال دهنده عصبی	Neuroceptor	گیرنده عصبی
Olfactory	اعصاب بویایی	Neurology	عصب شناسی
-pathy	هر بیماری در سیستم اعصاب	Neuropathy	آسیب عصبی
Periodic paralysis	فلج عصبی دوره‌ای	Neurosis	اختلال روانی
Peripheral nerve injury	آسیب اعصاب محیطی	Neurotherapy	درمان اختلالات عصبی
Peripheral nerves	اعصاب محیطی	Para sympathetic	دستگاه اعصاب پاراسمپاتی
		Nervous system (PNS)	پاراسمپاتیک
Phrenic nerve	عصب دیافراگمی	Peripheral nervous system	دستگاه اعصاب محیطی
Proprioceptor	گیرنده‌های عمقی	Proprioceptive neuromuscular facilitation (PNF)	تسهیل در کارگزیده‌های عمقی عصبی-عضلانی
Rachio-	نخاع	Radical/o-	ریشه عصبی- نخاعی
Sciatic nerve	عصب سیاتیک	Sensory neurone	نورون حسی
Spasm	انقباض ناگهانی	Spinal cord	طناب نخاعی
Spinal fluid	مایع مغزی نخاعی	Stroke	سکته مغزی
Sural	عصبی در پا	Synapse	سیناپس، پیوندگاه عصبی
Sympathetic nervous system (SNS)	دستگاه اعصاب سمپاتی	Tense	
Upper motor neurone	نورون محرکه فوقانی		
Nervous System:			دستگاه عصبی
		I. مرکزی (شامل مغز و نخاع)	
		Central Nervous System (C.N.S)	
		II. محیطی	
		Peripheral Nervous System (P.N.S)	
		- سیستم خودکار (اتونوم): (Autonom)	
		۱) سمپاتی (s) (sympathic)	
		۲) پاراسمپاتی (Ps) (Parasymathic)	
		سیستم عصبی غیرخودکار و ارادی:	
		PNS شامل ۳۱ جفت عصب نخاعی (از نخاع خارج می‌شوند)	
		۱۲ جفت عصب مغزی (از مغز خارج می‌شوند)	
		ساختمان سلولی دستگاه عصبی (CNS)	
		- تحریک‌پذیر: نورون Neuron	
		- تحریک ناپذیر (بافت پشتیبانی عصبی گلیا) Glia Cell	
		I. ماکروگلیا Macro Glia	

۱- الیگودندروسیت

۲- آستروسیت‌ها

II. میکروگلیا Micro Glia

مفروش کننده سطح داخلی لوله عصبی Ependymal Cell

در PNS پوشاننده غلاف آکسون Schwann Cell

دستگاه عصبی خودکار (اتونوم) Autonom

قسمتی از دستگاه عصبی محیطی PNS است که فعالیت‌های اتوماتیک بدنی را عهده‌دار است. مثل: ضربان قلب، تنفس، اعمال غیرارادی مثل، بلع، دفع ادرار، دفع مدفوع، ترشح غدد عضلات صاف (دیواره مری، رحم، عروق خونی و ...) را تنظیم می‌کند و شامل ۲ بخش می‌باشد:

I. سمپاتیک S= Sympathic

II. پاراسمپاتیک PS= Para Sympathic

سمپاتیک (Sympathic)

دستگاه S برای بالا بردن سطح انرژی بدن یا آمادگی بدن در شرایط اورژانس یا آماده باش می‌باشد مثل: ایجاد ناگهانی صدای انفجار، شنیدن اخبار هولناک

پاراسمپاتیک (Para Sympathic)

وظیفه متعادل کردن عملکرد سمپاتیک (S) را عهده‌دار است و برای شرایط خواب و استراحت بدن می‌باشد و اکثراً پاراسمپاتیک (PS) حالت ترمزی دارد (برعکس سمپاتیک)

Organ	عملکرد S	عملکرد PS
قلب	بالا بردن ضربان (HR)	پایین آوردن ضربان (HR)
ریه‌ها	گشادای برونش‌ها	تنگی برونش‌ها
عروق و رگ‌ها	گشادای عروق	تنگی عروق
غده فوق کلیوی	تحریک ترشح آدرنالین (A) و نورآدرنالین (NA) از مرکز آدرنالین	-
غدد عرق	زیاد شدن تعریق	-
دستگاه گوارش	کاهش حرکات دودی روده	افزایش حرکات دودی روده
کبد	تشدید تبدیل گلیکوژن به گلوکز	تشدید تبدیل گلوکز به گلیکوژن
شانه	انبساط شانه	انقباض شانه
چشم‌ها	گشادای مردمک چشم (میدریاز- Midriasis)	تنگی مردمک چشم (میوزیس- Miosis)

۳۱ جفت اعصاب نخاعی

Spinal Cords Nerves:

اعصاب نخاعی:

Cervical Nerves

اعصاب گردنی (۸ جفت)

Thoracic Nerves

اعصاب سینه‌ای (۱۲ جفت)

به شانه و عضلات پوست بازو و قفسه سینه عصب می‌دهد

Lumber Nerves

اعصاب کمری (۵ جفت)

به ناحیه باسن و کمر و عضلات ران عصب می‌دهد

Sacral Nerves

اعصاب خاجی (۵ جفت) به پایین شکم و ناحیه تناسلی عصب

می‌دهد

Coccygeal Nerves

اعصاب دنبالیچه‌ای (۱ جفت)

	به عضلات لگن، لگن خاصره و انتهای دستگاه گوارش
	عصب می‌دهد.
Brain	ساختمان مغز
Medulla Oblongata	بصل النخاع
Pons	پل مغزی (پل دماغی)
Mesencephalon (midbrain)	مغز میانی (پایه‌های مغزی)
Culvius Duct	مجرای سیلویوسی (بین بطن سوم و چهارم مغزی)
Third Ventricle	بطن سوم
Ventriculi Quarti	بطن چهارم
Cerebellum	مخچه
Diencephalon	- مغز واسطه‌ای
	I. تالاموسی
	II. ساب تالاموسی
	III. هیپوتالاموسی
	IV. اپی تالاموسی
Ventricalli Lateralis	بطن‌های طرفی
Telen Cephalon	قسمت‌های نیمکره‌های مغز (مخ)
	قسمت اعظم CNS
Frontal Lobe	- لوب فرونتال
Parietal Lobe	- لوب پریئال (آهیانه)
	لوب گیجگاهی
	لوب پس‌ری
Gyrus	شکج (قطعات کوچک نیمکره‌های مغزی)
Meninge	پرده پوشاننده مغز (مننژ)
Dura Mater	I. لایه خارجی (سخت شامه)
Arachnoid	II. لایه میانی (عنکبوتیه)
Pia mater	III. لایه خارجی (نرم شامه)
Cerebro Spinal Fluid (C.S.F)	مایع مغزی- نخاعی (بین نرم شامه و عنکبوتیه)
Cranial Nerves	اعصاب دوازده‌گانه مغزی
Olfactory Nerve	عصب بویایی (عصب زوج I، حسی)
Optic Nerve	عصب بینایی (عصب زوج II، حسی)
Occular Motor Nerve	عصب محرکه چشم (عصب زوج III، حسی- حرکتی)
Trochlear Nerve	عصب قرقره‌ای (عصب زوج IV، حرکت)
Trigeminal Nerve	عصب سه قلو (عصب زوج V، حسی- حرکت)
	I. عصب چشمی (حسی)
	II. عصب فک فوقانی (حسی)
	III. عصب فک تحتانی (حسی- حرکتی)
	عصب دورکننده یا غایب (عصب زوج VI، حرکت)
Facial Nerve	عصب صورتی یا چهره‌ای (عصب زوج VII، حسی- حرکتی)
Vestibulo Cochleor Nerve	عصب تعادلی شنوایی (عصب زوج VIII، حسی)

Glosso Pharyngeal Nerve	عصب حلقی زبانی (عصب زوج IX، حسی- حرکت)
Vagus Nerve (pneumo gastric Nerve)	عصب مبهم یا واگ (عصب زوج X، حسی- حرکتی)
Accessory Nerve	- عصب اکسسوری (فرعی) (XI، حرکتی)
	روی عضلات زیر تأثیر می‌گذارد:
	I. عضلات دوزنقه‌ای
Sterno Cleido Mastoid (SCM)	II. عضله ماستوئید
Hypoglossal	عصب زیرزبانی (عصب زوج XII، حرکتی)
Peripheral Nerves System (P.N.S)	اعصاب محیطی
Plexus Cervicalis	شبکه گردنی
Plexus Brachialis	شبکه بازویی
Nervous Intercotalis	اعصاب بین دنده‌ای
Plexus lumbaris	شبکه کمری
Plexus sacralis	شبکه خاصی
Plexus coccygealis	شبکه دنبالیچه‌ای
Autonomic Nervous System	اعصاب خودکار بدن
Para Sympatic	پاراسمپاتیک
Symatic	

اجزای نورون:

	هسته سلول
	جسم سلولی
Dendrite	دندریت
Axon	آکسون
Node of Ranvier	گروه رانویه
Myelin Sheath	غلاف میلین
Neuilemma	نورولیمما
Schwan Cells	سلول‌های شووان
Synapse	سیناپس‌ها (پایانه‌های عصبی جهت حرکت پیام عصبی دندرون‌ها)

۱۲ جفت اعصاب مغزی:

Olfactory Nerve	I. عصب بویایی (حسی)
Optic Nerve	II. عصب بینایی (حسی)
Oculo Motor Nerve	III. عصب محرکه چشم (حسی – حرکتی)
	عملکرد: حرکت و انقباض عضلات اطراف کره چشم
Trochlear Nerve	IV. عصب تروکلنار (حرکت) قرقره‌ای
	عملکرد: حرکت دهنده عضله مورب چشم
Trigeminal Nerve	V. عضله سه قلو (حسی، حرکتی)
	- چشمی (افتالمیک)
	- فک فوقانی (ماکزیلاری)

	- فک تحتانی (ماندولای)	
Abducens	.VI عصب آبدوسن (حرکتی)	
	عملکرد: عضله دید جانبی چشم (عصب داخلی)	
Facial Nerve	.VII عصب صورتی	
Restibulo- Cochlear Nerve	.VIII عصب شنوایی- تعادلی (حسی)	
	عملکرد: عصبدهی به بخش شنوایی و حس تعادلی در حرکات بدن	
Glosso Pharyngeal Nerve	.IX عصب زبانی- حلقی (حسی- حرکتی)	
	- عصب حرکتی، عضلات حلق، غدد بزاقی و عصب حسی $\frac{2}{3}$ خلفی زبان	
= Vagus Nerve Pneumo Gastric Nerve	.X عصب مبهم (پنوموگاستریکا)= واگوس (حسی، حرکت)	

شاخه‌های عصبی به ناحیه (طب‌های صوتی)، قفسه سینه به مری، قلب، ریه‌ها، شکم به اکثر ارگان‌های داخل حفره شکم عصب می‌دهد.

* عمل بلع توسط این عصب کنترل می‌شود.

Accessory Nerve	XI. عصب فرعی (حرکتی)	
	عملکرد: به عضلات گردن پشت کام (کام دهان)، حلق و حنجره عصب می‌دهد. یکی از عضلات مهمی که در این شاخه‌ی عصبی تغذیه می‌شود عضله‌ی دوزنقه‌ای (Trapezing) است.	
Hypoglossal Nerve	.XI عصب زیرزبانی (حرکتی)	
	عملکرد: عضلات زبان را عصبدهی می‌نماید.	

۱۲ جفت اعصاب مغزی:

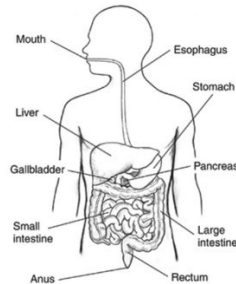
Olfactory Nerve	.I عصب بویایی (حسی)	
Optic Nerve	.II عصب بینایی (حسی)	
Oculomotor Nerve	.III عصب محرکه چشم (حسی، حرکت)	
	عملکرد: حرکت و انقباض اطراف کره چشم	
	.IV عصب تروکلنار قرقره‌ای (حرکت)	
	عملکرد: حرکت دهنده عضله مورب چشم	
Trigeminal Nerve	.V عصب سه قلو (حسی، حرکتی)	
	- چشمی (افتالمیک): عصب دهی به چشم- ها (عصب حسی)	
	- فک فوقانی (ماکزیلاری): عصب دهی به فک فوقانی و سینوس‌ها (حسی)	
	- فک تحتانی (ماندیبولار): عصب دهی به فک تحتانی (حسی- حرکتی)	
Abducens	.VI عصب آبدوسن غایب (حرکتی)	
	عملکرد: عضله دید جانبی چشم (عصب دهی)	

Facial Nerve	VII. عصب صورتی (حسی، حرکتی) عملکرد: به تمام عضلات صورت عصب حرکتی می‌دهد، حس چشایی در قسمتی از زبان و عصبدهی تعدادی از عضلات گردن نیز بر عهده این عصب است و همچنین $\frac{1}{3}$ قدامی زبان حسی
Restibulo- cochlear Nerve	VIII. عصب شنوایی- تعادلی (حسی)
Restibulo- Cochlear Nerve	عملکرد: عصبدهی به بخش شنوایی و حس تعادلی در حرکات بدن
Glosso Pharyngeal Nerve	IX. عصب زبانی- حلقی (حسی، حرکت) - عصب حرکتی عضلات حلق، غدد بزاقی و عصب حسی $\frac{2}{3}$ خلفی زبان
Pneumo Gastric Nerve = Vagus Nerve	X. عصب مبهم (پنوموگاستریکا) = واگوس (حسی، حرکت) * عمل بلع توسط این عصب کنترل می‌شود.
Accessory Nerve	XI. عصب فرعی (حرکتی) عملکرد: به عضلات گردن پشت کام (کام دهان)، حلق و حنجره عصب می‌دهد. یکی از عضلات مهمی که در این شاخه‌ی عصبی تغذیه می‌شود، عضله‌ی دوزنقه‌ای (Trapezing) است.
Hypoglossal Nerve	XII. عصب زیرزبانی (حرکت) عملکرد: عضلات زبان را عصبدهی می‌نماید.

Unit8

Digestive system

The function of the digestive system is to prepare food for intake by body cells. Nutrients must be broken down by mechanical and chemical means into molecules that are small enough to be absorbed into circulation. Within cells, the nutrients are used for energy and for rebuilding vital cell components. The digestive system also stores undigested waste materials and then eliminates them from the body.



Digestion

Digestion takes place in the digestive tract proper which extends from the mouth to the anus. Peristalsis, wave-like contractions of the organ walls, moves food through the digestive tract and also moves undigested waste material out of the body. Also contributing to digestion are several accessory organs that release secretions into the digestive tract.

The digestive tract

The digestive tract, also known as the alimentary canal or gastrointestinal (GI) tract, is essentially a long tube modified into separate organs with special functions. A large serous membrane, the peritoneum, covers the organs in the abdominal cavity, supporting and separating them.

The mouth to the stomach

Digestion begins in the mouth, also called the oral cavity. Here, food is chewed into small bits by the teeth. There are 32 teeth in a complete adult set.

The palate is the roof of the mouth; the anterior portion (hard palate) is formed by bone, and the posterior part (soft palate) is made of soft tissue.

In the process of chewing, or mastication, the tongue, lips, cheeks, and palate also help to break up food and mix it with saliva, a secretion that moistens the food and begins starch digestion.

The salivary glands secrete saliva into the mouth and are considered to be accessory digestive organs.

Stomach

The stomach is the most dilated part of the gastrointestinal tract and has a j-like shape.

Positioned between the abdominal esophagus and the small intestine, the stomach is in the epigastric, umbilical and left hypochondrium regions of the abdomen.

The stomach divided into four regions;

- The cardia, which surrounds the opening of the esophagus into the stomach
- The fundus of the stomach, which is the area above the level of the cardiac orifice
- The body of stomach, which is the largest region of the stomach
- The pyloric part, which is divided into the pyloric canal and is the distal end of the stomach

Small intestine

The small intestine is the longest part of the gastrointestinal tract and extends from the pyloric orifice of the stomach to the ileocecal fold. This hollow tube, which is approximately 6-7m long with a narrowing diameter from beginning to end, consists of the duodenum, the jejunum, and the ileum.

Food leaving the stomach enters the duodenum, the first portion of the small intestine. As the food continues through the jejunum and ileum, the small intestine's remaining sections, digestion is completed. The digestive substances active in the small intestine include enzymes from the intestine itself and products from accessory organs that secrete into the duodenum.

Duodenum

The first part of the small intestine is the duodenum. This C-shaped structure, adjacent to the head of the pancreas, is 20-25cm long and is above the level of the umbilicus; its lumen is the widest of the small intestine.

It is retroperitoneal except for its beginning, which is connected to the liver by the hepatoduodenal ligament, a part of the lesser omentum.

Jejunum

The jejunum and ileum make up the last two sections of the small intestine. The jejunum represent the proximal two-fifths. Is the mostly in the left upper quadrant of the abdomen and is larger in diameter and has a thicker wall than the ileum.

The arterial supply to the jejunum includes jejunal arteries from the superior mesenteric artery.

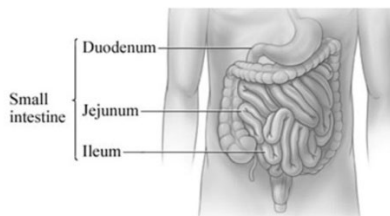
Ileum

The ileum makes up the distal three- fifths of the small intestine and is mostly in the right lower quadrant. Compared the jejunum, the ileum has thinner walls.

The ileum opens into the large intestine where the cecum and ascending colon join together.

The arterial supply to the ileum includes;

- Ileal arteries from the superior mesenteric artery
- Ileal branch from the ileocolic artery (from the superior mesenteric artery)



Large intestine

The large intestine extends from the distal end of the ileum to the anus, a distance of approximately 1.5m in adults. It absorbs fluids and salts from the gut contents, thus forming feces and consists of the cecum, appendix, colon, rectum, and anal canal.

Any food that has not been digested, along with water and digestive juices, passes into the large intestine. This part of the digestive tract begins in the lower right region of the abdomen with a small pouch, the cecum, to which the appendix attached. (the appendix does not aid in digestion, but contains lymphatic tissue and may function in immunity).

The large intestine continues as the colon, a name that is often used alone to mean the large intestine, because the colon constitutes such a large portion of that organ. The colon travels upward along the right side of the abdomen as the ascending colon, crosses below the stomach as the transverse colon, and then continues down the left side of the abdomen as the descending colon. As food is pushed through the colon, water is reabsorbed and stool or feces. This waste material passes into the S-shaped sigmoid colon and is stored in the rectum until eliminated through the anus.

Cecum and appendix

The cecum is the first part of the large intestine. It is inferior to the ileocecal opening and in the right iliac fossa.

It is an intraperitoneal structure because of its mobility not because of its suspension by a mesentery.

The cecum is continuous with the ascending colon at the entrance of the ileum and is usually in contact with the anterior abdominal wall. The appendix is attached to the posteromedial wall of the cecum, just inferior to the end of the ileum.

The appendix is a narrow, hollow, blind-ended tube connected to the cecum. It has large aggregations of lymphoid tissue in its walls and is suspended from the terminal ileum by the mesoappendix, which contains the appendicular vessels.

Colon

The colon extends superiorly from the cecum and consists of the ascending, transverse, descending and sigmoid colon.

Its ascending and descending segments are (secondarily) retroperitoneal and its transverse and sigmoid segments are intraperitoneal.

At the junction of the ascending and transverse colon is the right colic flexure, which is just inferior to the right lobe of the liver.

Transverse mesocolon

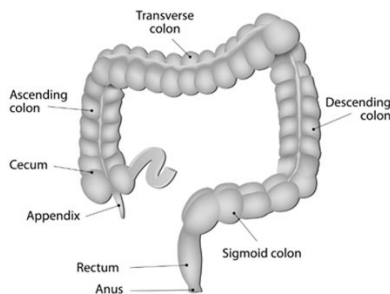
The transverse mesocolon is a fold of peritoneum that connects the transverse colon to the posterior abdominal wall. Its two layers of peritoneum leave the posterior abdominal wall across the anterior surface of the head and body of the pancreas and pass outward to surround the transverse colon.

Between its layers are the arteries, veins, nerve and lymphatics related to the transverse colon. The anterior layer of the transverse mesocolon is adherent to the posterior layer of the greater omentum.

Sigmoid mesocolon

The sigmoid mesocolon is an inverted, V-shaped peritoneal fold that attaches the sigmoid colon to the abdominal wall. The apex of the V is near the division of the left common iliac artery into its internal and external branches, with the left limb of the descending V along the medial border of the left psoas major muscle and the right limb descending into the pelvis into the end at the level of vertebra S3.

The sigmoid and superior rectal vessels, along with the nerves and lymphatics associated with the sigmoid colon, pass through this peritoneal fold.



Rectum and anal canal

Extending from the sigmoid colon is the rectum. The rectosigmoid junction is usually described as being at the level of vertebra S3 or at the end of the sigmoid mesocolon because the rectum is a retroperitoneal structure.

The anal canal is the continuation of the large intestine inferior to the rectum.

The arterial supply to the rectum and anal canal includes;

- The superior rectal artery- from the inferior mesenteric artery
- The middle rectal artery from the internal iliac artery

- The inferior rectal artery from the internal pudendal artery (from the internal iliac artery)

The accessory organs

The salivary glands, which secrete into the mouth, are the first accessory organs to act on food. They secrete an enzyme that begins starch digestion. The remaining accessory organs are in the abdomen and secrete into the duodenum. The liver is a large gland with many functions. A major activity is to process blood, removing toxins and converting nutrients into new compounds. A special circulatory pathway, the hepatic portal system, carries blood to the liver from the other abdominal organs. The liver functions in digestion by secreting bile, which emulsifies fats, that is, breaks them down into smaller units. The gallbladder stores bile until it is needed in digestion. The common hepatic duct from the liver and the cystic duct from the gallbladder merge to form the common bile duct, which empties into the duodenum. The pancreas produces a mixture of digestive enzymes that is delivered into the duodenum through the pancreatic duct.

MEDICAL DEVICE

Colonoscopy

A colonoscopy is a procedure that lets your health care provider check the inside of your entire colon (large intestine).

The procedure is done using a long, flexible tube called a colonoscope. The tube has a light and a tiny camera on one end. It is put in your rectum and moved into your colon.

In addition to letting your provider see the inside of your colon, the tube can be used to:

- Clean the lining of your colon using irrigation (a water jet)
- Remove any liquid stool with a suction device
- Inject air into your bowel to make it easier to see inside
- Work inside your bowel with surgical tools

During a colonoscopy, your provider may remove tissue or polyps (abnormal growths) for further examination. He or she may also be able to treat problems that are found.

A colonoscopy may be used to check and, if needed, treat problems such as:

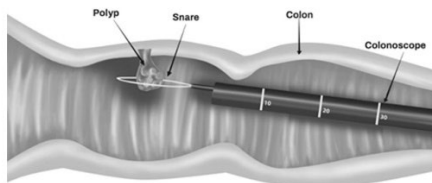
- Colon polyps
- Tumors
- Ulcerations
- Inflammation
- Diverticula (pouches) along the colon wall
- Narrowed areas (strictures) of the colon
- Any objects that might be in the colon

It may also be used to find the cause of unexplained, chronic (long-term) diarrhea or bleeding in the gastrointestinal (GI) tract.

Colonoscopy may be used when other tests show the need for additional testing. These include the following:

- Barium enema
- Computed tomography (CT) colonography (also called virtual colonoscopy)
- Tests for blood in the stool
- Stool DNA tests
- Sigmoidoscopy

Your health care provider may have other reasons to recommend a colonoscopy.



Alimentary	مری	-pep	
Anorexia	فقدان یا کاهش اشتها	An/o-	مقعدی، مربوط به مقعد
Bowels	روده	Ascitis	آس آرون شکم
Bucca	دهان، مربوط به دهان	Brash	احساس سوزش در معده
Celiac	شکمی، مربوط به شکم	Buccal	دهانی، مربوط به دهان
Colonoscop	کولونوسکوپ، وسیله معاینه کولون	Colitis	التهاب کولون
Diarrhea	اسهال	Defection	اجابت مزاج
Digestibilty	قابلیت هضم	Dieresis	دفع زیاد ادرار
Digestion	گوارشی	Digestible	قابل گوارش
Dyschezia	اجابت مزاج دردناک	Digestive	هضم شونده، گوارشی
Dyspepsia	سوء هضم	Dysentery	التهاب روده بزرگ همراه با دفع مدفوع آبکی یا خون
Encopnesis	دفع غیرارادی	Entero-	روده، مربوط به روده
Enteritis	التهاب روده باریک	Enterocolotis	التهاب روده باریک و کولون

Entrocytocele	فتق روده باریک و مثانه	Entorrhagia	خونریزی روده باریک
Esophago-	مری، مربوط به مری	Esophagodynia	درد مری
Esphagus	مری	Feces	مدفوع
Gastroenteritis	التهاب و ورم معده	Gasteromegaly	بزرگی معده
Gastroscoy	معاینه معده	Gastritis	التهاب معده
Gastro-	معدده‌ای، مربوط به معده	Gastric dilation	اتساع معده
Gastrointestinal		Gastrointestinal (GI)	مجرای گوارش
Hag/op	هضم کردن	Hemorrhoid	بواسیر
Hemorrhoidectomy	برداشتن همورونید یا بواسیر	Intensine	
Jejun/o	ژژنوم	Mega colon	گشادی و انبساط مفرط کولون
Mouth Cavity	حفره دهان	Palato-	مربوط به کام (دهان)
Palate	سقف دهان	Peros by mouth	از طریق التهاب حلق
Peroral	از راه دهان	Pharyngitis	تورم و التهاب حلق
Pharyngo-	حلقی، مربوط به حلق	Proctitis	التهاب جدار رکتوم
Procot-	رکتوم		
Procto-	مربوط به رکتوم	Stoma, Stomatio	التهاب دهان، مربوط به دهان
Sigmoid	کولون سیگموئید		
Stomach	معدده، شکم	Stomach ulcer	زخم معده
Stomach flu	اختلال گوارش		
Digestive system		دستگاه گوارش	
		مراحل فرایند گوارش:	
Ingestion	بلع	۱.	
Digestion	هضم	۲.	
Absorbtion	جذب	۳.	
Defection (Elimination)	دفع	۴.	
		اجزای لوله گوارش:	
Mouth (oral cavity)	دهان	-	
		I.	کام استخوانی (کام سخت)
		II.	پرده کامی (کام نرم)
Teeth	دندان	III.	
Tounge	زبان	IV.	
Pharynx	حلق		
Esophagus	مری	-	
		مری دارای دو دریچه (اسفنکتر) است:	
Upper Esophageal Sphincter (UES)	فوقانی	I.	

Lower Esophageal Sphincter (LES)

II. تحتانی

تقسیم بندی ظاهری ناحیه شکم:

Hypochondriac Right	I. ناحیه زیردنده راست (محل قرارگیری قسمتی از کبد، کلیه و زاویه راست کولون)
Epigastric	II. ناحیه اپی گاستریک (زیر استخوان جناغ و جایگاه قسمتی از کبد، معده، دوازدهه، لوزالمعده، کلیه و غده فوق کلیوی چپ است)
	III. ناحیه زیر دنده چپ (محل قرارگیری قسمتی از معده، طحال، دم لوزالمعده و قسمتی از کلیه چپ و زاویه کولونی چپ)
Right Lumber	IV. ناحیه کمری راست (جایگاه کولون صعودی، قسمتی از کلیه راست و قوس روده‌ی کوچک)
Umbilical	V. ناحیه نافی (جایگاه اثنی عشر، قسمتی از روده کوچک، قسمتی از کلیه‌ها، قسمتی از کولون عرضی)
Left lumbar	VI. ناحیه کمری چپ (شامل کولون نزولی، قسمتی از کلیه چپ، قسمتی از سیگمونید)
Right Iliac	VII. ناحیه ایلپاک راست (روده کوچک، آپاندیس، سکوم)
Hypo gastric	VIII. ناحیه هیپوگاستریک (رکتوم، شانه، رحم، سیگمونید)
Left Iliac	IX. ناحیه ایلپاک چپ (قسمتی از روده کوچک)
Salivary Gland	غدد ضمیمه دستگاه گوارش:
Pancreas	غدد بزاقی (بنگوش، زاینکی، زیرزبانی)
Hepar (Liver)	لوزالمعده (پانکراس)
Gall Bladder	کبد
Peritoneum	کیسه صفرا
Stomach	صفاق
	معده

اجزاء معده:

Funds	I. طاق معده (فاندوس)
Body	II. تنه معده
Pylor	III. باب المعده
Anthre	IV. آنتر
Small Colon Intensive	- روده کوچک
Deu Denum	I. اثنی عشر (دنونوم)
Jejnum	II. ژژنوم
Ileum	III. ایلنوم
Large Colon Intensive	- روده بزرگ
Cecum	I. روده کور (سکوم)
Ascending Colon	II. کولون صعودی

Transversus Colon	کولون عرضی	.III
Descending Colon	کولون نزولی	.IV
Sigmoid Colon	کولون سیگموئید	.V
Rectum	راست روده (رکتوم)	.VI
	آپاندیس	.VII
Anus	مقعد	.VIII

Unit9

Urogenital system

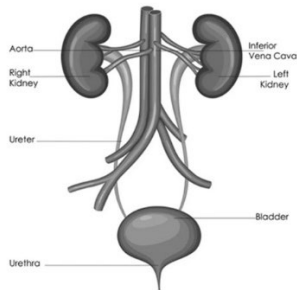
The reproductive tract develops in close association with the urinary tract. In females, the two systems become completely separate, whereas the male reproductive and urinary tracts share a common passage, the urethra. Thus, the two systems are referred together as the genitourinary (GU) or urogenital (UG) tract, and urologists are called on to treat disorders of the male reproductive system as well as those of the urinary system.

Urinary system

The urinary system excretes metabolic waste. In forming and eliminating urine, it also regulates the composition, volume and acid-base balance (PH) of body fluids. In several ways, kidney activity affects the circulation. The urinary system consists of;

- Two kidneys, the organs that form urine
- Two ureters, which transport urine from the kidneys to the bladder
- The urinary bladder, which stores and eliminates urine
- The urethra, which carries urine out of the body

The pelvic parts of the urinary system consist of the terminal parts of the ureters, the bladder and the proximal part of the urethra.



Kidneys

The kidneys are the organs that form urine from substances filtered out of the blood. In addition to metabolic wastes, urine contains water and ions, so its formation is important in regulating the blood's volume and composition. The bean-shaped kidneys are located in the posterior abdominal region.

Kidney structure

Each kidney has a smooth anterior and posterior surface covered by a fibrous capsule, which is easily removable except during disease. On the medial margin of each kidney is the hilum of kidney, which is a deep vertical slit through which renal vessels, lymphatics, and nerves enter and leave the substance of the kidney.

Each kidney consists of an outer renal cortex and an inner renal medulla. The renal cortex is a continuous band of pale tissue that completely surrounds the renal medulla.

Ureters

The ureters enter the pelvic cavity from the abdomen by passing through the pelvic inlet. On each side, the ureter crosses the pelvic inlet and enters the pelvic cavity in the area anterior to the bifurcation of the common iliac artery.

From this point, it continues along the pelvic wall and floor to join the base of the bladder.

In the pelvis, the ureter is crossed by;

- The ductus deferens in men

- The uterine artery in women

Bladder

The bladder is the most anterior element of the pelvic viscera. Although it is entirely situated in the pelvic cavity when empty, it expands superiorly into the abdominal cavity when full.

The empty bladder is shaped like a three-sided pyramid that has tipped over to lie on one of its margins. It has an apex, a base, a superior surface, and two inferolateral surfaces.

- The apex of the bladder is directed toward the top of the pubic symphysis; a structure known as the median umbilical ligament continues from it superiorly up the anterior abdominal wall to the umbilicus.
- The base of the bladder is shaped like an inverted triangle and faces posteroinferiorly. The two ureters enter the bladder at each of the upper corners of the base, and the urethra drains inferiorly from the lower corner of the base.
- The inferolateral surfaces of the bladder are cradled between the levator ani muscles of the pelvic diaphragm and the adjacent obturator internus muscles above the attachment of the pelvic diaphragm. The superior surface is slightly domed when the bladder is empty; it balloons upward as the bladder fills.

Urethra

The urethra begins at the base of the bladder and ends with an external opening in the perineum. The paths taken by the urethra differ significantly in women and men.

In women

In women, the urethra is short, being about 4cm long. It travels a slightly curved course as it passes inferiorly through the pelvic floor into the perineum, where it passes through the deep perineal pouch and perineal membrane before opening in the vestibule that lies between the labia minora.

The urethral opening is anterior to the vaginal opening in the vestibule. The inferior aspect of the urethra is bound to the anterior surface of the vagina.

In men

In men, the urethra is long, about 20cm, and bends twice along its course. Beginning at the base of the bladder and passing inferiorly through the prostate, it passes through the deep perineal pouch and perineal membrane and immediately enters the root of the penis. As the urethra exits the deep perineal pouch, it bends forward to course anteriorly in the root of penis. When the penis is flaccid, the urethra makes another bend, this time inferiorly, when passing from the root to the body of the penis. During erection, the bend between the root and body of the penis disappears.

The urethra in men is divided into preprostatic, prostatic, membranous and spongy parts.

- The preprostatic part of the urethra is about 1cm long, extends from the base of the bladder to the prostate, and is associated with a circular cuff of smooth muscle fibers (the internal urethral sphincter). Contraction of this sphincter prevents retrograde movement of semen into the bladder during ejaculation.
- The prostatic part of the urethra is 3-4cm long and is surrounded by the prostate. In this region, the lumen of the urethra is marked by a longitudinal midline fold of mucosa.
- The membranous part of the urethra is narrow and passes through the deep perineal pouch. During its transit through this pouch, the urethra in both men and women, is surrounded by skeletal muscle of the external urethral sphincter.
- The spongy urethra is surrounded by erectile tissue of the penis. It is enlarged to form a bulb at the base of the penis and again at the end of the penis to form the navicular fossa. The two bulbourethral glands in the deep perineal pouch are part of the male reproductive system and open into the bulb of the spongy urethra. The external urethral orifices is the sagittal slit at the end of the penis.

Reproductive system

The function of the gonads (sex glands) in both males and females is to produce the reproductive cells, the gametes, and to produce hormones.

Sex hormones aid in the manufacture of gametes, function in pregnancy and lactation, and also produce the secondary sex characteristics such as the typical size, shape, body hair, and voice that we associated with the male and female genders.

The male reproductive system

The reproductive system in men has components in the abdomen, pelvis, and perineum. The major components are a testis, epididymis, ductus deferens, and ejaculatory duct on each side, and the urethra and penis in the midline.

In addition three types of accessory glands are associated with the system;

- A single prostate
- A pair of seminal vesicles
- A pair of bulbourethral glands

The design of the reproductive system in men is basically a series of ducts and tubules. The arrangement of parts and linkage to the urinary tract reflects its embryological development.

Testes

The testes originally develop high on the posterior abdominal wall and then descend, normally before birth, through the inguinal canal in the anterior abdominal wall and into the scrotum of the perineum.

Each ellipsoid-shaped testis is enclosed within the end of an elongated musculofascial pouch, which is continuous with the anterior abdominal wall and projects into the scrotum. The spermatic cord is the tube-shaped connection between the pouch in the scrotum and the abdominal wall.

Spermatic cord

The spermatic cord begins to form proximally at the deep inguinal ring and consists of structures passing between the abdominopelvic cavities and the testis, and the three fascial coverings that enclose these structures.

The structures in the spermatic cord include;

- The ductus deferens
- The artery to ductus deferens (from the inferior vesical artery)
- The testicular artery (from the abdominal aorta)
- The genital branch of the genitofemoral nerve
- Sympathetic and visceral afferent nerve fibers
- Lymphatics
- Remnants of the processus vaginalis

These structures enter the deep inguinal ring, proceed down the inguinal canal, and exit from the superficial inguinal ring, having acquired the three fascial coverings during their journey. This collection of structures and fascia continues into the scrotum where the structures connect with the testes and the fascia surround the testes.

Epididymis

The epididymis is a single, long coiled duct that courses along the posterolateral side of the testis. It has two distinct components;

- The efferent ductules, which form an enlarged coiled mass that sits on the posterior superior pole of the testis and forms the head of the epididymis.
- The true epididymis, which is a single, long coiled duct into which the efferent ductules all drain, and which continues inferiorly along the posterolateral margin of the testis as the body of epididymis and enlarges to form the tail of epididymis at the inferior pole of the testis.

Prostate

The prostate is an unpaired accessory structure of the male reproductive system that surrounds the urethra in the pelvic cavity. It lies immediately inferior to the bladder, posterior to the pubic symphysis, and anterior to the rectum.

The prostate is shaped like an inverted rounded cone with a larger base, which is continuous above with the neck of the bladder, and a narrow apex, which rests below on the pelvic floor. The inferolateral surfaces of the prostate are in contact with the levator ani muscles that together cradle the prostate between them.

Secretion from the prostate, together with secretions from the seminal vesicles, contribute to the formation of semen during ejaculation.

The ejaculatory ducts pass almost vertically in an anteroinferior direction through the posterior aspect of the prostate to open into the prostatic urethra.

The female reproductive system

As in males, the female reproductive tract consists of internal organs and external genitalia. The breasts, or mammary glands although not part of the reproductive system, are usually included with a discussion of this system, as their purpose is to nourish an infant.

The reproductive tract in women is contained mainly in the pelvic cavity and perineum, although during pregnancy, the uterus expands into the abdominal cavity. Major components of the system consist of;

- An ovary on each side
- A uterus, vagina and clitoris in the midline

In addition, a pair of accessory glands, are associated with the tract.

Ovaries

Like the testes in men, the ovaries develop high on the posterior abdominal wall and then descend before birth, bringing with them their vessels, lymphatics, and nerves.

Unlike the testes the ovaries do not migrate through the inguinal canal into the perineum, but stop short and assume a position on the lateral wall of the pelvic cavity.

The ovaries are the sites of egg production. Mature eggs are ovulated into the peritoneal cavity and normally directed into the adjacent openings of the uterine tubes by cilia on the ends of the uterine tubes. The ovaries lie adjacent to the lateral pelvic wall just inferior to the pelvic inlet.

Uterus

The uterus is a thick-walled muscular organ in the midline between the bladder and rectum. It consists of a body and a cervix, and inferiorly it joins the vagina. Superiorly, uterine tubes project laterally from the uterus and open into the peritoneal cavity immediately adjacent to the ovaries.

The body of the uterus is flattened anteroposteriorly and above the level of origin of the uterine tubes, has a rounded superior end (fundus of uterus). The cavity of the body of the uterus is a narrow slit, when viewed laterally, and is shaped like an inverted triangle, when viewed anteriorly. Each of the superior corners of the cavity is continuous with the lumen of a uterine tube; the inferior corner is continuous with the central canal of the cervix.

Cervix

The cervix forms the inferior part of the uterus and is shaped like a short, broad cylinder with a narrow central channel. The body of the uterus normally arches forward over the superior surface of the emptied bladder. In addition, the cervix is angled forward on the vagina so that the inferior end of the cervix projects into the upper anterior aspect of the vagina. Because the end of the cervix is dome shaped.

Fascia

Fascia in the pelvic cavity lines the pelvic walls, surrounds the bases of the pelvic viscera, and forms sheaths around blood vessels and nerves that course medially from the pelvic walls to reach the viscera in the midline, this pelvic fascia is a continuation of the extraperitoneal connective tissue layer found in the abdomen.

In women

In women, a rectovaginal septum separates the posterior surface of the vagina from the rectum. Condensations of fascia form ligaments that extend from the cervix to the anterior, lateral, and posterior pelvic walls.

In men

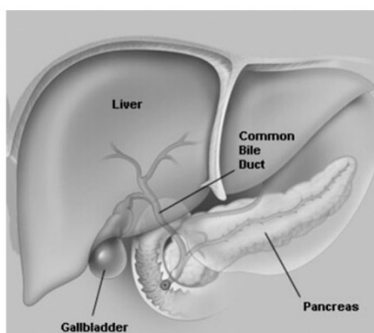
In men, a condensation of fascia around the anterior and lateral region of the prostate (prostatic fascia) contains and surrounds the prostatic plexus of veins and is continuous posteriorly with the rectovesical septum, which separates the posterior surface of the prostate and base of the bladder from the rectum.

Gallbladder

The gallbladder is a pear-shaped sac lying on the visceral surface of the right lobe of the liver in a fossa between the right and quadrate lobes. It has;

- A rounded end (fundus of gallbladder), which may project from the inferior border of the liver.
- A major part in the fossa (body of gallbladder), which may be against the transverse colon and the superior part of the duodenum

- A narrow part (neck of gallbladder) with mucosal folds forming the spiral fold.
- The arterial supply to the gallbladder is the cystic artery from the right hepatic artery (a branch of the hepatic artery proper). The gallbladder receives, concentrates, and stores bile from the liver.



Duct system for bile

The duct system for the passage of bile extends from the liver, connects with the gallbladder, and empties into the descending part of the duodenum.

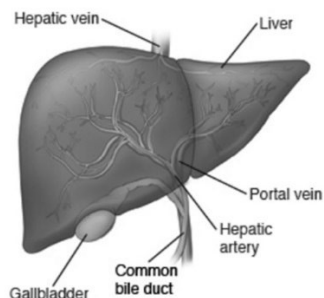
The bile duct continues to descend, passing posteriorly to the superior part of the duodenum before joining with the pancreatic duct to enter the descending part of the duodenum at the major duodenal papilla.

Liver

The liver is the largest visceral organ in the body and is primarily in the right hypochondrium and epigastric region, extending into the left hypochondrium (or in the right upper quadrant, extending into the left upper quadrant).

Surfaces of the liver include;

- A diaphragmatic surface in the anterior, superior and posterior directions
- A visceral surface in the inferior direction



Ureters

The ureters are muscular tubes that transport urine from the kidneys to the bladder. They are continuous superiorly with the renal pelvis, which is a funnel-shaped structure in the renal sinus. The renal pelvis narrows as it passes inferiorly through the hilum of the kidney and becomes continuous with the ureter at the ureteropelvic junction. The ureters cross either the end of the

common iliac or the beginning of the external iliac arteries, enter the pelvic cavity, and continue their journey to the bladder.

Gender determines the course of the urethra

In women, the urethra is short and passes inferiorly from the bladder through the pelvic floor and opens directly into the perineum.

In men, the urethra passes through the prostate before coursing through the deep perineal pouch and perineal membrane and then becomes enclosed within the erectile tissues of the penis before opening at the end of the penis.

It is important to consider the different courses of the urethra in men and women when catheterizing patients and when evaluating perineal injuries and pelvic pathology.

Gender determines the course of the urethra

The perineum is a diamond-shaped region positioned inferiorly to the pelvic floor between the thighs. (in both males and females, the region between the thighs from the external genital organs to the anus is the perineum)

The perineum is divided into an anterior urogenital triangle and a posterior anal triangle.

- The urogenital triangle is associated with the openings of the urinary systems and the reproductive systems and functions to anchor the external genitalia.
- The anal triangle contains the anus and the external anal sphincter.

Urogenital triangle

The urogenital triangle of the perineum is the anterior half of the perineum and is oriented in the horizontal plane. It contains the roots of the external genitalia and the openings of the urogenital system.

Structures in the superficial perineal pouch

The superficial perineal pouch contains;

- Erectile structures that join together to form the penis in men and the clitoris in women
- Skeletal muscles that are associated mainly with parts of the erectile structures attached to the perineal membrane and adjacent bone.

Each erectile structure consists of a central core of expandable vascular tissue and its surrounding connective tissue capsule.

Erectile tissues

Two sets of erectile structures join to form the penis and the clitoris

Clitoris

The clitoris is composed of two corpora cavernosa and the glans clitoris. As in the penis, it has an attached part (root) and a free part (body).

- Unlike the root of penis, the root of clitoris technically consists only of two crura. (although the bulbs of the vestibule are attached to the glans clitoris by thin bands of erectile tissue, they are not included in the attached part of the clitoris)
- The body of clitoris, which is formed only by the unattached parts

The body of clitoris is supported by a suspensory ligament that attaches superiorly to the pubic symphysis. The glans clitoris is attached to the distal end of the body and is connected to the bulbs of the vestibule by small bands of erectile tissue. The glans clitoris is exposed in the perineum and the body of the clitoris can be palpated through skin.

Penis

The penis is composed mainly of the two corpora cavernosa and the single corpus spongiosum, which contains the urethra. As in the clitoris, it has an attached part (root) and a free part (body)

- The root of penis
- The body of penis

Superficial features of the external genitalia

In women

All of the external female genitalia together are called the vulva. This includes the large outer labia major and small inner labia minor that enclose the vaginal and urethral

openings. The clitoris, anterior to the urethral opening, is similar in developmental origin to the penis and responds to sexual stimulation.

In women, the clitoris and vestibular apparatus, together with a number of skin and tissue folds, form the vulva. On either side of the midline are two thin folds of skin termed the labia minor. The region enclosed between them and into which the urethra and vagina open, is the vestibule.

The body of the clitoris extends anteriorly from the glans clitoris and is palpable deep to the prepuce and related skin.

The hymen which may have a small central perforation or may completely close the vaginal opening.

In men

Superficial components of the genital organs in men consist of the scrotum and the penis.

The scrotum is the male homologue of the labia major in women.

The penis consists of a root and body. The attached root of the penis is palpable posterior to the scrotum in the urogenital triangle of the perineum

The pendulous part of the penis (body of penis) is entirely covered by skin the tip of the body is covered by the glans penis.

MEDICAL DEVICE

Ureteral stent

Your ureters are tubes inside your body that drain urine from your kidneys to your bladder. If one of your ureters is blocked, your urine won't drain properly. When this happens, your kidney fills with urine and swells. This is called hydronephrosis. It can be caused by a tumor pushing on your ureter, kidney stones, or scar tissue. If your kidney remains blocked for a long period of time, it can become damaged. If both of your ureters are blocked, this will cause both of your kidneys to become weak and can place you at risk for kidney failure. Blocked kidney(s) require ureteral stent placement.

A ureteral stent is a thin tube that's placed in your ureter to help drain urine from your kidney. One end of the tube is inside your kidney and the other end is in your bladder.

After your stent placement procedure, you may feel a "pulling" sensation when you urinate. You may also have:

- Frequent urination, which is the need to urinate more often than usual.
- Urgent urination, which is a strong, sudden urge to urinate, along with discomfort in your bladder.
- Pelvic pain, which is pain in your lower abdomen (belly).

These symptoms usually go away with time. Your healthcare provider will talk to you about what symptoms you might feel. Your healthcare provider may give you medication to help with bladder symptoms.

You may sometimes see blood in your urine while you have the stent. This may happen for as long as the stent is in place. Sometimes, it happens after increased activity or long car rides. If you see blood in your urine, drink more water than usual until the blood goes away.

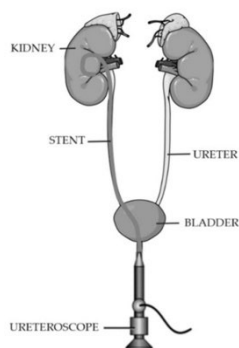
Your stent will need to be replaced about every 3 to 6 months. Your healthcare provider will tell you when it needs to be changed. Leaving your stent in place for too long can lead to:

- Your ureter becoming blocked

- Kidney stones
- Infection

Ureteral stents can be used for several weeks, months, or years. They're used to:

- Let urine flow through your blocked ureter.
- Keep your ureter open.



Acetonaemia	افزایش اجسام ستونی در ادرار	-part, pratus	مربوط به حاملگی و زایمان
Aglycosuria	عدم وجود قند در ادرار	Ammonuria	بی اختیاری، ضعف در نگهداری ادرار
Androgen	هورمون مردانه	Antidiuretic	ضداددرار
Anuria	بی ادراری	-ary	مربوط به ادرار
Bacteruria	وجود باکتری در ادرار	Bladder	مثانه
Cervix	دهانه رحم	Bradyuria	کند خارج شدن ادرار
Cystitis	التهاب و تورم مثانه	Cysto-	کیسه، مثانه
Cystoscopy	معاینه مثانه به وسیله سیستوسکوپی	Cystolithotomy	خارج کردن سنگ مثانه
Disuria	سوزش ادرار	Delayed Menarche	قاعدگی دیررس
Dysmenorrhea	قاعدگی دردناک	Dystocia	داروی پیشاب آور
Eclampsia	مسمومیت حاملگی، تشنج حاملگی	Dystocia	زایمان مشکل یا غیرطبیعی
Episio-	مربوط به دستگاه خارجی تناسلی زنان	Episiotomy	برش فرج
Estrogen	هورمون جنسی زنان	Fertilization	عمل لقاح
Fetal	بارداری	Fetus	جنین
Gynaecology	بیماری‌های مربوط به زنان	Gynaecologist	متخصص بیماری‌های زنان
Hernia	فتق	Herniotomy	برداشتن فتق

Hysterectomy	برداشتن رحم	Hystero-	رحمی، مربوط به رحم
Hysteropexy	ثابت کردن رحم	Illusion	مجازی
Inutero	در زهدان، در رحم	Ischuria	احتباس یا توقف جریان ادرار
Labor	درد زایمان	Menorrhagia	قاعدگی دردناک
Menopause	یائسگی	Mentum	مربوط به تخمدان
Menses, menstrual	قاعدگی	Micturition	ادرار کردن
Metro-	مربوط به رحم	oligomenorrhea	قاعدگی نابرجا
Obstetrics	مامایی (ابستت و زایمان)	Orchio-	مربوط به بیضه
Oligouria	کم شدن حجم ادرار	Orchitis	التهاب بیضه
Orchiocoele	فتق بیضه	Ovaritis	تورم و التهاب تخمدان
Ovary	تخمدان	Ovulation	تخمک گذاری
Ovocyte	تخمک	Poyuria	پلیواری
Pregnancy	بارداری	Pregnant	باردار
Preterm labor	زایمان زود رس	Public	نواحی دستگاه تناسلی زن یا مرد
Pyuria	وجود چرک در ادرار	Testis	بیضه
Salpingo-	مربوط به لوله رحمی	Uretero-	حالب، لوله‌ای که ادرار را از کلیه به مثانه می‌برد
Uremia	افزایش و احتباس اوره ادرار در بدن	Ureteralgia	درد حالب
Ureter	حالب، میرنای	Urethra	مربوط به پیشابراه
Urinalysis	تجزیه ادرار	Urinary Bladder	مثانه، کیسه ادرار
Urinarytract infection	عفونت مجرای ادراری	Urine	ادرار
Uro- , Urino,	مربوط به ادرار	Uterine	رحمی
Uterine Aspirators	مکنه xxxهای رحم	Uters	رحمی
Vagina	مهبل، واژن	Vaginal	مربوط به واژن
Venereal disease	بیماری‌های مقاربتی	Vesico-	مربوط به مثانه

Vrogental System (Genital Urinary System)

دستگاه ادراری- تناسلی

این بخش از دو قسمت تشکیل شده است:

Urinary System (Excetory System)

I. دستگاه ادراری

Genital System

II. دستگاه تناسلی

ساختمان دستگاه ادراری:

Kidney

کلیه (X2)

ساختمان کلیه:

Cortex

I. منطقه قشری کلیه (کورتکس)

Medulla

II. منطقه مرکزی (مدولا)

Pelvis

III. لگنچه کلیه

Urine

IV. مایع درون کلیه (ادرار)

Nephron	- نفرون
Bowmen Capsule	I. کپسول بومن
Proximal Convolutd Tubule	II. لوله پیچیده نزدیک
Loop of Henle	III. قوس هنله
Distal Convolutd Tubule	IV. لوله‌ی پیچیده دور
Collecting duct	V. مجرای جمع کننده
Vreter	حالت (میزنای X2)
Vrinary Bladder	مثانه
Urethra	مجرای اندرار (پیشابراه)
Reproductive System (Genital tract)	دستگاه تولیدمثل یا تناسلی
Ovulation	تخمک گذار (اووالاسیون)
Gonad	غدد جنسی
Tesis	I. بیضه
Ovary	II. تخمدان
Male Reproductive System	دستگاه تولید مثل مردانه:
Penis	آلت تناسلی مرد
Body	I. بدنه
Glans	II. حشمه
Prepuce	III. پریپوسی (پوستی روی حشمه که با جراحی ختنه برداشته می‌شود)
Testis	IV. بیضه
Scrotum	۱. پوست بیضه (کیسه بیضه)
Spermatic Cord	۲. طناب بیضه
Epididym	V. مجاری رشته‌ای (زائده اپی دیدیم)
Ductus Deferens	۱. مجرای منی بر
Seminal Vesicels	۲. کیسه منی
Prostate Gland	VI. غده پروستات
Cowper Gland	VII. غده کوپر
	مراحل تحریک جنسی در مردان:
Erection	راست شدن آلت تناسلی
Orgasm	اوج لذت جنسی (ارگاسم)
Ejaculation	انزال منی
Female Reproductive System (Female Genital)	دستگاه تولید مثل زنان
Vulva	فرج
Mons pubis	زهار
Clitoris	کلیتوریس
Labia Major	لب بزرگ
Labia Minor	لب کوچک
Hymen	سوراخ مهبل (واژن) و پرده بکارت
Bulb	بولب (X2)
Vagina	مهبل

Vaginal Opening	مدخل واژن
Urethra	محل خروج ادرار
Vaginal delivery	کانال زایمان طبیعی
Fallopian Tube (Uterine Tube)	لوله رحم (فالوپ)
Ovary	تخمندان
Bartholin's gland	غده بارتونن
Uterus	- رحم
Cervix	I. گردن
Body	II. تنه
Fundus	III. فاندوس رحم
	ساختمان کلیه:
Renal Capsule	۱- کپسول کلیه
	لایه نازک سیمی شکل پوشاننده کلیه‌ها
Cortex	۲- کورتکس (قشر کلیه‌ها)
	رنگ قهوه‌ای مایل به قرمز دارد و تصفیه خون را انجام می‌دهد.
	۳- مدولا (مرکز)
	شامل هرم‌های کلیوی بوده که باز جذب بعضی از مواد در آن صورت گرفته و پس از تولید آزاد می‌کند.
Renal Pelvis	۴- لگنچه
	یک یک حفره بزرگ قیفی شکل در مرکز کلیه که وظیفه جمع‌آوری ادرار از هرم‌های کلیوی را عهده‌دار است.
	دیگر اجزای ساختمان کلیه:
Ascending limb of loop of Henle	
Descending limb of loop of Henle	
Peritubular capillaries	
Proximal Tubule	
Glomerulus	
Bowman's Capsule	I.
Glomerular Capillaries	II.
Distal tubule	
Renal Vein	
Renal Artery	
Ureter	
Medula	
Pelvis	
Cortex	
	ساختمان جدار مثانه (از داخل به خارج)
	مخاط
	زیر مخاط

لایه عضلات دترسور

لایه خارجی سروز

مجرای خارجی مثانه

* قاعده مثانه توسط غده‌ای به نام پروستات (Prostate Gland) احاطه شده است.

در مردان

کیسه‌های منی

مجرای اسپرم

مجرای اندار در مردان:

۱- بخش پیوستاتیک

۲- بخش پرده‌ای (اسفنکتر ارادی مجرای اندار)

۳- بخش اسفنجی

داخل پنیس آلت تناسلی واقع شده است.

اندام تناسلی داخلی در مردان (غیرقابل رویت)

Testis ۱- بیضه‌ها (غدد جنسی)

Epididym ۲- مجاری رشته‌ای

مجرای اندار، مجرای منی بر (اسپرم بر)، (زائده اپی دریم)

۳- غدد ضمیمه

I. غده پروستات

II. غدد کوپر

III. کیسه‌های منی

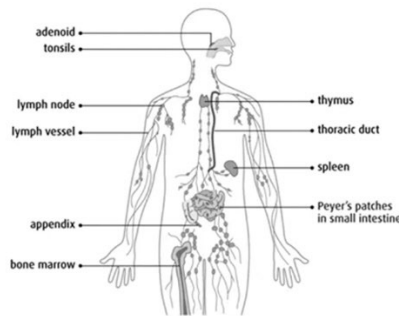
Unit10

Lymphatic system

The lymphatic system is a widely distributed system with multiple functions. Its role in circulation is to return excess fluid and proteins from the tissues to the bloodstream. Blind-ended lymphatic capillaries pick up these materials in the tissues and carry them into larger vessels. The fluid carried in the lymphatic system is called lymph.

Along the path of the lymphatic vessels are small masses of lymphoid tissue, the lymph nodes. Their function is to filter the lymph as it passes through. They are concentrated in the cervical (neck), axillary (armpit), mediastinal (chest), and inguinal (groin), regions. Other protective organs and tissues of the lymphatic system include of following;

- Tonsils; located in the throat (pharynx). They filter inhaled or swallowed materials and aid in immunity early in life.
- Thymus; in the chest, above the heart. It processes and stimulates lymphocytes active in immunity.
- Spleen; in the upper left region of the abdomen. It filters blood and destroys old red blood cells.
- Appendix; attached to the large intestine. It may aid in the development of immunity.



Lymphatic vessels

Lymphatic vessels form an extensive and complex interconnected network of channels, which begin as porous blind-ended lymphatic capillaries in tissues of the body and converge to form a number of larger vessels, which ultimately connect with large veins in the root of the neck. Lymphatic vessels mainly collect fluid lost from vascular capillary beds during nutrient exchange processes and deliver it back to the venous side of the vascular system.

The fluid in most lymphatic vessels is clear and colorless and is known as lymph, that carried by lymphatic vessels from the small intestine is milky because of the presence of chylomicrons and is termed chyle.

There are lymphatic vessels in most areas of the body except the brain, bone marrow, and vascular tissues such as epithelia and cartilage.

The movement of lymph through the lymphatic vessels is generated mainly by the indirect action of adjacent structures particularly by contraction of skeletal muscles and pulses in arteries. Unidirectional flow is maintained by the presence of valves in the vessels.

Lymph nodes

Lymph nodes are small (0.1-2.5cm long) encapsulated structures that interrupt the course of lymphatic vessels and contain elements of the body's defense system.

Lymph nodes are efficient filters and flow through them is slow, cells that metastasize from (migrate away from) primary tumors and enter lymphatic vessels often lodge and grow as secondary tumors in lymph nodes. Lymph nodes that drain regions that are infected or contain other forms of disease can enlarge or undergo certain physical changes such as becoming hard or tender.

A number of regions in the body are associated with clusters or a particular abundance of lymph nodes. Not surprisingly, nodes in many of these regions drain the body's surface, the digestive system, or the respiratory system. All three of these areas are high-risk sites for the entry of foreign pathogens.

Lymph nodes are abundant and accessible to palpation in axilla, the groin and femoral region and the neck. Deep sites that are not palpable include those associated with the trachea and bronchi in the thorax, and with the aorta and its branches in the abdomen.

The endocrine system

The body's main controlling systems are the endocrine system and the nervous system. The endocrine system consists of a widely distributed group of glands that secrete regulatory substances called hormones. Because hormones are released into the blood, the endocrine glands are known as the ductless glands, as compared to exocrine glands, such as sweat glands and digestive glands, that secrete through ducts to the outside. Despite the fact that hormones circulating in the blood reach all parts of the body, only certain tissues respond to a specific hormone. The tissue that is influenced by a specific hormone is called the target tissue. The cells in a target tissue have specific receptors on their membranes or within the cell to which the hormones attaches, enabling it to act.

Glands

The mammary glands

The mammary gland or breasts are composed mainly of glandular tissue and fat. Their purpose is to provide nourishment for the newborn. The milk secreted by the glands is carried in ducts to the nipple.

The breasts, consisting of secretory glands, superficial fascia, and overlying skin, are in the pectoral region on each side of the anterior thoracic wall.

Vessels, lymphatics, and nerves associated with the breast are as follows;

- Branches from the internal thoracic arteries and veins perforate the anterior chest wall on each side of the sternum to supply anterior aspects of the thoracic wall. Those branches associated mainly with the second to fourth intercostal spaces also supply the anteromedial parts of each breast.
- Lymphatic vessels from the medial part of the breast accompany the perforating arteries and drain into the parasternal nodes on the deep surface of the thoracic wall
- Vessels and lymphatics associated with lateral parts of the breast emerge from or drain into the axillary region of the upper limb
- Lateral and anterior branches of the fourth to sixth intercostal nerves carry general sensation from the skin of the breast

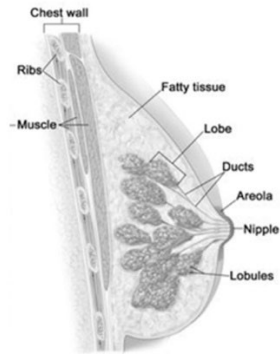
The breasts consist of mammary glands and associated skin and connective tissues. The mammary glands are modified sweat glands in the superficial fascia anterior to the pectoral muscles and the anterior thoracic wall.

The mammary glands consist of a series of ducts and associated secretory lobules. These converge to form 15 to 20 lactiferous ducts, which open independently onto the nipple. The nipple is surrounded by a circular pigmented area of skin termed the areola.

The breast lies on deep fascia related to the pectoralis major muscle and other surrounding muscles. A layer of loose connective tissue (the retromammary space) separates the breast from the deep fascia and provides some degree of movement over underlying structures.

Breast in men

The breast in men is rudimentary and consists only of small ducts, often composed of cords of cells, that normally do not extend beyond the areola. (breast cancer can occur in men)



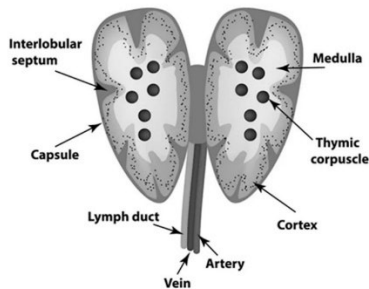
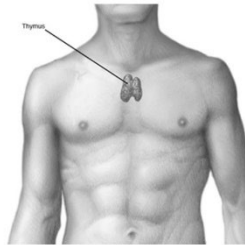
Thymus

The thymus is the most anterior component of the superior mediastinum, lying immediately posterior to the manubrium of the sternum. It is an asymmetric structure.

The upper extent of the thymus can reach into the neck as high as the thyroid gland; a lower portion typically extends into the anterior mediastinum over the pericardial sac.

Involved in the early development of the immune system, the thymus is a large structure in the child, begins to atrophy after puberty and shows considerable size variation in the adult. In the elderly adult, it is barely identifiable as an organ, consisting mostly of fatty tissue that is sometimes arranged as two lobulated fatty structures.

Arteries to the thymus consist of small branches originating from the internal thoracic arteries.



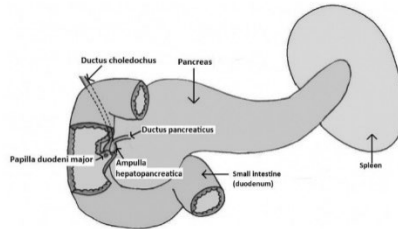
Pancreas

The pancreas lies mostly posterior to the stomach. It extends across the posterior abdominal wall from the duodenum, on the right, to the spleen on the left.

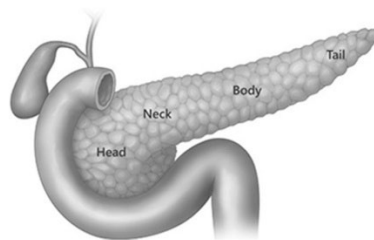
The pancreas is retroperitoneal except for a small part of its tail and consists of a head, neck, body and tail.

- The head of pancreas lies within the C-shaped concavity of the duodenum
- The neck of pancreas is anterior to the superior mesenteric vessels

- The body of pancreas is elongate and extends from the neck to the tail of the pancreas
 - The tail of pancreas passes between layers of the splenorenal ligament
- The pancreatic duct begins in the tail of the pancreas. It passes to the right through the body of the pancreas and after entering the head of the pancreas, turns inferiorly. In the lower part of the head of pancreas the pancreatic duct joins the bile duct.



Spleen



The spleen develops as part of the vascular system in the part of the dorsal mesentery that suspends the developing stomach from the body wall. It is therefore in the left upper quadrant or left hypochondrium of the abdomen.

The spleen is connected to the;

- Greater curvature of the stomach by the gastrosplenic ligament which contains the short gastric and gastroepiploic vessels
- Left kidney by the splenorenal ligament which contains the splenic vessels

The spleen is surrounded by visceral peritoneum except in the area of the hilum on the medial surface of the spleen. The splenic hilum is the entry point for the splenic vessels and occasionally the tail of the pancreas reaches this area.

Suprarenal glands

The suprarenal glands are associated with the superior pole of each kidney. They consist of an outer cortex and an inner medulla. The right gland is shaped like a pyramid, whereas the left gland is semilunar in shape and the larger of the two.

Anterior to the right suprarenal gland is part of the right lobe of the liver and the inferior vena cava, whereas anterior to the left suprarenal gland is part of the stomach, pancreas and on occasion, the spleen. Parts of the diaphragm are posterior to both glands.

The suprarenal glands are surrounded by the periphric fat and enclosed in the renal fascia, through a thin septum separates each gland from its associated kidney.

Seminal vesicle

Each seminal vesicle is an accessory gland of the male reproductive system that develops as a blind-ended tubular outgrowth from the ductus deferens. The tube is coiled with numerous pocket-like outgrowths and is encapsulated by connective tissue to form an elongate structure situated between the bladder and rectum. The gland is immediately lateral to and follows the course of the ductus deferens at the base of the bladder.

The duct of the seminal vesicle joins the ductus deferens to form the ejaculatory duct. Secretions from the seminal vesicle contribute significantly to the volume of the ejaculate (semen).

Bulbourethral glands

The bulbourethral glands one on each side, are small, pea-shaped mucous glands situated within the deep perineal pouch. They are lateral to the membranous part of the urethra. The duct from each gland passes inferomedially through the perineal membrane, to open into the bulb of the spongy urethra at the root of the penis.

Together with small glands positioned along the length of the spongy urethra, the bulbourethral glands contribute to lubrication of the urethra and the pre-ejaculatory emission from the penis.

In women

The reproductive tract in women is contained mainly in the pelvic cavity and perineum, although during pregnancy the uterus expands into the abdomen cavity. Major components of the system consist of;

- An ovary on each side
- A uterus, vagina, and clitoris in the midline

In addition, a pair of accessory glands (the greater vestibular glands) are associated with the tract.

Thyroid and parathyroid gland

The thyroid gland consists of two lobes on either side of the larynx and upper trachea. The lobes are connected by a narrow band (isthmus). The thyroid secretes a mixture of hormones, mainly thyroxine (T4) and triiodothyronine (T3). Because thyroid hormones contain iodine. Most thyroid hormone in the blood is bound to protein, primarily thyroxine-binding globulin (TBG).

On the posterior surface of the thyroid are four to six tiny parathyroid glands that affect calcium metabolism. Parathyroid hormone (PTH) regulates calcium exchange between the blood and bones. It increases blood level of calcium when needed.

Thyroid gland

The thyroid gland is anterior in the neck below and lateral to the thyroid cartilage. It consists of two lateral lobes (which cover the anterolateral surfaces of the trachea, and the lower part of the thyroid cartilage) with an isthmus that connects the lateral lobes and a crosses the anterior surfaces of the second and third tracheal cartilages.

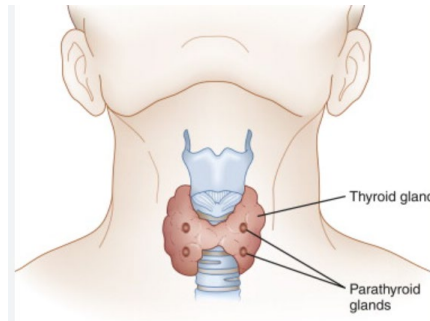
The thyroid gland arises as a median outgrowth from the floor of the pharynx near the base of the tongue. There may also be functional thyroid gland;

- Associated with the tongue (a lingual thyroid)
- Anywhere along the path of migration of the thyroid gland
- Extending upward from the gland along the path of the pyramidal lobe

Parathyroid glands

The parathyroid glands are two pairs of small, aloid, yellowish structures on the deep surface of the lateral lobes of the thyroid gland. They are designated as the superior and the inferior parathyroid glands. However, their position is quite variable and they may be anywhere from the carotid bifurcation superiorly to the mediastinum inferiorly. Derived from the third (the inferior parathyroid glands) and fourth (the superior parathyroid glands) pharyngeal pouches these paired structures migrate to their final adult position and are named accordingly.

The arteries supplying the parathyroid glands are the inferior thyroid arteries and venous and lymphatic drainage follows that described for the thyroid gland.

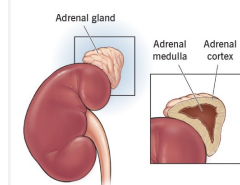


Adrenals

The adrenal glands, located at the top of the kidneys, are divided into two distinct regions; an outer cortex and inner medulla. The hormones produced by this gland are involved in the body's response to stress. The cortex produces steroid hormones;

- Cortisol (hydrocortisone) mobilizes fat and carbohydrate reserves to increase these nutrients in the blood.
- Aldosterone causes the kidneys to conserve sodium and water while eliminating potassium.
- Sex hormones, mainly testosterone, are also produced in small amounts, but their importance is not well understood. Some athletes, illegally and dangerously, take testosterone-like steroids to increase muscle size, strength, and endurance.

The medulla of the adrenal gland produces the hormone epinephrine (adrenaline) in response to stress. Epinephrine works with the nervous system to help the body meet physical and emotional challenges.



The kidneys

The kidneys are the organs that form urine from substances filtered out of the blood. In addition to metabolic wastes, urine contains water and ions, so its formation is important in regulating the blood's volume and composition. In addition, the kidneys produce two substances that act on the circulatory system;

- Erythropoietin (EPO), a hormone that stimulates red blood cell production in the bone marrow.
- Renin, an enzyme that functions to raise blood pressure. It activates a blood component called angiotensin, which causes constriction of the blood vessels.

The testes

The male germ cells, the sperm cells or spermatozoa are produced in the paired testes that are suspended outside of the body in the scrotum. Although the testes develop in the abdominal cavity.

From the start of sexual maturation spermatozoa are continuously produced within the testes in coiled seminiferous tubules. Their development requires the aid of special cells and male sex hormones, or androgens, mainly testosterone.

In both males and females, the gonads are stimulated by follicle-stimulating hormone (FSH) and luteinizing hormone (LH), released from the anterior pituitary gland beneath the brain. These hormones are chemically the same in males and females, although they are named for their actions in female reproduction.

Formation of semen

Semen is the thick, whitish fluid that transports spermatozoa. It contains, in addition to sperm cells, secretion from three types of accessory glands. Following the sequences of sperm transport, these are;

- The paired seminal vesicles, which release their secretions into the ejaculatory duct on each side.
- The prostate gland, which secretes into the first part of the urethra beneath the bladder
- The two bulbourethral (cowper) glands, which secrete into the urethra just below the prostate gland.

Together, these glands produce a slightly alkaline mixture that nourishes and transports the sperm cells and also protects them by neutralizing the acidity of the female vaginal tract.

Salivary glands

Salivary glands are gland that open or secrete into the oral cavity. Most are small glands in the submucosa or mucosa of the oral epithelium lining the tongue, palate, cheeks and lips and open into the oral cavity directly or via small ducts. In addition to these small glands are much larger glands which include the paired parotid, submandibular, and sublingual glands.

Parotid gland

The parotid gland on each side is entirely outside the boundaries of the oral cavity in a shallow triangular-shaped trench formed by;

- The sternocleidomastoid muscle behind
- The ramus of mandible in front
- Superiorly, the base of the trench is formed by the external acoustic meatus

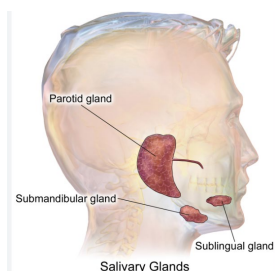
The gland normally extends anteriorly over the masseter muscle and inferiorly over the posterior belly of the digastric muscle.

Submandibular glands

The elongate submandibular glands are smaller than the parotid glands but larger than the sublingual glands. Each is hook shaped;

Sublingual glands

The sublingual glands are the smallest of the three major paired salivary glands. Each is almond shaped and is immediately lateral to the submandibular duct and associated lingual nerve in the floor of the oral cavity. Each sublingual gland lies directly against the medial surface of the mandible where it forms a shallow groove superior to the anterior one-third of the mylohyoid line.



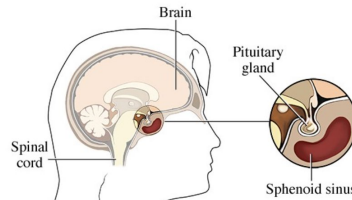
Pituitary

The pituitary gland or hypophysis, is a small gland beneath the brain. It is divided into an anterior lobe (adenohypophysis) and a posterior lobe (neurohypophysis). The hypothalamus, a part of the brain that regulates homeostasis, is connected to and controls both lobes. Because the hypothalamus secrete hormones and is active in controlling the pituitary gland, it is considered to be part of the endocrine system as well as the nervous system.

The anterior pituitary produces six hormones. One of these is growth hormone (somatotropin), which stimulates bone growth and acts on other tissues. The remainder of the pituitary hormones regulate other glands, including the thyroid, adrenals, gonads and mammary glands.

The posterior pituitary releases two hormones that are actually produced in the hypothalamus. These hormones are stored in the posterior pituitary until they are needed;

- Antidiuretic hormone (ADH) acts on the kidneys to conserve water and also promotes constriction of blood vessels. Both of these actions increase blood pressure.
- Oxytocin stimulates uterine contractions and promotes milk letdown in the breasts during lactation.



Other endocrine tissues

There are three additional types of glands that secrete hormones;

- The pineal gland is a small gland in the brain. It regulates mood, daily rhythms, and sexual development in response to environmental light. Its hormone is melatonin, which some people take to help regulate sleep-wake cycles when they travel between time zones.
- The thymus secretes the hormone thymosin that aids in the development of the immune system. The thymus lies in the upper chest above the heart.
- The gonads, testes and ovaries are also included because they secrete hormones in addition to producing the sex cells.

Other organs including the stomach, kidney, heart, and small intestine also produce hormones.

MEDICAL DEVICE

Laparoscopy

Laparoscopy is a surgical procedure used to examine the organs in the belly (abdomen). It can also examine a woman's pelvic organs.

Laparoscopy uses a thin lighted tube that has a video camera. The tube is called a laparoscope. It is put into a tiny cut (incision) in your belly. The video camera images can be seen on a computer screen.

One benefit of laparoscopy is that it is minimally invasive. That means it uses a very small cut (incision) in the belly. Laparoscopy often takes less time and has a faster recovery than open (traditional) surgery.

Laparoscopy may be used to take a small tissue sample for testing (a biopsy). It can also be used to remove organs, such as the appendix (appendectomy) or the gallbladder (cholecystectomy).

An abdominal laparoscopy is sometimes called a diagnostic laparoscopy. It can be done to examine the abdomen and its organs for:

- Tumors and other growths
- Injuries
- Bleeding inside the belly
- Infections
- Pain that can't be explained

- Blockages
- Other conditions

A diagnostic laparoscopy is often done when the results of a physical exam, X-ray, or CT scan aren't clear. Or it may be done when more information is needed.

Laparoscopy may be used to figure out the stage of cancer for an abdominal organ. It may also be used to find where and how deep an abdominal injury is. It can also see how much internal bleeding you have.

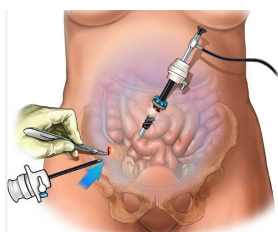
For women, a gynecologic laparoscopy may be used to check:

- Pelvic pain and problems
- Ovarian cysts
- Fibroids
- The fallopian tubes

Laparoscopy can also be used to diagnose and treat endometriosis. This is when tissue that normally lines the uterus grows outside it. Laparoscopy may be done to treat an ectopic pregnancy or to do a tubal ligation (tie the fallopian tubes) to permanently prevent pregnancy.

Laparoscopy can also be used to do bariatric surgery, such as gastric bypass or gastric sleeve. These procedures have become more common in treating obesity.

There may be other reasons for your healthcare provider to suggest a laparoscopy.



Adenocarcinoma	تومور بدخیم بافت غده‌ای	Adeno-	غده
Aderno, Adernal	غده آدرنال	Adenoma	تومور خوش خیم اپی تلیوم غده‌ای
Adenocratic	کورتکس آدرنال	Aderno-	غده فوق کلیوی
Appendectomy	برداشتن آپاندیس از بدن	Angio cholecystitis	التهاب کیسه صفرا و عروق صفراوی

Breast	پستان	Bile	صفرا
Cholangi/o	مجرای صفراوی	Chole, Chol/o	صفراوی
Cholangiotomy	برش یک مجرای صفراوی	Chole	مربوط به صفرا
Cholecyst	کیسه صفرا	Cholangitis	التهاب مجاری صفراوی
Cholecystectomy	برداشتن کیسه صفرا	Cholecystitis	سنگ کیسه صفرا
Cholecystopathy	هر نوع بیماری کیسه صفرا	Cholecystitis	التهاب و تورم کیسه صفرا
Choler	مایع صفراوی	Choledoch-	مجرای صفراوی عمومی
Cirrhosis	التهاب بینابینی یک عضو به خصوص کبد	Choleric	صفراوی
Exocrine	غدد برون ریز	Endocrine/o	غددی، مربوط به غدد
Glandular malfunction	اختلالات غددی	Gallstones	سنگ کیسه صفرا
Hepatitis	التهاب کبد	Hepato-	کبدی، مربوط به کبد
Hypophys	غده هیپوفیز	Hepatositis	هر نوع اختلال عملی کبد
Hypothyroidism	کمکاری تیروئید	Hyposalivation	کمبود ترشح بزاق
Lacrim	اشک	Insul	جزایر پانکراس
Liver	کبد، جگر	Leino-	مربوط به طحال
Lympho-	مربوط به سیستم لنف	Lymph	لنف
Lymphangia	رگ لنفاوی	Lymphocyt	لنفوسیت
Mammary	مربوط به پستان‌ها	Lymphaden	غدد لنفاوی
Masto-	مربوط به پستان و غده شیری	Mamma	غده پستان
Mestodynia	درد پستان	-megaly	بزرگ شدن کبد
Nephrolithiasis	سنگ کلیه	Nephro-	کلیوی، مربوط به کلیه
Nipple	نوک پستان	Nephron	واحد کلیوی
Pancreat	پانکراس	Pancreas	لوزالمعده
Parathyroid glands	پانکراس	Papillo-	نوک پستان
Ren	کلیه	Pituitar	غده هیپوفیز
Renal	کلیوی	Prostate gland	غده پروستات
Seb	غده سباسه	Reno-	کلیوی، مربوط به کلیه
Sial	غده بزاقی	Renal Stone	سنگ کلیه
Splomegaly	بزرگ شدن طحال	Sebo-	مربوط به غده سباسه
Thele	مربوط به نوک پستان	Spleen	طحال
Thelion	نوک پستان	Splendo-	مربوط به طحال
Thyro-, thyroid	غده تیروئید	Thymus	غده تیموس
Tonsil	لوزه	Thyro-	مربوط به غده تیروئید
Tonsillitis	التهاب لوزه‌ها	Tonsilo-	مربوط به لوزه

Endocrine system	غده مترشحہ داخلی (غدد درون‌ریز)
Thyroid Gland	غده تیروئید
Parathyroid Gland	غده پارائتیروئید
Hypophys	غده هیپوفیز
Noro Hypophys	I. نورو هیپوفیز
Adno Hypophys	II. آدنو هیپوفیز (قدامی)
Adrenal or Suprarenal Glands	غده فوق کلیوی
Pineal Glands	غده صنوبری
Pancreas (Islets of Langerhans)	پانکراس (جزایر لانگرهانس)
Thymus	تیموس
Gonads	غدد جنسی
Breasts	- پستان
	غده شیری
	چربی
	بافت همبند
	الیااف الاستیک
	(۱۶-۲۰) لوب (هر لوب یک راه برای شیری دارد که به نوک پستان خاتمه پیدا می‌کند)
	لوبول

Endo Crine System	دستگاه غدد درون‌ریز
	غدد درون‌ریز
Pituitary Gland	- غده هیپوفیز
Endo Pituitary Gland	I. آدنو هیپوفیز
Noro Pituitary Gland	II. نورو هیپوفیز
Thyroid Gland	غده تیروئید
Para Thyroid Gland	غده پارائتیروئید
Adrenal Gland	غده فوق کلیوی (آدرنال)
Pancreas	پانکراس (جزایر لانگرهانس (لوزالمعده))
Gonad	غدد جنسی
Pineal Gland	غده اپی‌فیز (صنوبری)
Thymus	غده تیموس
Breast	پستان
Salivary Gland	غدد بزاقی (بناگوش، زیرفکی، زیرزبانی)
Liver	کبد
Gall bladder	کیسه صفرا
Sebaceous Gland	غده چربی (غدد سباسه)
Swent Gland	- غدد عرق
Ecrine Sweat Glands	I. غدد عرق معمولی (ترشح بدون بو)

Apocrine Sweat Glands	II. غدد عرق آپوکراین
Ceruminous Gland	غدد سرومن
Lacrimal Gland	غده اشکی
Bowmen Gland	غده بومن (دربین)
	* مایع مترشحه از غدد بومن (Bowmen G)
	مایع سووزی
	سیستم لنفاوی بدن:
	اجزای سیستم لنفاوی:
	۱. عروق لنفاوی
	۲. غدد لنفاوی
	۳. اندام‌های لنفاوی
	I. طحال (سپتزر)
	II. لوزه
	III. غده تیموس
	IV. آپاندیس
	۴. مایع لنف
	لوزه (tonsil)
Oropharynx	۱. لوزه کامی (در ناحیه طرفین)
	۲.
	۳. لوزه زبانی (در قاعده و ریشه زبان)
Adenoid	۴. لوزه حلقی (لوزه سوم، آدنوئید)
	هورمون مترشحه از پانکراس:
Exocrine	اگزوکرین
Endocrine	آندوکرین
	هورمون مترشحه از کبد:
Bile	صفرا (بایل)
	هورمون مترشحه از غدد سباسه (چربی)
Sobum	سبوم
	مایع مترشحه از غده اشکی (lacrimal G)
Tear	اشک
	محور (AXIS) هورمون بدن است
Releasing Hormone	هورمون آزاد کننده
Stimulus Hormone	هورمون محرک
	غدد ضمیمه در دستگاه گوارش یک سری غدد ضمیمه
	وجود دارد
	۱- کبد و کیسه صفرا
	۲- لوزالمعده (پانکراس)
	۳- غدد بزاقی (بناگوش، زیرفکی، زیرزبانی)
	هورمون مترشحه از غده تیروئید:

تری‌یودوتیرونین (T3)	TriIodothyronin (T3)
تیروکسین (T4)	Thyroxine (T4)
کلسی‌تونین	Calcitonin
هورمون مترشح از غده پاراتیروئید:	
پاراتورمون	PTH= parathorormon Hormon
هورمون‌های مترشح از قسمت کورتکس آدرنال:	
کورتیزون (کورتون خون)	Cortisone
آلدوسترون	ALD= Aldestrone
تسترون	Testosterone
پروژسترون	Progesterone
استروژن	Estrogen

پانکراس (لوزالمعده) Pancreas

لوزالمعده به عنوان یک ارگان دوگانه شناخته شده و عملکردی برون‌ریز و درون‌ریز دارد. لوزالمعده در پشت معده، دوازدهه و طحال واقع شده است و حدود ۱۵-۱۳ cm طول دارد و از ۳ نقش زیر تشکیل شده است: (از راست به چپ) ۱- سر ۲- تنه ۳- دم.

- ۱- قسمت سر پانکراس قسمتی است که در داخل قسمت شکل دندونوم یا اثنی عشر قرار دارد (حلقه دوازدهه)
- ۲- قسمت تنه پانکراس بخشی از لوزالمعده است که در جلوی ستون مهره‌ها واقع شده و دارای سطوح قدامی، خلفی و تحتانی می‌باشد.
- ۳- قسمت دم پانکراس در بخش فوقانی و سمت چپ شکم واقع شده و نوک آن با طحال تماس پیدا می‌کند. این غده دارای دو عملکرد درون‌ریز و برون‌ریز می‌باشد.

I. درون‌ریز: وارد خون می‌شود (مثل انسولین)

II. برون‌ریز: وارد دستگاه گوارش GI می‌شود (هورمون‌های کمکی جهت هضم شیمیایی غذا)

غده هیپوفیز Pituitary Gland

این غده در قسمت پایین و وسط نیم‌کره‌های مغزی و هیپوتالاموس واقع شده این غده در داخل یک محفظه‌ی استخوانی به نام زین ترکی واقع شده است و توسط ساقه‌ای به هیپوتالاموس مغز متصل می‌شود و از نظر آناتومیک به سه بخش زیر تقسیم می‌شود:

- ۱- قدامی
- ۲- میانی
- ۳- خلفی

غده هیپوفیز ترشح هورمون‌هایی که وظیفه کنترل غدد درون‌ریز دیگر را به عهده دارند، اصلی‌ترین غده درون‌ریز بدن محسوب می‌شود اگر چه هیپوفیز خود توسط هیپوتالاموس کنترل می‌شود.

هورمون‌های مترشح از لوب قدامی هیپوفیز:

- ۱- هورمون رشد (رشد عضلات و استخوان‌های بلند) GH= Grown Hormone
- ۲- هورمون تحریک‌کننده تیروئید (کنترل رشد و فعالیت غده تیروئید)

TSH= Thyroid Stimulating Hormone

- ۳- هورمون کورتیکوتروپین (تحریک و کنترل رشد و خروجی هورمون‌های قشر آدرنال)

ACTH= Aderno Contro Trophic Hormone

- ۴- هورمون محرکه جنسی (گونا‌دوتروپیک)

GTH= Gonadotropic

I. هورمون موگالیکول (در مردان، بیضه‌ها را تخریب به تولید اسپرم می‌کند. در زنان به آماده سازی رحم

برای باروری تخمک کمک می‌کند) FSH= Follicle Stimulating Hormone

II. هورمون محرک جسم زرد LH (در مردان بیضه‌ها را برای تولید تسترون تحریک می‌کند)

۵- هورمون پرولاکتین (تحریک شیر از سینه‌ها پس از تولد نوزاد)

PRL- Prolactin Hormone

هورمون‌های مترشح از لوب میانی هیپوفیز:

هورمون محرک ملانوسیت‌ها (تحریک تولید ملانین در لایه سلول بازال پوست)

MSH= Melanocyte Stimulating Hormone

هورمون‌های مترشح از لوب خلفی هیپوفیز:

در لوب خلفی هیپوفیز ۲ هورمون ترشح می‌شود که در هیپوتالاموس ساخته شده اما در لوب خلفی ذخیره می‌شوند.

I. هورمون ضد ادرار (بازجذب آب در توبول‌های کلیوی را افزایش می‌دهد)

ADH= Anti Diuretic Hormone

II. اکسی توسین (تحریک رحم در هنگام زایمان و تحریک سینه برای تولید شیر)

Oxy= Oxytocin

Pineal Gland

غده اپی‌فیز (صنوبری، پینه‌آل)

توسط یک ساقه به بخش مرکزی مغز متصل شده است. این توده در عمق و بین نیم‌کره‌های مغزی جای گرفته است و به قسمت فوقانی تالاموس متصل می‌باشد.

Melatonin

غده pineal آن هورمون ملاتونین رنگ پوست

را ترشح می‌کند این غده در تنظیم ریتم فعالیت‌هایی که با چرخه‌های زیست محیطی روز و شب در ارتباط هستند (خواب و بیداری) و همچنین خلق و خو تأثیرگذار است.

Thyroid Gland

غده تیروئید:

غده تیروئید در گردن، در دو طرف نای واقع شده است و توسط لوب قدامی هیپوفیز کنترل می‌شود:

T3= Triiodothyronine

I. تری‌یودوتیرونین

T4= Thyroxine

II. تیروکسین

Calcitonin

III. کلسی‌تونین (سطح کلسیم خون را کنترل می‌کند)

Parathyroid Gland

غده پاراتیروئید

۴ عدد غده کوچک که بر روی قسمت خلفی غده تیروئید قرار گرفته‌اند وظیفه اصلی غدد پاراتیروئید ترشح هورمون

PTH=Parathormone Hormone

پاراتورمون

که باعث بالا رفتن کلسیم خون می‌شود (تنظیم و کنترل میزان کلسیم خون در استخوان‌ها)

Adrenal Glands

غده آدرنال دو غده مثلثی شکل که در بالای کلیه‌ها قرار گرفته‌اند و از دو بخش کورتکس (قشری)، موولا (مرکزی) تشکیل شده است.

I. هورمون‌های قسمت کورتکس آدرنال:

۱- کورتیزول (کورتون خون) Cortisone

۲- آلدوسترون Ald= Aldesterone

۳- هورمون‌های جنبی (به مقدار کمی):

I. تسترون Testosterone

II. پروژسترون Progesterone

III. استروژن Estrogen

II. هورمون‌های قسمت مرکزی آدرنال:

۱- آدرنالین A (اپی نفرین E)

۲- آدرنالین NA (اپی نفرین EN)

هورمون‌های مترشح‌ه از لوب قدامی هیپوفیز:

G.H= Growth Hormone	هورمون رشد
TSH= Thyroid Stimulating Hormone	هورمون تحریک کننده تیروئید
ACTH= Adreno Cortico Throphic Hormone	هورمون کنوتیکوتروپین
GN= Gonado Trophic	هورمون محرکه جنسی (گونادوتروپیک)
FSH= Follicole Stimulating Hormone	هورمون محرک فولیکول
PRL= Prolactine Hormone	هورمون پرولاکتین

هورمون مترشح‌ه از لوب میانی هیپوفیز:

هورمون محرک ملانوسیت‌ها

MSH= Melanocyte Stimulating Hormone

هورمون مترشح‌ه از لوب خلفی هیپوفیز:

ADH= Anti Diurectic Hormone	هورمون ضد ادرار
OXY= Oxytocin	اکسی‌توسین
Thymus Gland	غده تیموسی

یکی از اعضا لنفاوی بدن می‌باشد (حاوی لنفوسیت) که در دوران نوزادی فعال و بزرگ بوده ولی تدریجاً غیرفعال و کوچک می‌شود و در نهایت تبدیل به بافت چربی می‌شود. این غده در پشت یا سطح خلفی یک سوم فوقانی استخوانی جناغ سینه واقع شده است (در مدیاستن فوقانی- قدامی)

پستان

یک جفت غدد عرقی تغییر شکل یافته می‌باشد که در ناحیه سینه و بر روی عضله سینه‌ای بزرگ واقع شده‌اند در زمان بلوغ به ویژه در دختران رشد کرده و کاملاً برجسته می‌شود. نوک پستان که در وسط پستان واقع شده است Nipple نامیده می‌شود و در اطراف نوک پستان دایره‌ی بزرگی قرار دارد که هاله پستان یا آرنول Areola نامیده می‌شود.

ساختمان پستان:

۱. غدد شیری
۲. غدد چربی
۳. بافت هم بزوالاستیک
۴. مجاری شیری

هر پستان از ۱۶ تا ۲۰ لوب (قطعه) تشکیل شده است و هر لوب به یک مجرای شیری راه دارد که از نوک به خارج راه دارد. در جنس مذکر با بلوغ پستان کمی رشد می‌کند ولی تدریجاً تحلیل رفته یا کوچک می‌ماند. ولی در جنس مونث رشد کامل نموده و در زمان حاملگی و زایمان و دوران شیردهی شیر ترشح می‌کند توسط Prolactine و اکسی‌توسین Oxytocin (در ترشح و خروج شیر نقش کمک کننده تحریکی دارد)

Unit 1

Sensory system

The sensory system is our network for detecting stimuli from the internal and external environments. It is needed to maintain homeostasis, provide us with pleasure, and protect us from harm. Pain, for example, is an important warning sign of tissue damage. The signals generated in the various sensory receptors must be transmitted to the central nervous system for interpretation.

the senses

the senses are divided according to whether they are widely distributed or localized in special sense organs. The receptors for the general senses are found throughout the body. These senses include the following;

- Pain; these receptors are found in the skin and also in muscles, joints, and internal organs.
- Touch; sensitivity to touch depends on the concentration of these receptors in different areas (high on the fingers, lips, and tongue, for example, but low at the back of the neck or back of the hand)
- Pressure; or deep touch, located beneath the skin and in deeper tissues.
- Temperature; receptors for heat and cold are located in the skin and also in the hypothalamus, which regulates body temperature.

General description

The head is composed of a series of compartments, which are formed by bone and soft tissues. They are;

- The cranial cavity
- Two ears
- Two orbits
- Two nasal cavities
- An oral cavity

The cranial cavity is the largest compartment and contains the brain and associated membranes (meninges).

Most of the ear apparatus on each side is contained within one of the bones forming the floor of the cranial cavity. The external parts of the ears extend laterally from these regions.

The two orbits contain the eyes. They are cone-shaped chambers immediately inferior to the anterior aspect of the cranial cavity. And the apex of each cone is directed posteromedially. The walls of the orbits are bone, whereas the base of each conical chamber can be opened and closed by the eye lids.

The nasal cavities are the upper parts of the respiratory tract and are between the orbits, they have walls, floors, and ceiling which are predominantly composed of bone and cartilage. The anterior openings to the nasal cavities are nares (nostrils). And the posterior openings are choanae (posterior nasal apertures)

Continuous with the nasal cavities are air-filled extensions (paranasal sinuses) which project laterally, superiorly and posteriorly into surrounding bones. The largest the maxillary sinuses are inferior to the orbits.

The oral cavity is inferior to the nasal cavities, and separated from them by the hard and soft palates. The floor of the oral cavity is formed entirely of soft tissues. The anterior opening to the oral cavity is the oral fissure (mouth) and the posterior opening is the oropharyngeal isthmus. Unlike the choanae which is continuously open, both the oral fissure and oropharyngeal isthmus can be opened and closed by surrounding soft tissues.

The integumentary system

The skin and its associated structures make up the integumentary system. This body-covering system protects against infection, dehydration, ultraviolet radiation, and injury. Extensive damage to the skin, such as by burns, can result in a host of

dangerous complications. The skin helps to regulate temperature by evaporation of sweat and by changes in the diameter of surface blood vessels, which control how much heat is lost to the environment. The skin also contains receptors for the sensory perceptions of touch, temperature, pressure, and pain.

Anatomy of the skin

The skin's outermost portion is the epidermis, consisting of four to five layers of epithelial cells. The deepest epidermal layer, basal layer, produces new cells. As these cells gradually rise toward the surface, they die and become filled with keratin (a protein that thickens and toughens the skin). The outermost epidermal layer is composed of flat, dead, protective cells that are constantly being shed and replaced. Some of the cells in the epidermis produce melanin (a pigment that gives the skin color and protects against sunlight). The dermis is beneath the epidermis. It contains connective tissue, nerves, blood vessels, lymphatics, and sensory receptors. This layer supplies nourishment and support for the skin. The subcutaneous layer beneath the dermis is composed mainly of connective tissue and fat.

Skin

The skin is the largest organ of the body. It consists of the epidermis and the dermis. The epidermis is the outer cellular layer which is avascular and varies in thickness.

The dermis is a dense bed of vascular connective tissue.

The skin functions as a mechanical and permeability barrier and as a sensory organ. It also can initiate primary immune responses.

The skin is the outer layer of the scalp. It is similar structurally to skin throughout the body with the exception that hair is present on a large amount of it.

Connective tissue

Deep to the skin is connective tissue. This layer anchors the skin to the third layer and contains the arteries, veins, and nerves supplying the scalp. When the scalp is cut, the connective tissue surrounding the vessels tends to hold cut vessels open. This results in profuse bleeding.

Associated skin structures

Specialized structures within the skin are part of the integumentary system;

- The sweat glands act mainly in temperature regulation by releasing a watery fluid that evaporates to cool the body.
- The sebaceous glands release an oily fluid, sebum, that lubricates the hair and skin and prevents drying.
- Hair is widely distributed over the body. Each hair develops within a sheath or hair follicle and grows from its base within the skin's deep layers.
- Nails develop from a growing region at the proximal end. The cuticle, technically named the eponychium, is an extension of the epidermis onto the surface of the nail plate. A lighter region distal to the cuticle is called the lunula because it looks like a half moon. Here the underlying skin is thicker, and blood does not show as much through the nail.

Hair and nails are composed of nonliving material consisting mainly of keratin. Both function in protection.

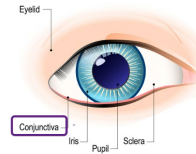
The eye and vision

The eye is protected by its position within a bony socket or orbit. It is also protected by the eyelids, or palpebrae; eyebrows and eyelashes. The lacrimal (tear) glands constantly bathe and cleanse the eyes with a lubricating fluid that drains into the nose. The protective conjunctiva is a thin membrane that lines the eyelids and covers the anterior portion of the eye. This membrane folds back to form a narrow space between the eyeball and the eye lids.

The wall of the eye is composed of three layers. Named from outermost to innermost, they are as follows;

- The sclera; commonly called the white of the eye, is the tough surface protective layer. The sclera extends over the eye's anterior portion as the transparent cornea.

- The uvea; is the middle layer, which consists of the; choroid, ciliary body, and iris.
- The retina is the innermost layer and the actual visual receptor.



Orbit

The orbits are bilateral structures in the upper half of the face below the anterior cranial fossa and anterior to the middle cranial fossa that contains the eyeball, the optic nerve, the extra-ocular muscles, the lacrimal apparatus, fascia and the nerves and vessels that supply these structures.

Eyelids

The upper and lower eyelids are anterior structures that when closed protect the surface of the eyeball. The space between the eyelids when they are open is the palpebral fissure.

The layers of the eyelids from anterior to posterior consist of skin, subcutaneous tissue, voluntary muscle, the orbital septum, the tarsus, and conjunctiva.

The upper and lower eyelids are basically similar in structure except for the addition of two muscles in the upper eyelid.

Conjunctiva

The structure of the eyelid is completed by a thin membrane (conjunctiva) which covers the posterior surface of each eyelid. This membrane covers the full extent of the posterior surface of each eyelid before reflecting onto the outer surface (sclera) of the eyeball. It attaches to the eyeball at the junction between the sclera and the cornea.

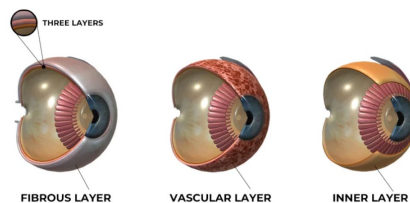
Optic canal

When the bony orbit is viewed from an anterolateral position, the round opening at the apex of the pyramidal-shaped orbit is the optic canal, which opens into the middle cranial fossa and is bounded medially by the body of the sphenoid and laterally by the lesser wing of the sphenoid. Passing through the optic canal are the optic nerve and the ophthalmic artery.

Eye ball

The globe-shaped eyeball occupies the anterior part of the orbit. Its rounded shape is disrupted anteriorly, where it bulges outward. This outward projection represents about one-sixth of the total area of the eyeball and is the transparent cornea.

Posterior to the cornea and in order from front to back are the anterior chamber, the iris and pupil, the posterior chamber, the lens, the postermal chamber and the retina.



Fibrous layer of the eyeball

The fibrous layer of the eyeball consists of two components the sclera covers the posterior and lateral parts of the eyeball, and the cornea covers the anterior part.

Sclera

The sclera is an opaque layer of dense connective tissue that can be seen anteriorly through its conjunctival covering as the white of the eye.

The fascial sheath of the eyeball covers the surface of the sclera externally from the entrance of the optic nerve to the corneoscleral junction while internally the surface of the sclera is loosely attached to the choroid of the vascular layer.

Cornea

Continuous with the sclera anteriorly is the transparent cornea. It covers the anterior one-sixth of the surface of the eyeball and being transparent allows light to enter the eyeball.

Vascular layer of the eyeball

The vascular layer of the eyeball consists of three continuous parts;

- Choroid
- Ciliary body
- Iris

Choroid

The choroid is posterior and represents approximately two-thirds of the vascular layer. It is a thin, highly vascular, layer consisting of smaller vessels adjacent to the retina and larger vessels more peripherally. It is firmly attached to the retina internally and loosely attached to the sclera externally.

Ciliary body

Extending from the anterior border of the choroid is the ciliary body. This triangular-shaped structure, between the choroid and the iris, forms a complete ring around the eyeball. Its components include the ciliary muscle and the ciliary processes.

Iris

Completing the vascular layer of the eyeball anteriorly is the iris. This circular structure projecting outward from the ciliary body, is the colored part of the eye with a central opening (the pupil). Controlling the size of the pupil are smooth muscle fibers within the iris;

- Fibers arranged in a circular pattern make up the sphincter pupillae muscle, which is innervated by parasympathetics-contraction of its fibers decreases or constricts the pupillary opening
- Fibers arranged in a radial pattern make up the dilator pupillae muscle, which is innervated by sympathetics-contraction of its fibers increases or dilates the pupillary opening.

The eye and lacrimal apparatus

Major features of the eye include the sclera, cornea, iris, and pupil. The cornea is continuous with the sclera and is the clear circular region of the external covering of the eye through which the pupil and iris are visible. The sclera is not transparent and is normally white.

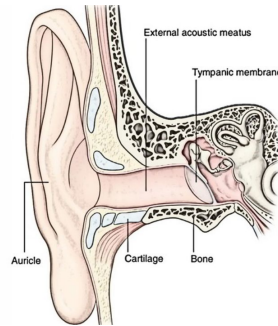
Ear

The ear is the organ of hearing and balance. It has three parts;

- The first part is the external ear consisting of the part attached to the lateral aspect of the head and the canal leading inward
- The second part is the middle ear a cavity in the petrous part of the temporal bone bounded laterally and separated from the external canal, by a membrane and connected internally to the pharynx by a narrow tube
- The third part is the internal ear consisting of a series of cavities within the petrous part of the temporal bone between the middle ear laterally and the internal.

The internal ear converts the mechanical signals received from the middle ear, which start as sound captured by the external ear, into electrical signals to transfer

information to the brain. The internal ear also contains receptors that detect motion and position.



External ear

The external ear consists of the auricle and the external acoustic meatus. The auricle is supported by cartilage and is covered by skin. The external auditory meatus is near the anterior margin of the auricle.

The external ear consists of two parts. The part projecting from the side of the head is the auricle (pinna) and the canal leading inward is the external acoustic meatus. The auricle is characterized by a number of depressions, eminences and folds. The folded outer margin of the auricle is the helix, which ends inferiorly as the lobule. A smaller fold (the antihelix) parallels the contour of the helix and is separated from it by a depression.

Auricle

The auricle is on the side of the head and assists in capturing sound. It consists of cartilage covered with skin and arranged in a pattern of various elevations and depressions.

The large outside rim of the auricle is the helix. It ends inferiorly at the fleshy lobule, the only part of the auricle not supported by cartilage.

The hollow center of the auricle is the concha of auricle. A smaller curved rim, parallel and anterior to the helix is the antihelix.

Middle ear

The middle ear is an air-filled, mucous membrane-lined space in the temporal bone between the tympanic membrane laterally and the lateral wall of the internal ear medially. It is described as consisting of two parts;

- The tympanic cavity immediately adjacent to the tympanic membrane
- The epitympanic recess superiorly

The middle ear communicates with the mastoid area posteriorly and the nasopharynx anteriorly. Its basic function is to transmit vibrations of the tympanic membrane across the cavity of the middle ear to the internal ear. It accomplishes this through three interconnected but movable bones that bridge the space between the tympanic membrane and the internal ear.

Mastoid area

The mastoid antrum is a cavity continuous with collections of air-filled spaces, throughout the mastoid part of the temporal bone, including the mastoid process.

Pharyngotympanic tube

The pharyngotympanic tube connects the middle ear with the nasopharynx and equalizes pressure on both sides of the tympanic membrane. Its opening in the middle ear is on the anterior wall, and from here it extends forward, medially, and downward to enter the nasopharynx just posterior to the inferior meatus of the nasal cavity. It consists of;

- A bony part (the one-third nearest the middle ear)
- A cartilaginous part (the remaining two-thirds)

The opening of the bony part is clearly visible on the inferior surface of the skull.

Internal ear

The internal ear consists of a series of bony cavities (bony labyrinth) and membranous ducts (membranous labyrinth) within this cavity. All these structures are in the petrous part of the temporal bone between the middle ear laterally and the internal acoustic meatus medially.

The bony labyrinth consists of the vestibule, three semicircular canals, and the cochlea.

The structures in the internal ear convey information to the brain about balance and hearing;

- The cochlear duct is the organ of hearing
- The semicircular ducts, utricle, and saccule are the organs of balance

The nerve responsible for these functions is the vestibulocochlear nerve, which divides into vestibular (balance) and cochlear (hearing) parts after entering the internal acoustic meatus.

Tongue

The tongue is a muscular structure that forms part of the floor of the oral cavity and part of the anterior wall of the oropharynx. Its anterior part is in the oral cavity and is somewhat triangular in shape with a blunt apex of tongue. The apex is directed anteriorly and sits immediately behind the incisor teeth. The root of tongue is attached to the mandible.

The superior surface of the oral or anterior two-thirds of the tongue is oriented in the horizontal plane.

The pharyngeal surface or posterior one-third of the tongue curves inferiorly and becomes oriented more in the vertical plane. The oral and pharyngeal surfaces are separated by a V-shaped terminal sulcus of tongue.

Papillae

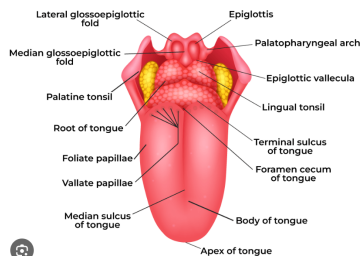
The superior surface of the oral part of the tongue is covered by hundreds of papillae;

- Filiform papillae are small cone-shaped projections of the mucosa that end in one or more points
- Fungiform papillae are rounder in shape and larger than the filiform papillae and tend to be concentrated along the margins of the tongue
- The largest of the papillae are the vallate papillae, which are blunt-ended cylindrical papillae invaginations in the tongue's surface
- Foliate papillae are linear folds of mucosa on the sides of the tongue near the terminal sulcus of tongue

The papillae in general increase the area of contact between the surface of the tongue and the contents of the oral cavity. All except the filiform papillae have taste buds on their surfaces.

Inferior surface of tongue

The undersurface of the oral part of the tongue lacks papillae, but does have a number of linear mucosal folds. A single median fold is continuous with the mucosa covering the floor of the oral cavity, and overlies the lower margin of a midline sagittal septum, which internally separates the right and left sides of the tongue.



Pharyngeal surface

The mucosa covering the pharyngeal surface of the tongue is irregular in contour because of many small nodules of lymphoid tissue in the submucosa. These nodules are collectively the lingual tonsil. There are no papillae on the pharyngeal surface.

Tonsils

Collection of lymphoid tissue in the mucosa of the pharynx surrounding the openings of the nasal and oral cavities are part of the body's defense system. The largest of these collections from distinct masses (tonsils). Tonsils occur mainly in three areas;

- The pharyngeal tonsil, known as adenoids when enlarged is in the midline on the roof of the nasopharynx.
- The palatine tonsils are on each side of the oropharynx (the palatine tonsils are visible through the open mouth of a patient when the tongue is depressed)
- The lingual tonsil refers collectively to numerous lymphoid nodules on the posterior one-third of the tongue

Small lymphoid nodules also occur in the pharyngotympanic tube near its opening into the nasopharynx, and on the upper surface of the soft palate.

MEDICAL DEVICE

General medical examination

physical examination may include checking vital signs, including temperature examination, blood pressure, pulse, and respiratory rate. The healthcare provider uses the senses of sight, hearing, touch, and sometimes smell.

In a physical examination, medical examination, clinical examination, or medical checkup, a medical practitioner examines a *patient* for any possible *medical signs* or *symptoms* of a *medical condition*. It generally consists of a series of questions about the patient's medical history followed by an examination based on the reported symptoms. Together, the medical history and the physical examination help to determine a diagnosis and devise the treatment plan. These data then become part of the medical record.

Although providers have varying approaches as to the sequence of body parts, a systematic examination generally starts at the head and finishes at the extremities and includes evaluation of general patient appearance and specific organ systems. After the main organ systems have been investigated by inspection, palpation, percussion, and auscultation.



-phas	مربوط به سخن گفتن	-op, -opto	مربوط به دیدن
us, cus	صدا، شنوایی	-plas	رشد کردن، ترمیم کردن
geuzia	فقدان یا اختلال حس چشایی	Acuity	تیزبینی
lyopia	بینایی بی تمرکز	Alalia	عدم توانایی در تکلم
aphia	کاهش حس لامسه	Anacusis	ناشنوایی مطلق
-audi-	شنوایی، مربوط به شنوایی	Arthroscopy	معاینه مفصل بینی
iology	شنوایی شناسی	Audiogram	لو له گوش

Audiometry	شنوایی سنجی	Audiometer	اودیومتر
Auricula	لاله گوش	Auditory Brain Stem Response	آزمایش عصب شنوایی
Autoplonia	خودشنیداری	Buricalur	مربوط به گوش
Blepharectomy	برداشتن زخم از پلکها	Blepharo-	پلک چشم
Blind	نابینا	Blepharitis	التهاب و تورم پلک
Bradylunesia	کاهش قدرت حرکت در کلام و گفتار	Blinking	پلک زدن
Canthus	گوشه چشم، زاویه‌ای که در اثر به هم رسیدن پلکها تشکیل می‌شود	Brady Lalia	کن کلامی
Choroid	مشیمیه	Capillus	مو
Cilia	مژه	Ciliary Mucle	عضلات مژگانی
Circum	اطراف چشم	Cilium	مربوط به مژه، مژگان
Cochliea	حلزون شنوایی	Color blind	کوررنگی
Consideration	مشاهده	Cornea	قرنیه
Corium	لایه فیبری داخلی پوست	Cutaneous	پوستی
Dacryo-	بسته شدن مجرای اشکی	Dacryo-	اشکی، مربوط به اشک
Dacryo cyst	کیسه اشکی	Deafness	ناشنوایی
Derm	پوست	Dermo-, dermato-	پوستی، مربوط به پوست
Dermal	پوستی	Derma-	پوست
Dermatitis	آماسی پوستی	Dermis	پوست، درم
Diplopia	دوربینی	Disorders	ناشنوا
Dizziness	سباهی رفتن چشم	Dysarthria	اختلال تکلم
Dysphasia	اشکال در گفتار	Dysosmia	نقص یا اختلال در حس بویایی
Ear, nose, throat (ENT)	گوش و بینی و حلق	Earlobe	لاله گوش
Electro dermal audiometry (EDA)	شنوایی سنجی از طریق تحریکات الکتریکی پوست	Electro encephalic audiometry (EEA)	شنوایی سنجی از طریق تحریکات الکتریکی مغز
Electronystagmography (ENG)	ترسیم حرکات کره چشم از طریق تحریکات عضلات الکتریکی آن	Eye ball	کره چشم
Facial Paralysis	فلج صورت	Eyelid	پلک
Fovea	حفره مرکزی شبکیه	Focal vision	دیدکانونی
Glosso-	زبانی، مربوط به زبان	-geusia	حس چشایی
Hearing aid evaluation (HAE)	ارزیابی وسایل کمک شنیداری	Haptic	لامسه
Hypo dermic	زیرپوستی	Hearing loss	افت شنوایی
Irito-, Irido-	عنبیه	Infraorbital	مربوط به ناحیه پایین چشم
Iritis	التهاب و تورم عنبیه چشم	Iris	عنبیه
Kerat	لایه شاخی پوست	Karat	قرنیه
Keratitis	التهاب و تورم قرنیه چشم	Lens	عدسی
Lingua	زبان	Middle Ear	گوش میانی
Myringo	مربوط به پرده صماخ	Myopia	نزدیک بینی

Naris	سوراخ بینی	Nail	ناخن
Nasal cavity	حفرة بینی	Naso-	بینی، مربوط به بینی
Oculo-	چشمی، مربوط به چشم	Ocular	چشمی
Olfactory	اعصاب بویایی	Olfact-	بویایی
Ophthalmic	چشمی	Ophtalmitis	تورم و التهاب چشم
-opsia	چشم	Optic	بیناییف مربوط به چشم
Opto-	چشم، بینایی	Optometry	بینایی سنجی
-osmia	حس بویایی	Otalgia	گوش درد
Otitis	التهاب گوش	Oto-	مربوط به گوش
Palpebro-	پلک	Palpebral-	مربوط به پلک
Panotitis	التهاب گوش	Papillo-	نوک پستان
Papilla	برجستگی مخروطی کوچک	Phak, phac	؟؟؟
Pupil	مردمک	Retical	شبکیه
Retin	شبکیه	Retina	شبکیه
Retio	شبکیه	Sclera	صلبیه
Septic bursitis	عفونت کیسه زلالی	Sublingual	مربوط به زیر زبان
Suborbital	مربوط به ناحیه بالای چشم	Tactile perception	ادراک لمسی
Tactile sensors	حسگرهای لمسی	Tag	لمس کردن
Tarso	حاشیه پلک	Turbinat	شاخک های بینی
Villi	پرز	Vision sensor	حساسه بینایی
Vision	بینایی		
Vitreous	زجاجیه شیشه‌ای		

حواس

اندام چشایی:

Tip of tongue	نوک زبان
Papillae	پرزها (پایی)
Large Papillae	پرزهای بزرگ
Surface of the tongue	سطح زبان
Tonsils	لوزه‌ها
Epiglott	اپی گلوت
Lingual Tonsils	لوزه‌های زبانی
Frenulum	لگام زبان
Body of tongue	قسمت دهانی زبان (دو سوم قدامی)
Root of tongue	قسمت خلفی زبان (دو سوم خلفی)
Median sulcus	شیار میانی زبان
Terminal sulcus	شیار انتهایی زبان (سوراخ کور)
Lingual/ taste papillae	پرزهای زبانی (چشایی)
Taste buds	جوانه‌های چشایی
Taste pore	منفذ چشایی
Lingual Papillae	پرز مخاطی زبان (پایی‌ها)

Fili from papillae	I. پرز های نخی شکل
Fungi from papillae	II. پرز های قارچی شکل
Circum vallatr papillae	III. پرز های جامی شکل
Foliate papillae	IV. پرز های برگي شکل
اندام بویایی:	
Nasal septum	تیغه بینی (سپتوم)
Conchae	شاخک بینی
Nostril	سوراخ قدامی حفرات بینی
Vestibule	دهلیز بینی
Swell body	اجسام توری
Choana	سوراخ خلفی حفرات بینی
Maxillary sinuses	مناقد (سوراخ های) خروجی سینوسی
Nasola crimal	منافذ مجرای اشکی بینی
Nasal cells	- سلول های بویایی (مربوط به بینی)
Olfactory cell	I. سلول بویایی
Support cells	II. سلول های پشتیبان
Basal cell	III. سلول قاعده ای
Anosmia	فقدان بویایی
Hyposmia	کاهش حس بویایی
Parosmia	بویایی متفاوت از یک محرک بویایی مشخص
Phantosmia	توهم بویایی (بویایی در غیاب محرک بو)
Cacosmia	درک پدیده بودن تمام محرک های بویایی
Integumentary System (Skin)	سیستم پوششی و محافظتی بدن (پوست)
	محل اتصال پوست و مخاط
	لایه های پوست:
	۱- لایه سطحی
	I. لایه زاینده (قاعده ای)
Spinosum	II. لایه خاردار
Granulosum	III. لایه دانه دار (گرانولی)
Lucidum	IV. لایه شفاف
Corneum	V. لایه شاخی
Dermis	۲- لایه عمقی
Nail	ناخن
Nail Body	جسم ناخن
Nail Root	ریشه ناخن
Nail bed (underneath)	بسته ناخن
Eponychium (cuticle)	پوست اپیدوم (در مجاورت فوقانی ماهک ناخن)
Hyponychium (Nail Plate)	صفحه ناخن
Lunula	هاله ناخن (قسمت کمرنگ تر پایین ناخن)
Free edge	لبه آزاد (قسمت جلوی ناخن در جهت رشد)
Hair	مو:

Medulla	I. مغز (موولا)
Cortex	II. قشر
Cuticle	III. پوسته
Root	ریشه مو
Shaft	ساقه مو
Hair bulb	پیاز مو
Internal Sheath	غلاف درونی ریشه مو
External Sheath	غلاف بیرونی ریشه مو
A.C.T	چرخه رشد مو:
Anagen	مرحله آنژن (رشد عادی مو)
Catagen	مرحله کاتازن (مرحله توقف رشد مو)
Telogen	مرحله تلوزن (دوره سه ماهه توقف فعالیت سلولی مو)

Visusal system	دستگاه بینایی
Retina	شبکیه چشم
Lacrimal Gland	غده اشکی
Eyeball	کره چشم
Corna	قرنیه
Outer layer	I. لایه خارجی
Sclera	صلبیه
Conjunctiva	ملتحمه (مخاط پلک)
Limbus	اتصال صلبیه با قرنیه
Schlemm duct	کانال اشلم
Middle layer	II. لایه میانی یا عروقی چشم

Uveal tract	سینستم اووال
Choroid	مشیمیه
Iris	جسم مژگانی
Zonula	عنیه (رنگ چشم)
Pupila	الیاف عضلانی (زونولا)
Miosis	مردمک
Midriasis	الیاف حلقوی مردمک (میوزیس)
Aqueous Humor	زلالیه
Vitreous body	زجاجیه
Inner layer	III. لایه داخلی یا شبکیه چشم (لایه عصبی چشم)

Yellow Spot (macula)	لکه زرد (حساس‌ترین منطقه بینایی)
Optic disk	نقطه کور

Lens	عدسی چشم
Lacrimal duct	مجرای اشکی
Lid	پلک
Accommodation	تطابق چشم (عدسی)
Eyelash	مژه
Moll Gland	غدد عروق چشم
Fovea Coutrlis	محل تراکم سلول‌های مخروطی در ناحیه جسم زرد
Posterior cavity (vitreous chamber)	حفره خلفی زجاجیه
Conjunctiva	مخاط چشم (ملتحمه)
Visual Cells	سلول‌های بینایی
Cone Cells	I. سلول‌های مخروطی
Rods Cells	II. سلول‌های استوانه‌ای