Human Anatomy

Contents

Chapter 1

Human body

"Physiologies" redirects here. For other uses, see Physiology.

The **human body** is the entire structure of a human being and comprises a head, neck, trunk (which includes the thorax and abdomen), arms and hands, legs and feet. Every part of the body is composed of various types of cell.[1]

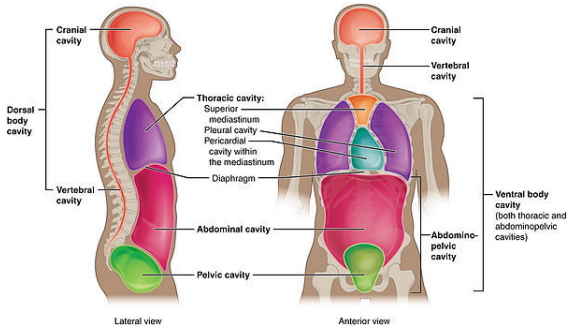
At maturity, the estimated average number of cells in the body is given as 37.2 trillion. This number is stated to be of partial data and to be used as a starting point for further calculations. The number given is arrived at by totalling the cell numbers of all the organs of the body and cell types.[2] The composition of the human body is made up of a number of certain elements including carbon, calcium and phosphorus.

The study of the human body involves anatomy and physiology. The human body can show anatomical non-pathological anomalies known as variations which need to be able to be recognised. Physiology focuses on the systems and their organs of the human body and their functions. Many systems and mechanisms interact in order to maintain homeostasis.

1.1 Structure

Further information: Anatomy, Body proportions and Anatomical terminology

Skeletal structure frames the overall shape of the body and does not alter much over a lifetime. General body shape (and female body shape) is influenced by the distribution of muscle and fat tissue and is also affected by various hormones. The average height of an adult male human (in developed countries) is about 1.7–1.8 m (5'7" to 5'11") and the adult female is about 1.6–1.7 m (5'2" to 5'7") .[3] Height is largely determined by genes and diet. Body type and composition are influenced by factors such as genetics, diet, and exercise.



Cavities of human body

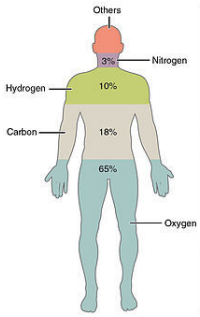
The human body has several body cavities the largest of which is the abdominopelvic cavity. These cavities house the various body organs including the spinal cord which also accommodates the production and flow of cerebrospinal fluid in the ventricular system of the brain.

Many other smaller cavities exist throughout the body called sinuses, which have varied functions. *Sinuses* in general usage refers to the paranasal sinuses which are involved in the condition *sinusitis*. The paranasal sinuses are four pairs of vital air-cavities in the cranial bones. These air-filled spaces are paired between the eyes, above the eyes, deeper behind the eyes and around the nasal cavity.

1.1.1 Composition

Main article: Composition of the human body

The average adult body contains between 5 and 5½ litres of blood and approximately 10 litres of interstitial fluid.



Element	Symbol	Percentage in Body
Oxygen	O	65.0
Carbon	C	18.5
Hydrogen	H	9.5
Nitrogen	N	3.2
Calcium	Ca	1.5
Phosphorus	P	1.0
Potassium	K	0.4
Sulfur	S	0.3
Sodium	Na	0.2
Chlorine	Cl	0.2
Magnesium	Mg	0.1
Trace elements include boron (B), chromium (Cr), cobalt (Co), copper (Cu), fluorine (F), iodine (I), iron (Fe), manganese (Mn), molybdenum (Mo), selenium (Se), silicon (Si), tin (Sn), vanadium (V), and zinc (Zn).		less than 1.0

The main elements that compose the human body are shown from most abundant to least abundant.

The composition of the human body can be referred to in terms of its water content, elements content, tissue types

or material types. The adult human body contains approximately 60% water, and so makes up a significant proportion of the body, both in terms of weight and volume. Water content can vary from a high 75% in a newborn infant to a lower 45% in an obese person. (These figures are necessarily statistical averages).

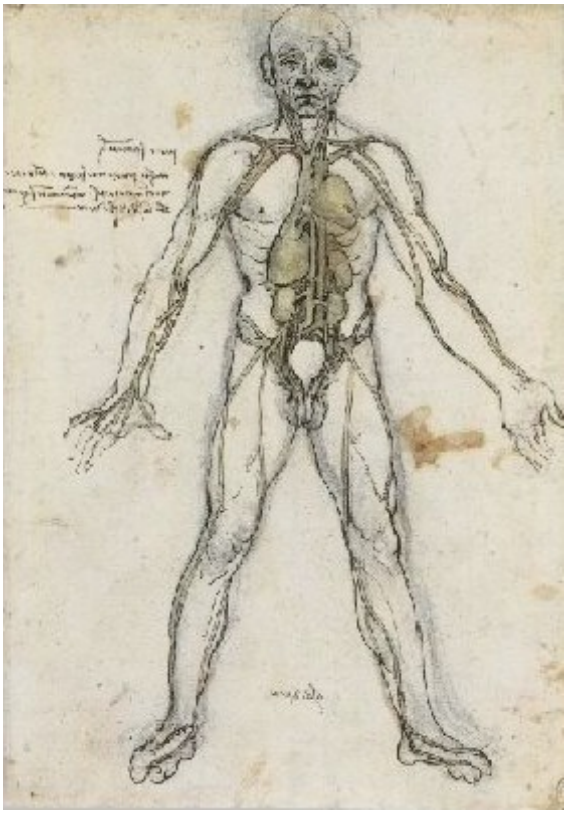
The vast majority of cells in the human body are not human at all; rather they are of bacteria, archaea, and methanogens such as *Methanobrevibacter smithii*. The largest proportion of these form the gut flora. The whole population of microbiota include microorganisms of the skin and other body parts and this altogether is termed as the human microbiome.

The proportions of the elements of the body can be referred to in terms of the main elements, minor ones and trace elements. Material type may also be referred to as including water, protein, connective tissue, fats, carbohydrates and bone.

1.1.2 Human anatomy

Further information: Head and neck anatomy and Nail (anatomy)

Human anatomy (gr. ἀνατομία, “dissection”, from



Anatomical study by Leonardo da Vinci

ἀνά, “up”, and τέμνειν, “cut”) is primarily the scientific study of the morphology of the human body.[4] Anatomy is subdivided into gross anatomy and microscopic anatomy (histology)[4] Gross anatomy (also called topographical anatomy, regional anatomy, or anthropotomy) is the study of anatomical structures that can be seen by the naked eye.[4] Microscopic anatomy involves the use of microscopes to study minute anatomical structures, and is the field of histology which studies the organization of tissues at all levels, from cell biology (previously called cytology), to organs.[4] Anatomy, human physiology (the study of function), and biochemistry (the study of the chemistry of living structures) are complementary basic medical sciences that are generally taught together (or in tandem) to students studying medicine.

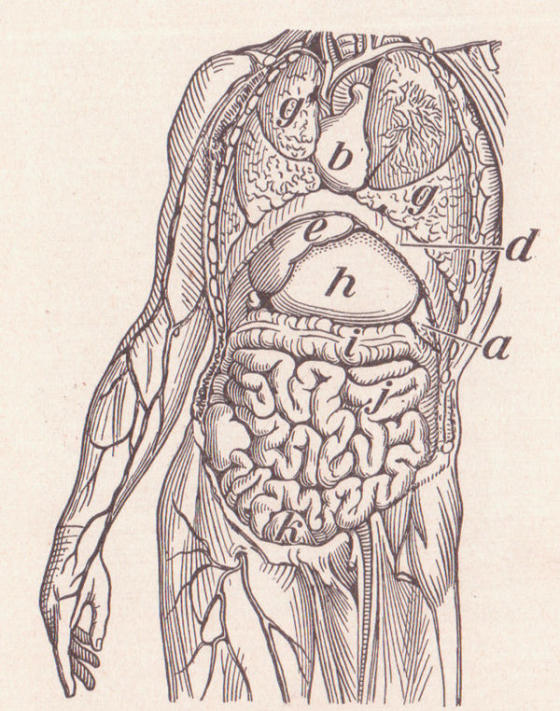


Fig. 52. — Front view of the viscera. *a*, spleen; *b*, heart; *d*, diaphragm; *e*, liver; *g*, lung; *h*, stomach; *i*, large intestine; *j* small intestine; *k*, bladder.

Front view of viscera

In some of its facets human anatomy is closely related to embryology, comparative anatomy and comparative embryology,[4] through common roots in evolution; for example, much of the human body maintains the ancient segmental pattern that is present in all vertebrates with basic units being repeated, which is particularly obvious in the vertebral column and in the ribcage, and which can be traced from the somitogenesis stage in very early embryos.

Generally, physicians, dentists, physiotherapists, nurses, paramedics, radiographers, and students of certain biological sciences, learn gross anatomy and microscopic anatomy from anatomical models, skeletons, textbooks, diagrams, photographs, lectures, and tutorials. The study of microscopic anatomy (or histology) can be aided by practical experience in examining histological prepara-

tions (or slides) under a microscope; and in addition, medical and dental students generally also learn anatomy with practical experience of dissection and inspection of cadavers (corpses). A thorough working knowledge of anatomy is required for all medical doctors, especially surgeons, and doctors working in some diagnostic specialities, such as histopathology and radiology.

Human anatomy, physiology, and biochemistry are basic medical sciences, generally taught to medical students in their first year at medical school. Human anatomy can be taught regionally or systemically;[4] that is, respectively, studying anatomy by bodily regions such as the head and chest, or studying by specific systems, such as the nervous or respiratory systems. The major anatomy textbook, *Gray's Anatomy*, has recently been reorganized from a systems format to a regional format, in line with modern teaching.[5][6]

Anatomical variations

Further information: List of anatomical variations

In human anatomy, the term **anatomical variation** refers to a non-pathologic anatomic structure that is different from the norm. The possible anatomic variations in each organ and its arterial and venous supply must be known by physicians, such as surgeons or radiologists, in order to identify them. Unlike congenital anomalies, anatomic variations are typically inconsequential and do not constitute a disorder. Accessory muscles are rare anatomical duplicates of muscle that can occur and only require treatment where function is impaired. The accessory soleus muscle in the ankle is one such variation and one which does not need to be rectified.[7][8] Another more common variation found in around ten per cent of the population is the accessory spleen.[9]

1.1.3 Human physiology

Main article: Physiology

Human physiology is the science of the mechanical, physical, bioelectrical, and biochemical functions of humans in good health, their organs, and the cells of which they are composed. Physiology focuses principally at the level of organs and systems. Most aspects of human physiology are closely homologous to corresponding aspects of animal physiology, and animal experimentation has provided much of the foundation of physiological knowledge. Anatomy and physiology are closely related fields of study: anatomy, the study of form, and physiology, the study of function, are intrinsically related and are studied in tandem as part of a medical curriculum.

The study of how physiology is altered in disease is **pathophysiology**.

1.1.4 Systems

See also: List of systems of the human body

The human body consists of many interacting systems. Each system contributes to the maintenance of homeostasis, of itself, other systems, and the entire body. A system consists of two or more organs, which are functional collections of tissue. Systems do not work in isolation, and the well-being of the person depends upon the well-being of all the interacting body systems. Some combining systems are referred to by their joint names such as the nervous system and the endocrine system known together as the neuroendocrine system.

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1.1.5 Homeostasis

The term *homeostasis* refers to a system that regulates its internal environment and maintains a stable, relatively constant condition; such as maintaining an equal temperature, or acid balance pH. This is required for the body to function properly. Without a relatively constant pH, temperature, blood flow, and position, survival would be impossible.

Many interacting systems and mechanisms act to maintain the human's internal environment. The nervous system receives information from the body and transmits this to the brain via neurotransmitters. The endocrine system may release hormones to help regulate blood pressure and volume. Cell metabolism may help to maintain the blood's pH.

1.2 Society and culture

Further information: History of anatomy, History of medicine and History of physiology

1.2.1 Depiction

Anatomy has become a key part of the visual arts. Basic concepts of how muscles and bones function and change with movement are vital in drawing, painting or animating a human figure. Many books (such as "Human Anatomy for Artists: The Elements of Form") have been written as guides to drawing the human body anatomically correctly.[14] Leonardo da Vinci sought to improve his art through a better understanding of human anatomy. In the process he advanced both human anatomy and its representation in art.

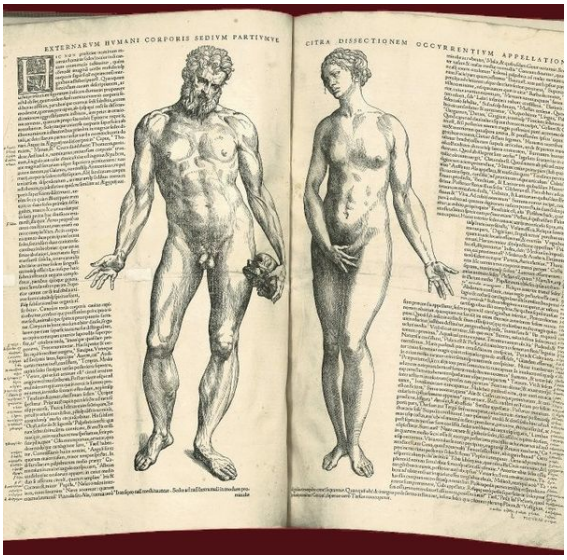

Image of two facing pages of text with woodcuts of naked male and female figures. "Epitome" by Andreas Vesalius, fol. 10b and 11a. HMD Collection, WZ 240 V575dhZ 1543.

Because the structure of living organisms is complex, anatomy is organized by levels, from the smallest components of cells to the largest organs and their relationship to others.

1.2.2 Appearance

Main article: Human physical appearance

1.2.3 History of anatomy

The history of anatomy has been characterized, over a long period of time, by an ongoing, developing understanding of the functions of organs and structures in the human body. Methods have advanced dramatically, from the simple examination by dissection of animals and cadavers (corpses), to the development and use of the microscope, to the far more technological advances of the electron microscope and other complex techniques developed since the beginning of the 20th century. During the 19th and early 20th centuries it was the most prominent biological field of scientific study. [15]

1.2.4 History of physiology

Main article: History of physiology

The study of human physiology dates back to at least 420 B.C. and the time of Hippocrates, the father of western medicine.[16] The critical thinking of Aristotle and his emphasis on the relationship between structure and function marked the beginning of physiology in Ancient Greece, while Claudius Galenus (c. 126–199 A.D.), known as Galen, was the first to use experiments to probe the function of the body. Galen was the founder of experimental physiology.[17] The medical world moved on from Galenism only with the appearance of Andreas Vesalius and William Harvey.[18]

Following from the Middle Ages, the Renaissance brought an increase of physiological research in the Western world that triggered the modern study of anatomy and physiology. Andreas Vesalius was an author of one of the most influential books on human anatomy, *De humani corporis fabrica*.[19] Vesalius is often referred to as the founder of modern human anatomy.[20] Anatomist William Harvey described the circulatory system in the 17th century,[21] demonstrating the fruitful combination of close observations and careful experiments to learn about the functions of the body, which was fundamental to the development of experimental physiology. Herman Boerhaave is sometimes referred to as a father of physiology due to his exemplary teaching in Leiden and textbook *Institutiones medicae* (1708).

In the 18th century, important works in this field were done by Pierre Cabanis, a French doctor and physiologist.

In the 19th century, physiological knowledge began to accumulate at a rapid rate, in particular with the 1838 appearance of the Cell theory of Matthias Schleiden and Theodor Schwann. It radically stated that organisms are made up of units called cells. Claude Bernard's (1813–1878) further discoveries ultimately led to his concept of *milieu interieur* (internal environment), which would later be taken up and championed as "homeostasis" by American physiologist Walter Cannon (1871–1945).

In the 20th century, biologists also became interested in how organisms other than human beings function, eventually spawning the fields of comparative physiology and ecophysiology.[22] Major figures in these fields include Knut Schmidt-Nielsen and George Bartholomew. Most recently, evolutionary physiology has become a distinct subdiscipline.[23]

The biological basis of the study of physiology, integration refers to the overlap of many functions of the systems of the human body, as well as its accompanied form. It is achieved through communication that occurs in a variety of ways, both electrical and chemical.

In terms of the human body, the endocrine and nervous systems play major roles in the reception and transmission of signals that integrate function. Homeostasis is a major aspect with regard to the interactions in the body.

1.3 See also

1.4 References

[1] Cell Movements and the Shaping of the Vertebrate Body

in Chapter 21 of *Molecular Biology of the Cell* fourth edition, edited by Bruce Alberts (2002) published by Garland Science.
The Alberts text discusses how the "cellular building blocks" move to shape developing embryos. It is also common to describe small molecules such as amino acids as "molecular building blocks".

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1.5 Further reading

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1.6 External links

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- Media related to Human body at Wikimedia Commons
- The dictionary definition of body at Wiktionary
- Human Physiology at Wikibooks
- Human Physiology textbook at Wikibooks
- *The Book of Humans* (from the early 18th century)

Chapter 2

Anatomical terminology

Anatomists and health care providers use **anatomical terminology** and medical terminology intermittently. These *languages* can be bewildering to the uninitiated, however the purpose of this language is not to confuse, but rather to increase precision and reduce medical errors. For example, is a scar "above the wrist" located on the forearm two or three inches away from the hand? Or is it at the base of the hand? Is it on the palm-side or back-side? By using precise anatomical terminology, ambiguity is eliminated. Anatomical terms derive from Ancient Greek and Latin words, and because these languages are no longer used in everyday conversation, the meaning of their words does not change.[1]

The current international standard is the Terminologia Anatomica.

2.1 Anatomical vocabulary

Further information: International scientific vocabulary and Medical terminology

Anatomical terms are made up of roots, prefixes, and suffixes. The root of a term often refers to an organ, tissue, or condition, whereas the prefix or suffix often describes the root. For example, in the disorder hypertension, the prefix "hyper-" means "high" or "over," and the root word "tension" refers to pressure, so the word "hypertension" refers to abnormally high blood pressure. The roots, prefixes and suffixes are often derived from Greek or Latin, and often quite dissimilar from their English-language variants.[1]

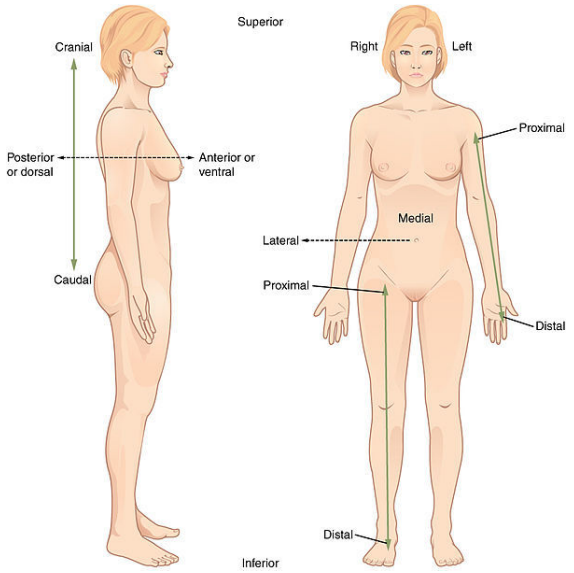
Latin names of structures such as musculus biceps brachii can be split up and refer to, *musculus* for muscle, *biceps* for "two-headed", *brachii* as in the brachial region of the arm.

The first word tells us what we are speaking about, the second describes it, and the third points to location.

2.2 Relative location

Main article: Anatomical terms of location

Anatomical terminology is often chosen to highlight the relative location of body structures. For instance, an anatomist might describe one band of tissue as "inferior to" another or a physician might describe a tumor as "superficial to" a deeper body structure. Terms are used to define the relative location of body structures in a body that is positioned in the anatomical position, which is standing, feet apace, with palms forward and thumbs facing outwards.[1]



The anatomical position, with terms of relative location noted.

To further increase precision, anatomists standardize the way in which they view the body. Just as maps are normally oriented with north at the top, the standard body "map," or anatomical position, is that of the body standing upright, with the feet at shoulder width and parallel, toes forward. The upper limbs are held out to each side, and the palms of the hands face forward. Using the **standard anatomical position** reduces confusion. It does not matter how the body being described is oriented, the terms are used as if it is in anatomical position. For example, a scar in the "anterior (front) carpal (wrist) re-

gion" would be present on the palm side of the wrist. The term "anterior" would be used even if the hand were palm down on a table.[1]

When anatomists refer to the right and left of the body, it is in reference to the right and left of the subject, not the right and left of the observer. When observing a body in the anatomical position, the left of the body is on the observer's right, and vice versa.

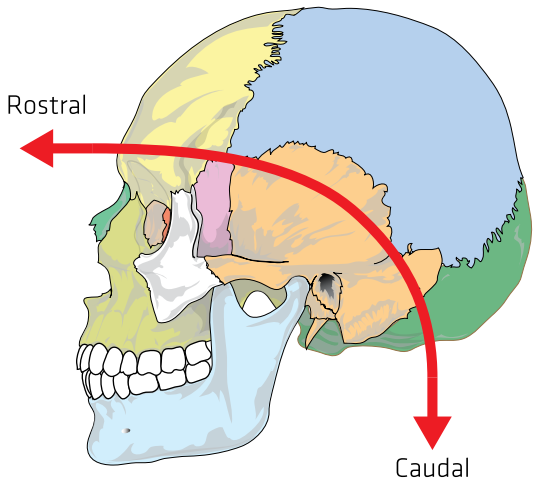
These standardized terms avoid confusion. Examples of terms include:[2]:4

- *Anterior* and *posterior*, which describe structures at the front (anterior) and back (posterior) of the body. For example, the toes are anterior to the heel, and the popliteus is posterior to the patella.
- *Superior* and *inferior*, which describe a position above (superior) or below (inferior) another part of the body. For example, the orbits are superior to the oris, and the pelvis is inferior to the abdomen.
- *Proximal* and *distal*, which describe a position that is closer (proximal) or further (distal) from the trunk of the body. For example, the shoulder is proximal to the arm, and the foot is distal to the knee.
- *Superficial* and *deep*, which describe structures that are closer to (superficial) or further from (deep) the surface of the body. For example, the skin is superficial to the bones, and the brain is deep to the skull. Sometimes *profound* is used synonymously with *deep*.
- *Medial* and *lateral*, which describe a position that is closer to (medial) or further from (lateral) the midline of the body. For example, the nose is medial to the eyes, and the thumb is lateral to the other fingers.
- *Ventral* and *Dorsal*, which describe structures derived from the front (ventral) and back (dorsal) of the embryo, before limb rotation.
- *Cranial* and *caudal*, which describe structures close to the top of the skull (cranial), and towards the bottom of the body (caudal).
- Occasionally, *sinister* for left, and *dexter* for right are used.

2.2.1 Skull and brain

Different terms are used when it comes to the skull in compliance with its embryonic origin and its tilted position compared to in other animals.

- *Rostral* refers to proximity to the front of the nose, and is particularly used when describing the skull.[2]:4



The skull uses different terminology, due to its embryonic origin of neuraxis.

2.2.2 Arm

When speaking of the arm different terminology is often used, to account for the supination action of the arm. Therefore the terms ventral for anterior and dorsal for posterior are used preferentially. Aside from this additional terms are employed:

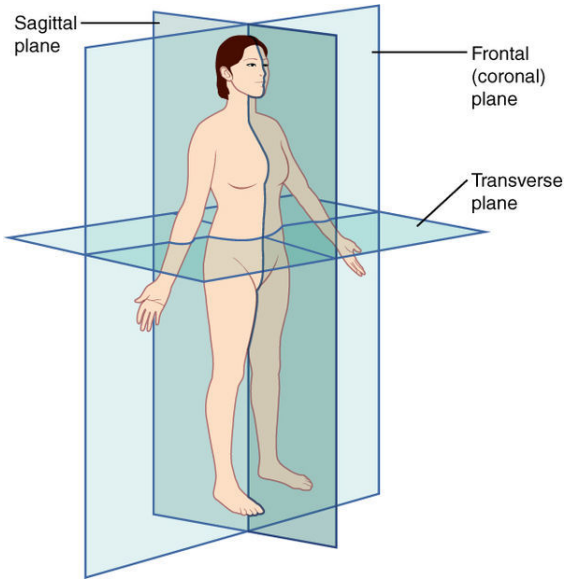
- *Radial* referring to the radius bone, seen laterally in the anatomical position.
- *Ulnar* referring to the ulna bone, medially positioned when in the anatomical position.

2.3 Planes

Main article: Anatomical plane

Anatomy is often described in *planes*, referring to two-dimensional *sections* of the body. A *section* is a two-dimensional surface of a three-dimensional structure that has been cut. A plane is an imaginary two-dimensional surface that passes through the body. Three planes are commonly referred to in anatomy and medicine:[2] :4

- The *sagittal plane* is the plane that divides the body or an organ vertically into right and left sides. If this vertical plane runs directly down the middle of the body, it is called the *midsagittal* or *median plane*. If it divides the body into unequal right and left sides, it is called a *parasagittal plane*, or less commonly a longitudinal section.
- The *frontal plane* is the plane that divides the body or an organ into an anterior (front) portion and a posterior (rear) portion. The frontal plane is often re-



The three anatomical planes of the body: the sagital, transverse (or horizontal), frontal planes.

ferred to as a *coronal plane*, following Latin corona, which means "crown".

- The *transverse plane* is the plane that divides the body or organ horizontally into upper and lower portions. Transverse planes produce images referred to as cross sections.

2.4 Functional state

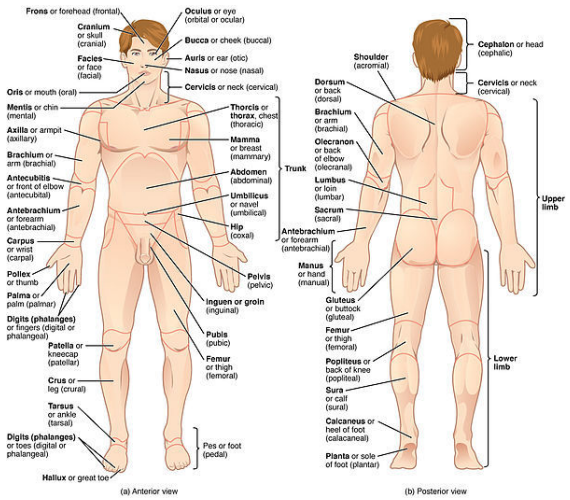
Anatomical terms may be used to describe the functional state of an organ:

- *Anastomoses* refers to the connection between two structures previously branched out, such as blood vessels or leaf veins.
- *Patent*, meaning a structure such as an artery or vein that abnormally remains open, such as a patent ductus arteriosus, referring to the ductus arteriosus which normally becomes ligamentum arteriosum within three weeks of birth.
- *Visceral* and *parietal'* describe structures that relate to an organ (visceral), or the wall of the cavity that the organ is in (parietal). For example, the parietal peritoneum surrounds the abdominal cavity.
- *Paired*, referring to a structure that is present on both sides of the body. For example, the hands are paired structures.

2.5 Regions

Main article: List of human anatomical regions

A body that is lying down is described as either **prone** or **supine**. Prone describes a face-down orientation, and supine describes a face up orientation. These terms are sometimes used in describing the position of the body during specific physical examinations or surgical procedures.[1]



The human body is shown in anatomical position in an anterior view and a posterior view. The regions of the body are labeled in boldface.

The human body's numerous regions have specific terms to help increase precision. Notice that the term "brachium" or "arm" is reserved for the "upper arm" and "antebrachium" or "forearm" is used rather than "lower arm." Similarly, "femur" or "thigh" is correct, and "leg" or "crus" is reserved for the portion of the lower limb between the knee and the ankle.[1]

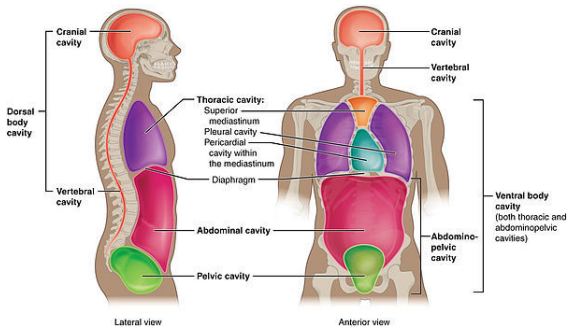
2.5.1 Landmarks

When describing the position of anatomical structures, landmarks may be used to describe location. These landmarks may include structures, such as the umbilicus or sternum, or anatomical *lines*, such as the *midclavicular line* from the centre of the clavicle. The cephalon or cephalic region refers to the head. This area is further differentiated into the cranium (skull), facies (face), frons (forehead), oculus (eye area), auris (ear), bucca (cheek), nausus (nose), oris (mouth), and mentis (chin). The neck area is called the cervicis or cervical region.

2.5.2 Body cavities

Main article: Body cavity

Anatomical structures are often described in terms of the



Different body cavities (anterior mediastinum not visible)

cavity in which they reside. The body maintains its internal organization by means of membranes, sheaths, and other structures that separate compartments. The **dorsal** (posterior) cavity and the **ventral** (anterior) cavity are the largest body compartments. These cavities contain and protect delicate internal organs, and the ventral cavity allows for significant changes in the size and shape of the organs as they perform their functions. The lungs, heart, stomach, and intestines, for example, can expand and contract without distorting other tissues or disrupting the activity of nearby organs.[1]

The ventral cavity includes the **thoracic** and **abdominopelvic** cavities and their subdivisions. The dorsal cavity includes the **cranial** and **spinal** cavities. This illustration shows a lateral and anterior view of the body and highlights the body cavities with different colors.[1]

- The cranial cavity is a large, bean-shaped cavity filling most of the upper skull where the brain is located.
- The vertebral cavity is a very narrow, thread-like cavity running from the cranial cavity down the entire length of the spinal cord.

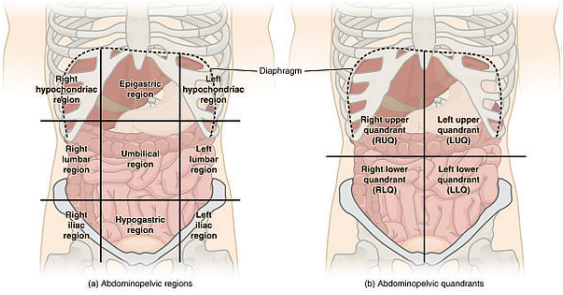
Together the cranial cavity and vertebral cavity can be referred to as the dorsal body cavity. In the posterior (dorsal) cavity, the cranial cavity houses the brain, and the spinal cavity (or vertebral cavity) encloses the spinal cord. Just as the brain and spinal cord make up a continuous, uninterrupted structure, the cranial and spinal cavities that house them are also continuous. The brain and spinal cord are protected by the bones of the skull and vertebral column and by cerebrospinal fluid, a colorless fluid produced by the brain, which cushions the brain and spinal cord within the posterior (dorsal) cavity.[1]

The thoracic cavity consists of three cavities that fill the interior area of the chest.

- The two pleural cavities are situated on both sides of the body, anterior to the spine and lateral to the breastbone.
- The superior mediastinum is a wedge-shaped cavity located between the superior regions of the two thoracic cavities.
- The pericardial cavity within the mediastinum is located at the center of the chest below the superior mediastinum. The pericardial cavity roughly outlines the shape of the heart.

The diaphragm divides the thoracic and the abdominal cavities. The abdominal cavity occupies the entire lower half of the trunk, anterior to the spine. Just under the abdominal cavity, anterior to the buttocks, is the pelvic cavity. The pelvic cavity is funnel shaped and is located inferior and anterior to the abdominal cavity. Together the abdominal and pelvic cavity can be referred to as the abdominopelvic cavity while the thoracic, abdominal, and pelvic cavities together can be referred to as the ventral body cavity.[1] Subdivisions of the Posterior (Dorsal) and Anterior (Ventral) Cavities The anterior (ventral) cavity has two main subdivisions: the thoracic cavity and the abdominopelvic cavity. The thoracic cavity is the more superior subdivision of the anterior cavity, and it is enclosed by the rib cage. The thoracic cavity contains the lungs and the heart, which is located in the mediastinum. The diaphragm forms the floor of the thoracic cavity and separates it from the more inferior abdominopelvic cavity. The abdominopelvic cavity is the largest cavity in the body. Although no membrane physically divides the abdominopelvic cavity, it can be useful to distinguish between the abdominal cavity, the division that houses the digestive organs, and the pelvic cavity, the division that houses the organs of reproduction.[1]

2.5.3 Abdomen



Abdominal regions are used for example to localize pain.

Main article: Abdomen

To promote clear communication, for instance about the location of a patient's abdominal pain or a suspicious mass, health care providers typically divide up the cavity into either nine regions or four quadrants.[1]

Quadrants

The abdomen may be divided into four quadrants, more commonly used in medicine, subdivides the cavity with

one horizontal and one vertical line that intersect at the patient's umbilicus (navel).. The right upper quadrant (RUQ) includes the lower right ribs, right side of the liver, and right side of the transverse colon. The left upper quadrant (LUQ) includes the lower left ribs, stomach, spleen, and upper left area of the transverse colon. The right lower quadrant (RLQ) includes the right half of the small intestines, ascending colon, right pelvic bone and upper right area of the bladder. The left lower quadrant (LLQ) contains the left half of the small intestine and left pelvic bone.[1]

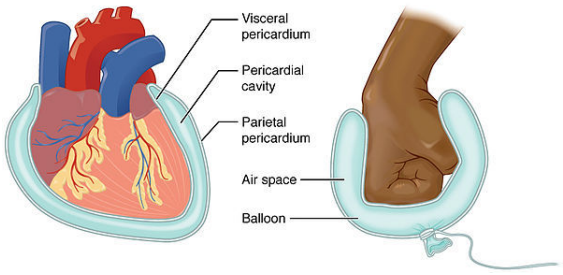
Regions

The more detailed regional approach subdivides the cavity with one horizontal line immediately inferior to the ribs and one immediately superior to the pelvis, and two vertical lines drawn as if dropped from the midpoint of each clavicle, resulting in nine regions. The upper right square is the right hypochondriac region and contains the base of the right ribs. The upper left square is the left hypochondriac region and contains the base of the left ribs. The epigastric region is the upper central square and contains the bottom edge of the liver as well as the upper areas of the stomach. The diaphragm curves like an upside down U over these three regions. The central right region is called the right lumbar region and contains the ascending colon and the right edge of the small intestines. The central square contains the transverse colon and the upper regions of the small intestines. The left lumbar region contains the left edge of the transverse colon and the left edge of the small intestine. The lower right square is the right iliac region and contains the right pelvic bones and the ascending colon. The lower left square is the left iliac region and contains the left pelvic bone and the lower left regions of the small intestine. The lower central square contains the bottom of the pubic bones, upper regions of the bladder and the lower region of the small intestine.[1]

2.5.4 Membranes

Main article: Serous membrane

A serous membrane (also referred to as a serosa) is a thin



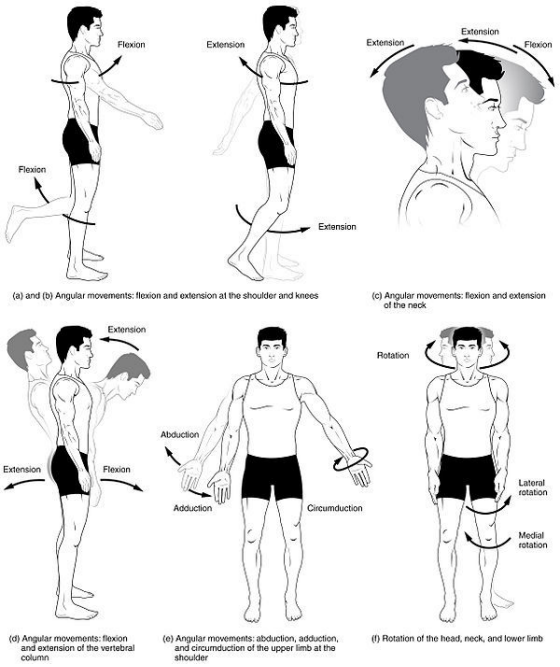
Serous membrane

membrane that covers the walls of organs in the thoracic and abdominal cavities. The serous membranes have two layers; *parietal* and *visceral*, surrounding a fluid filled space.[1] The visceral layer of the membrane covers the organ (the viscera), and the parietal layer lines the walls of the body cavity (pariet- refers to a cavity wall). Between the parietal and visceral layers is a very thin, fluid-filled serous space, or cavity.[1] An example of a serous cavities include the pericardium, which surrounds the heart.[1]

2.6 Movement

Main article: Anatomical terms of motion

Joints, especially synovial joints allow the body a tremendous range of movements. Each movement at a synovial joint results from the contraction or relaxation of the muscles that are attached to the bones on either side of the articulation. The type of movement that can be produced at a synovial joint is determined by its structural type.



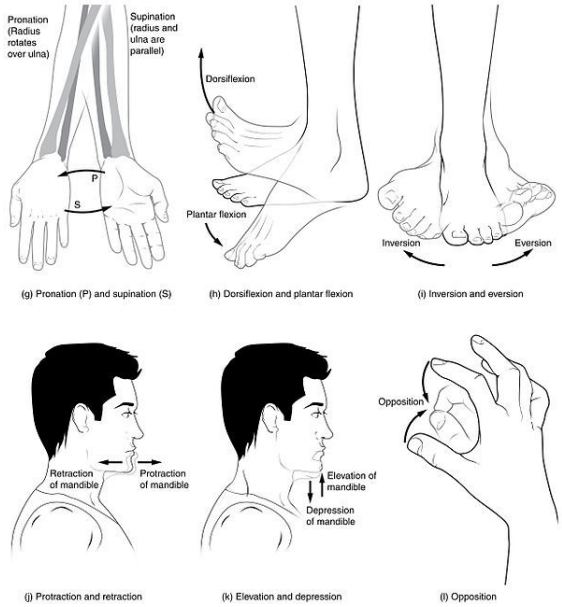
Movement types are generally paired, with one being the opposite of the other. Body movements are always described in relation to the anatomical position of the body: upright stance, with upper limbs to the side of body and palms facing forward.[1]

2.6.1 General movements

2.6.2 General motion

Terms describing motion in general include:

- *Flexion* and *Extension*, which refer to a movement that decreases (flexion) or increases (extension) the



angle between body parts. For example, when standing up, the knees are extended.

- *Abduction* and *adduction* refers to a motion that pulls a structure away from (abduction) or towards (adduction) the midline of the body or limb. For example, a star jump requires the legs to be abducted.
- *Internal rotation* (or *medial rotation*) and *External rotation* (or *lateral rotation*) refers to rotation towards (internal) or away from (external) the center of the body. For example, the asana posture in yoga requires the legs to be externally rotated.
- *Elevation* and *Depression* refer to movement in a superior (elevation) or inferior (depression) direction. Primarily refers to movements involving the scapula and mandible.

2.6.3 Special motions of the hands and feet

These terms refer to movements that are regarded as unique to the hands and feet:[3] :590–7

- *Dorsiflexion* and *Plantarflexion* refers to flexion (dorsiflexion) or extension of the foot at the ankle. For example, plantarflexion occurs when pressing the brake pedal of a car.
- *Palmarflexion* and dorsiflexion refer to movement of the flexion (palmarflexion) or extension (dorsiflexion) of the hand at the wrist. For example, prayer is often conducted with the hands dorsiflexed.
- *Pronation* and *Supination* refer to rotation of the forearm or foot so that in the anatomical position the palm or sole is facing anteriorly (supination) or posteriorly (pronation) rotation of the forearm. For example, a person skiing must pronate their arms in order to grasp the skis.
- *Eversion* and *Inversion* refer to movements that tilt the sole of the foot away from (eversion) or towards (inversion) the midline of the body.

2.6.4 Other special motions

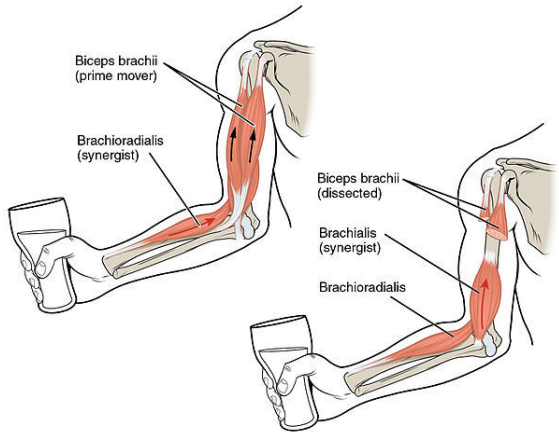
Other terms include:

- *Anterograde* and *Retrograde* flow, refers to movement of blood or other fluids in a normal (anterograde) or abnormal (retrograde) direction.
- *Protraction* and *Retraction* refer to an anterior (protraction) or posterior (retraction) movement of the arm at the shoulders.
- *Circumduction* refers to the circular (or, more precisely, conical) movement of a body part, such as a ball-and-socket joint or the eye. It consists of a combination of flexion, extension, adduction, and abduction. “Windmilling” the arms or rotating the hand from the wrist are examples of circumductive movement.
- *Opposition* – A motion involving a grasping of the thumb and fingers.
- *Reposition* – To release an object by spreading the fingers and thumb.
- *Reciprocal motion* of a joint – Alternating motion in opposing directions, such as the elbow alternating between flexion and extension.
- *Protrusion* and *Retrusion* are sometimes used to describe the anterior (protrusion) and posterior (retrusion) movement of the jaw.
- *Occlusion* is the action of closing one’s jaw, the act in which teeth touch teeth. May also be referred to as *elevation of the mandible*.

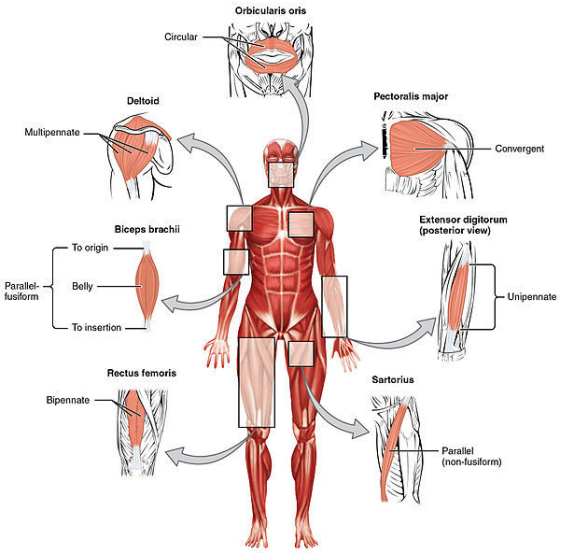
2.6.5 Muscles

Main article: Muscle

Muscle action that moves the axial skeleton work over a joint with an origin and insertion of the muscle on respective side. The insertion is on the bone deemed to move towards the origin during muscle contraction. Muscles are often present that engage in several actions of the joint; able to perform for example both flexion and extension of the forearm as in the biceps and triceps respectively.[1] This is not only to be able to revert actions of muscles, but also brings on stability of the actions though muscle coactivation.



The biceps brachii flex the lower arm. The brachoradialis, in the forearm, and brachialis, located deep to the biceps in the upper arm, are both synergists that aid in this motion.



The skeletal muscles of the body typically come in seven different general shapes. This figure shows the human body with the major muscle groups labeled.

Agonist and antagonist muscles

Further information: Agonist and Antagonist

The muscle performing an action is the agonist, while the muscle which contraction brings about an opposite action is the antagonist. For example an extension of the lower arm is performed by the triceps as the agonist and the biceps as the antagonist (which contraction will perform flexion over the same joint). Muscles that work together to perform the same action are called synergists. In the above example synergists to the biceps can be the brachioradialis and the brachialis muscle.[1]

Skeletal and smooth muscle

Main article: Gross anatomy of muscles

The gross anatomy of a muscle is the most important indicator of its role in the body. One particularly important aspect of gross anatomy of muscles is pennation or lack thereof. In most muscles, all the fibers are oriented in the same direction, running in a line from the origin to the insertion. In pennate muscles, the individual fibers are oriented at an angle relative to the line of action, attaching to the origin and insertion tendons at each end. Because the contracting fibers are pulling at an angle to the overall action of the muscle, the change in length is smaller, but this same orientation allows for more fibers (thus more force) in a muscle of a given size. Pennate muscles are usually found where their length change is less important than maximum force, such as the rectus femoris.[4]

Skeletal muscle is arranged in discrete muscles, an example of which is the *biceps brachii*. The tough, fibrous epimysium of skeletal muscle is both connected to and continuous with the tendons. In turn, the tendons connect to the periosteum layer surrounding the bones, permitting the transfer of force from the muscles to the skeleton. Together, these fibrous layers, along with tendons and ligaments, constitute the deep fascia of the body.[4]

2.6.6 Joints

Main article: Joint

Movement is not limited to only synovial joints, although they allow for most freedom. Muscles also run over symphysis, which allow for movement in for example the vertebral column by compression of the intervertebral discs. Additionally, synovial joints can be divided into different types, depending on their axis of movement.

2.7 Anatomical variation

Main article: Human body § Anatomical variations

The term *anatomical variation* is used to refer to a difference in anatomical structures that is not regarded as a disease. Many structures vary slightly between people, for example muscles that attach in slightly different places. For example, the presence or absence of the palmaris longus tendon. Anatomical variation is unlike congenital anomalies, which are considered a disorder.

2.8 History

International morphological terminology is used by the colleges of medicine and dentistry and other areas of

the health sciences. It facilitates communication and exchanges between scientists from different countries of the world and it is used daily in the fields of research, teaching and medical care. The international morphological terminology refers to morphological sciences as a biological sciences' branch. In this field, the form and structure are examined as well as the changes or developments in the organism. It is descriptive and functional. Basically, it covers the gross anatomy and the microscopic (histology and cytology) of living beings. It involves both development anatomy (embryology) and the anatomy of the adult. It also includes comparative anatomy between different species. The vocabulary is extensive, varied and complex, and requires a systematic presentation.

Within the international field, a group of experts reviews, analyzes and discusses the morphological terms of the structures of the human body, forming today's Terminology Committee (FICAT) from the International Federation of Associations of Anatomists (IFAA).[5][6] It deals with the anatomical, histological and embryologic terminology.

In the Latin American field, there are meetings called Iberian Latin American Symposium Terminology (SILAT), where a group of experts of the Pan American Association of Anatomy (PAA)[7] that speak Spanish and Portuguese, disseminates and studies the international morphological terminology.

2.9 Additional images

- Older image of; *Parts of the Human Body. Posterior and anterior view.* From the 1933 Morris' Human Anatomy.
- Human body features displayed on bodies on which body hair and male facial hair has been removed

2.10 See also

- Anthropometry
- Functional movement
- Histology - also known as *Microscopic anatomy*
- International scientific vocabulary
- Kinesiology
- Terminologia Anatomica
- Terminologia Anatomica
- Nomina Anatomica
- Terminologia Embryologica
- Terminologia Histologica

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Chapter 3

Human skeleton

"Bone structure" and "Skeletal system" redirect here. For the skeletal system in other animals, see Skeleton.

The **human skeleton** is the internal framework of the body. It is composed of 270 bones at birth[1][2][3] – this total decreases to 206 bones by adulthood after some bones have fused together. The bone mass in the skeleton reaches maximum density around age 30. The human skeleton can be divided into the axial skeleton and the appendicular skeleton. The axial skeleton is formed by the vertebral column, the rib cage and the skull. The appendicular skeleton, which is attached to the axial skeleton, is formed by the pectoral girdle, the pelvic girdle and the bones of the upper and lower limbs.

The human skeleton serves six major functions; support, movement, protection, production of blood cells, storage of ions and endocrine regulation.

The human skeleton is not as sexually dimorphic as that of many other primate species, but subtle differences between sexes in the morphology of the skull, dentition, long bones, and pelves exist. In general, female skeletal elements tend to be smaller and less robust than corresponding male elements within a given population. The human female pelvis is also different from that of males in order to facilitate child birth. Unlike most other primates, human males do not have penile bones.[4]

3.1 Divisions

3.1.1 Axial skeleton

Main article: Axial skeleton

The axial skeleton (80 bones) is formed by the vertebral column (32–34 bones; the number of the vertebrae differs from human to human as the lower 2 parts, sacral and coccygeal bone may vary in length), the rib cage (12 pairs of ribs and the sternum), and the skull (22 bones and 7 associated bones).

The upright posture of humans is maintained by the axial skeleton, which transmits the weight from the head, the trunk, and the upper extremities down to the lower extremities at the hip joints. The bones of the spine are supported by many ligaments. The erectors spinae muscles are also supporting and are useful for balance.

A human is able to survive with just the axial portion of their skeleton.

3.1.2 Appendicular skeleton

Main article: Appendicular skeleton

The appendicular skeleton (126 bones) is formed by the pectoral girdles, the upper limbs, the pelvic girdle or pelvis, and the lower limbs. Their functions are to make locomotion possible and to protect the major organs of digestion, excretion and reproduction.

3.2 Functions

The skeleton serves six major functions; support, movement, protection, production of blood cells, storage of minerals and endocrine regulation.

3.2.1 Support

The skeleton provides the framework which supports the body and maintains its shape. The pelvis, associated ligaments and muscles provide a floor for the pelvic structures. Without the rib cages, costal cartilages, and intercostal muscles, the lungs would collapse.

3.2.2 Movement

The joints between bones allow movement, some allowing a wider range of movement than others, e.g. the ball and socket joint allows a greater range of movement than the pivot joint at the neck. Movement is powered by skeletal muscles, which are attached to the skeleton at various sites on bones. Muscles, bones, and joints provide the principal mechanics for movement, all coordinated by the nervous system.

A human skeleton on exhibit at The Museum of Osteology, Oklahoma City, Oklahoma

3.2.3 Protection

The skeleton helps protect our many vital internal organs from being damaged.

- The skull protects the brain, the eyes, and the middle and inner ears.
- The vertebrae protect the spinal cord.
- The rib cage, spine, and sternum protect the lungs, heart and major blood vessels.
- The clavicle and scapula protect the shoulder.
- The ilium and spine protect the digestive and urogenital systems and the hip.
- The patella and the ulna protect the knee and the elbow respectively.
- The carpals and tarsals protect the wrist and ankle respectively.

3.2.4 Blood cell production

The skeleton is the site of haematopoiesis, the development of blood cells that takes place in the bone marrow. In children, haematopoiesis occurs primarily in the marrow of the long bones such as the femur and tibia. In adults, it occurs mainly in the pelvis, cranium, vertebrae, and sternum.[5]

3.2.5 Storage

The bone matrix can store calcium and is involved in calcium metabolism, and bone marrow can store iron in ferritin and is involved in iron metabolism. However, bones are not entirely made of calcium, but a mixture of chondroitin sulfate and hydroxyapatite, the latter making up 70% of a bone. Hydroxyapatite is in turn composed of 39.8% of calcium, 41.4% of oxygen, 18.5% of phosphorus, and 0.2% of hydrogen by mass. Chondroitin sulfate is a sugar made up primarily of oxygen and carbon.

3.2.6 Endocrine regulation

Bone cells release a hormone called osteocalcin, which contributes to the regulation of blood sugar (glucose) and fat deposition. Osteocalcin increases both the insulin secretion and sensitivity, in addition to boosting the number of insulin-producing cells and reducing stores of fat.[6]

3.3 Sex differences

Anatomical differences between human males and females are highly pronounced in some soft tissue areas, but tend to be limited in the skeleton. The human skeleton is not as sexually dimorphic as that of many other primate species, but subtle differences between sexes in the morphology of the skull, dentition, long bones, and pelves (*sing.* pelvis) are exhibited across human populations. In general, female skeletal elements tend to be smaller and less robust than corresponding male elements within a given population.

3.3.1 Skull

A variety of gross morphological traits of the human skull demonstrate sexual dimorphism, such as the nuchal crest, mastoid processes, supraorbital margin, supraorbital ridge, and mental eminence.[7]

3.3.2 Dentition

Human inter-sex dental dimorphism centers on the canines, but it is not nearly as pronounced as in the other great apes.

3.3.3 Long bones

Long bones are generally larger in males than in females within a given population. Muscle attachment sites on long bones are often more robust in males than in females, reflecting a difference in overall muscle mass and development between sexes. Sexual dimorphism in the long bones is commonly characterized by morphometric or gross morphological analyses.

3.3.4 Pelvis

Human pelves exhibit greater sexual dimorphism than other bones, specifically in the size and shape of the pelvic cavity, ilia, greater sciatic notches, and the subpubic angle. The Phenice method is commonly used to determine the sex of an unidentified human skeleton by anthropologists with 96% to 100% accuracy in some populations.[8]

3.4 Disorders

See also: Bone disease

There are many classified skeletal disorders. One of the most common is osteoporosis. Also common is scoliosis, a side-to-side curve in the back or spine, often creating a pronounced "C" or "S" shape when viewed on an x-ray of the spine. This condition is most apparent during adolescence, and is most common with females.

3.4.1 Arthritis

Main article: Arthritis

Arthritis is a disorder of the joints. It involves inflammation of one or more joints. When affected by arthritis, the joint or joints affected may be painful to move, may move in unusual directions or may be immobile completely. The symptoms of arthritis will vary differently between types of arthritis. The most common form of arthritis: Osteoarthritis can affect both the larger and smaller joints of the human skeleton. The cartilage in the affected joints will degrade, soften and wear away. This decreases the mobility of the joints and decreases the space between bones where cartilage should be.

3.4.2 Osteoporosis

Main article: Osteoporosis

Osteoporosis is a disease of bone where there is reduced bone mineral density, increasing the likelihood of fractures.[9] Osteoporosis is defined by the World Health Organization in women as a bone mineral density 2.5 standard deviations below peak bone mass, relative to the age and sex-matched average, as measured by Dual energy X-ray absorptiometry, with the term "established osteoporosis" including the presence of a fragility fracture.[10] Osteoporosis is most common in women after menopause, when it is called "postmenopausal osteoporosis", but may develop in men and premenopausal women in the presence of particular hormonal disorders and other chronic diseases or as a result of smoking and medications, specifically glucocorticoids.[9] Osteoporosis usually has no symptoms until a fracture occurs.[9] For this reason, DEXA scans are often done in people with one or more risk factors, who have developed osteoporosis and be at risk of fracture.[9]

Osteoporosis treatment includes advice to stop smoking, decrease alcohol consumption, exercise regularly, and have a healthy diet. Calcium supplements may also be advised, as may Vitamin D. When medication is used, it may include bisphosphonates, Strontium ranelate, and osteoporosis may be one factor considered when commencing Hormone replacement therapy.[9]

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Chapter 4

Table of muscles of the human body/End

4.1 Notes

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4.3 External links

- Tutorial & Quizzes on Skeletal Muscular Anatomy

Chapter 5

List of muscles of the human body

This is a table of muscles of the human anatomy.

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These muscles are described using anatomical terminology.

5.1 Head

5.1.1 Scalp/Eyelid

5.1.2 Extraocular muscles

5.1.3 Intraocular

5.1.4 Ear

5.1.5 Nose

5.1.6 Mouth

5.1.7 Mastication

5.1.8 Tongue

Extrinsic muscle

Intrinsic

5.1.9 Soft palate

5.1.10 Pharynx

5.1.11 Larynx

5.2 Neck

5.2.1 Cervical

5.2.2 Suprahyoid

5.2.3 Infrahyoid/Strap

5.2.4 Vertebrate

Anterior

Lateral

Posterior

| obliquus capitis superior || lateral mass of atlas|| lateral half of the inferior nuchal line || || suboccipital nerve || || |-valign="top" |- | inferior || spinous process of the axis || lateral mass of atlas || || suboccipital nerve || || |}

5.3 Torso

5.3.1 Back

5.3.2 Chest

5.3.3 Abdomen

5.3.4 Pelvis

5.3.5 Perineum

5.4 Upper limbs

5.4.1 Vertebral column

5.4.2 Thoracic walls

5.4.3 Shoulder

5.4.4 Arm

Anterior compartment

Posterior compartment

5.4.5 Forearm

Anterior compartment

Superficial

Deep

Posterior compartment

Superficial

Deep

5.4.6 Hand

Lateral volar

Thenar

Medial volar

Intermediate

5.5 Lower limb

5.5.1 Iliac region

5.5.2 Gluteal

5.5.3 Thigh

anterior compartment

posterior compartment/hamstring

medial compartment

5.5.4 Leg

anterior compartment

posterior compartment

Superficial

Deep

lateral compartment

fibularis muscles:

5.5.5 Foot

Dorsal

Plantar

1st layer

2nd layer

3rd layer

4th layer

5.6 Innervation overview

Mind Map showing a summary of Upper Limb Muscle Innervation

Mind Map Showing a summary of Lower Limb Muscle innervation

5.7 See also

- Accessory muscle

5.8 Notes

[1] Enotes

[2] exrx.net

[3] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 193

[4] Gosling *et al.* 2008, p. 200

[5] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 217

[6] Gosling 2008, p. 273

[7] Gosling et al. 2008, p. 266

[8] *MedicalMnemonics.com*: 255

5.9 References

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- http://www.ptcentral.com/muscles/
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5.10 External links

- Tutorial & Quizzes on Skeletal Muscular Anatomy
- Muscles of human body also at

Chapter 6

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6.1.3 Intraocular

6.1.4 Ear

6.1.5 Nose

6.1.6 Mouth

6.1.7 Mastication

6.1.8 Tongue

Extrinsic muscle

Intrinsic

6.1.9 Soft palate

6.1.10 Pharynx

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6.2.4 Vertebrate

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6.3 Torso

6.3.1 Back

6.3.2 Chest

6.3.3 Abdomen

6.3.4 Pelvis

6.3.5 Perineum

6.4 Upper limbs

6.4.1 Vertebral column

6.4.2 Thoracic walls

6.4.3 Shoulder

6.4.4 Arm

Anterior compartment

Posterior compartment

6.4.5 Forearm

Anterior compartment

Superficial

Deep

Posterior compartment

Superficial

Deep

6.4.6 Hand

Lateral volar

Thenar

Medial volar

Intermediate

6.5 Lower limb

6.5.1 Iliac region

6.5.2 Gluteal

6.5.3 Thigh

anterior compartment

posterior compartment/hamstring

medial compartment

6.5.4 Leg

anterior compartment

posterior compartment

Superficial

Deep

lateral compartment

fibularis muscles:

6.5.5 Foot

Dorsal

Plantar

1st layer

2nd layer

3rd layer

4th layer

6.6 Innervation overview

Mind Map showing a summary of Upper Limb Muscle Innervation

Mind Map Showing a summary of Lower Limb Muscle innervation

6.7 See also

- Accessory muscle

6.8 Notes

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[3] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 193

[4] Gosling *et al.* 2008, p. 200

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[8] *MedicalMnemonics.com*: 255

6.9 References

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- http://www.ptcentral.com/muscles/
- http://www.rad.washington.edu/atlas2/

6.10 External links

- Tutorial & Quizzes on Skeletal Muscular Anatomy
- Muscles of human body also at

Chapter 7

Axial skeleton

The **axial skeleton** is the portion of the human skeleton that consists of the bones of the head and trunk of an organism. In humans, it consists of 80 bones and is composed of eight parts; the skull bones, the ossicles of the middle ear, the hyoid bone, the rib cage, sternum and the vertebral column. The axial skeleton along with the appendicular skeleton together form the complete skeleton.

7.1 Structure

See also: List of bones of the human skeleton

Flat bones house the brain and other vital organs. This article mainly deals with the axial skeletons of humans; however, it is important to understand the evolutionary lineage of the axial skeleton. The human axial skeleton consists of 80 different bones. It is the medial core of the body and connects the pelvis to the body, where the appendix skeleton attaches. As the skeleton grows older the bones get weaker with the exception of the skull. The skull remains strong to protect the brain from injury.

7.1.1 Rib cage

The rib cage is composed of 12 pairs of ribs plus the sternum for a total of 25 separate bones. The rib cage functions as protection for the vital organs such as the heart and lungs. The ribs are shaped like crescents, with one end flattened and the other end rounded. The rounded ends are attached at joints to the thoracic vertebrae at the back and the flattened ends come together at the sternum, in the front.[1]

The upper seven pairs of ribs attach to the sternum with costal cartilage and are known as “true ribs.” The 8th through 10th ribs have non-costal cartilage which connects them to the ribs above. The last two ribs are called “free ribs” because they do not attach to the sternum or to other ribs and simply “hang free.” The length of each rib increases from number one to seven and then decreases until rib pair number 12. The first rib is the shortest, broadest, flattest, and most curved.[2]

7.1.2 Skull

The human skull consists of the cranium and the facial bones. The cranium holds and protects the brain in a large space called the cranial vault. The cranium is formed from eight plate-shaped bones which fit together at meeting points (joints) called sutures. In addition there are 14 facial bones which form the lower front part of the skull. Together the 22 bones that compose the skull form additional, smaller spaces besides the cranial vault, such as the cavities for the eyes, the internal ear, the nose, and the mouth. The most important facial bones include the jaw or mandible, the upper jaw or maxilla, the zygomatic or cheek bone, and the nasal bone.[3]

Humans are born with separate plates which later fuse to allow flexibility as the skull passes through the pelvis and birth canal during birth. During development the eight separate plates of the immature skull fuse together into one single structure known as the skull. The only bone that remains separate from the rest of the skull is the mandible.[4]

7.1.3 Vertebral column

At birth the majority of humans have 33 separate vertebrae. However during normal development several vertebrae fuse together, leaving a total of 24, in most cases. The confusion about whether or not there are 32-34 vertebrae stems from the fact that the two lowest vertebrae, the sacrum and the coccyx, are single bones made up of several smaller bones which have fused together. This is how the vertebrae are counted: 24 separate vertebrae and the sacrum, formed from 5 fused vertebrae and the coccyx, formed from 3-5 fused vertebrae. If you count the coccyx and sacrum each as one vertebra, then there are 26 vertebrae. If the fused vertebrae are all counted separately, then the total number of vertebrae comes to between 32 and 34.

The vertebral column consists of 5 parts. The most cranial (uppermost) part is made up by the cervical vertebrae (7), followed by thoracic (12), lumbar (5), sacral (4–5) and coccygeal vertebrae (3–4).

Cervical vertebrae make up the junction between the ver-

tebral column and the cranium. Sacral and coccygeal vertebras are fused and thus often called “sacral bone” or “coccygeal bone” as unit.

The sacral bone makes up the junction between the vertebral column and the pelvic bones.

7.2 History

The word **“Axial”** is taken from the word “axis” and refers to the fact that the bones are located close to or along the central “axis” of the body.[5]

7.3 Additional images

- Illustration depicting anterior and posterior view of axial skeleton

7.4 See also

This article uses anatomical terminology; for an overview, see anatomical terminology.

- Appendicular skeleton

7.5 References

[1] “Postcranial Skeletal/Ribs”. Observation and Analysis Method for Human Bones. Retrieved 25 February 2014.

[2] “Human Body Maps/Ribs”. Healthtime. Retrieved 25 February 2014.

[3] “Features of the Human Skull”. Face and Emotion. Retrieved 25 February 2014.

[4] “Skull”. Inner Body. Retrieved 25 February 2014.

[5] “Axial skeleton”. AnatomyExpert. Retrieved 15 March 2013.

7.6 External links

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Chapter 8

Superior thoracic aperture

The **superior thoracic aperture** refers to the opening at the top of the thoracic cavity. It is also referred to anatomically as the **thoracic inlet** and clinically as the **thoracic outlet** as in thoracic outlet syndrome, which refers to the superior thoracic aperture, and not to the inferior thoracic aperture which is the larger opening at the bottom of the thoracic cavity.

8.1 Structure

The thoracic inlet is essentially a hole surrounded by a bony ring, through which several vital structures pass.

The superior thoracic aperture is bounded by: the first thoracic vertebra (T1) *posteriorly*, the first pair of ribs *laterally* (more specifically, the first ribs form lateral C-shaped curves posterior to anterior), the costal cartilage of the first rib and the superior border of the manubrium *anteriorly*.

8.1.1 Relations

The clavicle articulates with the manubrium to form the anterior border of the thoracic inlet. Superior to the thoracic inlet is the root of the neck, and the superior mediastinum is related inferiorly.

The brachial plexus is a superolateral relation of the thoracic inlet. The brachial plexus emerges between the anterior and middle scalene muscles, superior to the first rib, and passes obliquely and inferiorly, underneath the clavicle, into the shoulder and then the arm. Impingement of the plexus in the region of the scalenes, ribs, and clavicles is responsible for thoracic outlet syndrome.

8.2 Function

Structures that pass through the **superior thoracic aperture** include:

- trachea
- esophagus
- thoracic duct
- apexes of the lungs
- nerves
  - phrenic nerve
  - vagus nerve
  - Recurrent laryngeal nerves
  - sympathetic trunks
- vessels
  - arteries
    - left and right common carotid arteries
    - left and right subclavian arteries
  - veins
    - internal jugular veins
    - brachiocephalic veins
    - subclavian veins
- lymph nodes and lymphatic vessels

This is not an exhaustive list. There are several other minor but important vessels and nerves passing through, and an abnormally large thyroid gland may extend inferiorly through the thoracic inlet into the superior mediastinum.

The oesophagus lies against the body of the T1 vertebra, separated from it by the prevertebral fascia, and the trachea lies in front of the oesophagus, in the midline, and may touch the manubrium. The apices of the lungs lie to either side of the oesophagus and trachea, and is separated from them by the other vessels and nerves listed above. Furthermore, they extend slightly superior past the level of the inlet (e.g. the horizontal plane of the first rib).

8.3 Additional images

- Vasculature entering at top. (*Note: internal mammary is now known as internal thoracic artery.*)

8.4 References

McMinn, RMH (Ed) (1994) Last's Anatomy: Regional and applied (9th Ed). London: Churchill Livingstone. ISBN 0-443-04662-X

8.5 External links

- *−2033188804* at GPnotebook
- Thoracic Outlet Syndrome, Musculoskeletal Consumer Review

Chapter 9

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9.1.2 Extraocular muscles

9.1.3 Intraocular

9.1.4 Ear

9.1.5 Nose

9.1.6 Mouth

9.1.7 Mastication

9.1.8 Tongue

Extrinsic muscle

Intrinsic

9.1.9 Soft palate

9.1.10 Pharynx

9.1.11 Larynx

9.2 Neck

9.2.1 Cervical

9.2.2 Suprahyoid

9.2.3 Infrahyoid/Strap

9.2.4 Vertebrate

Anterior

Lateral

Posterior

| obliquus capitis superior || lateral mass of atlas|| lateral half of the inferior nuchal line || || suboccipital nerve || || |-valign="top" |- | inferior || spinous process of the axis || lateral mass of atlas || || suboccipital nerve || || |}

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9.3.1 Back

9.3.2 Chest

9.3.3 Abdomen

9.3.4 Pelvis

9.3.5 Perineum

9.4 Upper limbs

9.4.1 Vertebral column

9.4.2 Thoracic walls

9.4.3 Shoulder

9.4.4 Arm

Anterior compartment

Posterior compartment

9.4.5 Forearm

Anterior compartment

Superficial

Deep

Posterior compartment

Superficial

Deep

9.4.6 Hand

Lateral volar

Thenar

Medial volar

Intermediate

9.5 Lower limb

9.5.1 Iliac region

9.5.2 Gluteal

9.5.3 Thigh

anterior compartment

posterior compartment/hamstring

medial compartment

9.5.4 Leg

anterior compartment

posterior compartment

Superficial

Deep

lateral compartment

fibularis muscles:

9.5.5 Foot

Dorsal

Plantar

1st layer

2nd layer

3rd layer

4th layer

9.6 Innervation overview

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9.7 See also

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9.8 Notes

[1] Enotes

[2] exrx.net

[3] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 193

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[5] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 217

[6] Gosling 2008, p. 273

[7] Gosling et al. 2008, p. 266

[8] *MedicalMnemonics.com*: 255

9.9 References

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9.10 External links

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Chapter 10

Scalene muscles

The **scalene muscles** (from Greek σκαληνός, or *skalenos*, meaning uneven[1] as the pairs are all of differing length[2]) are a group of three pairs of muscles in the lateral neck, namely the scalenus anterior, scalenus medius, and scalenus posterior. They are innervated by the fourth, fifth, and sixth cervical spinal nerves (C4-C6).

A fourth muscle, the scalenus minimus (Sibson's muscle), is sometimes present behind the lower portion of the scalenus anterior.[2]

10.1 Origin and insertion

They originate from the transverse processes from the cervical vertebrae of C2 to C7 and insert onto the first and second ribs. Thus they are called the **lateral vertebral muscles**.[3]

10.2 Function

The action of the anterior and middle scalene muscles is to elevate the first rib and laterally flex (bend) the neck to the same side;[4] the action of the posterior scalene is to elevate the second rib and tilt the neck to the same side.

They also act as accessory muscles of inspiration, along with the sternocleidomastoids.

10.3 Relations

The scalene muscles have an important relationship to other structures in the neck. The brachial plexus and subclavian artery pass between the anterior and middle scalenes.[5] The subclavian vein and phrenic nerve pass anteriorly to the anterior scalene as the muscle crosses over the first rib. The phrenic nerve is oriented vertically as it passes in front of the anterior scalene, while the subclavian vein is oriented horizontally as it passes in front of the anterior scalene muscle.[5]

The passing of the brachial plexus and the subclavian artery through the space of the anterior and middle scalene muscles constitute the scalene hiatus (the term "scalene fissure" is also used). The region in which this lies is referred to as the scaleotracheal fossa. It is bound by the clavicle inferior anteriorly, the trachea medially, posteriorly by the trapezius, and anteriorly by the platysma muscle.

10.4 Clinical relevance

Since the nerves of the brachial plexus pass through the space between the anterior and middle scalene muscles, that area is sometimes targeted with the administration of regional anesthesia by physicians. The nerve block, called an interscalene block, may be performed prior to arm or shoulder surgery.[6]

10.5 See also

- Muscles
- List of muscles of the human body
- Accessory muscles of respiration

10.6 Additional images

- Musculi coli base
- Scalene muscles. Muscles of the neck. Lateral view.
- Scalene muscles. Muscles of the neck. Lateral view.

10.7 References

[1] Mosby's Medical, Nursing & Allied Health Dictionary, Fourth Edition, Mosby-Year Book Inc., 1994, p. 1395

[2] Davies, Clair; Davies, Amber (2013). *The Trigger Point Therapy Workbook* (Third ed.). New Harbinger Publications. ISBN 9781608824960.

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[6] Graber, Raymound. "Interscalene Nerve Block". *WebMD, LLC*. Medscape. Retrieved 10 December 2012.

Chapter 11

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11.1.7 Mastication

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Extrinsic muscle

Intrinsic

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11.3.3 Abdomen

11.3.4 Pelvis

11.3.5 Perineum

11.4 Upper limbs

11.4.1 Vertebral column

11.4.2 Thoracic walls

11.4.3 Shoulder

11.4.4 Arm

Anterior compartment

Posterior compartment

11.4.5 Forearm

Anterior compartment

Superficial

Deep

Posterior compartment

Superficial

Deep

11.4.6 Hand

Lateral volar

Thenar

Medial volar

Intermediate

11.5 Lower limb

11.5.1 Iliac region

11.5.2 Gluteal

11.5.3 Thigh

anterior compartment

posterior compartment/hamstring

medial compartment

11.5.4 Leg

anterior compartment

posterior compartment

Superficial

Deep

lateral compartment

fibularis muscles:

11.5.5 Foot

Dorsal

Plantar

1st layer

2nd layer

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11.6 Innervation overview

Mind Map showing a summary of Upper Limb Muscle Innervation

Mind Map Showing a summary of Lower Limb Muscle innervation

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- http://www.rad.washington.edu/atlas2/

11.10 External links

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Chapter 12

Hip flexors

Flexion is a term used in anatomical terminology that refers to a movement that decreases the angle between two bones at a joint. For example, your elbow joint flexes when you bring your hand closer to the shoulder. Flexion is typically instigated by muscle contraction. A muscle that flexes a joint is called a *flexor*. In anatomy, **flexion** (from the Latin verb *flectere*, to bend)[1] is a joint movement that decreases the angle between the bones that converge at the joint.

12.1 Flexors

12.1.1 Upper limb

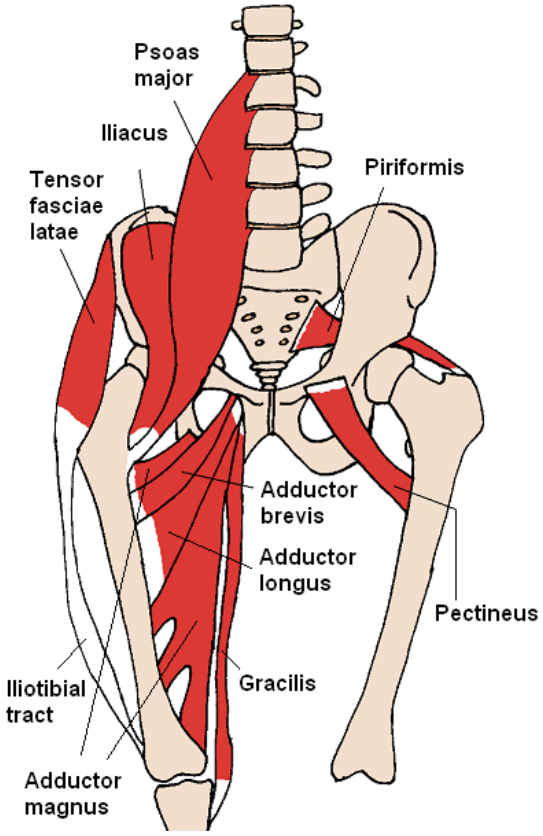
- of forearm at elbow
  - Brachialis
  - Brachioradialis
  - Biceps brachii
- of humerus at shoulder
  - Pectoralis major
  - Anterior deltoid
  - Coracobrachialis
  - Biceps brachii
- of carpus at wrist
  - flexor carpi radialis
  - flexor carpi ulnaris
  - palmaris longus

12.1.2 Lower limb

Hip

The hip flexors are (in descending order of importance to the action of flexing the hip joint):[2]

- Collectively known as the iliopsoas or inner hip muscles:
  - Psoas major
  - Iliacus muscle
- Anterior compartment of thigh
  - Rectus femoris (part of the quadriceps muscle group)
  - Sartorius
- One of the gluteal muscles:
  - Tensor fasciae latae
- Medial compartment of thigh



The iliacus and nearby muscles

- Pectineus
- Adductor longus
- Adductor brevis
- Gracilis

Without the iliopsoas muscles, flexion in sitting position is not possible across the horizontal plane.[2]

Leg

- of leg at knee (L5-S2)[3]
  - Posterior compartment of thigh/Hamstrings
    - Biceps femoris
    - Semitendinosus
    - Semimembranosus
  - Gracilis
  - Sartorius
  - Tensor fasciae latae
  - Gastrocnemius
  - Popliteus
  - Plantaris (negligible)
- of toes
  - Posterior compartment of leg
    - Flexor hallucis longus
    - Flexor digitorum longus
  - Flexor digitorum brevis
  - Quadratus plantae
  - Flexor hallucis brevis
  - Flexor digiti minimi brevis
- of proximal phalanges at metatarsophalangeal joint[4]
  - Lumbrical muscle (foot)
  - Plantar interossei
  - Dorsal interossei

12.1.3 Other

- torso/lumbar vertebrae
  - Rectus abdominis muscle
- neck at atlanto-occipital joint
  - Longus capitis muscle

12.2 See also

This article uses anatomical terminology; for an overview, see anatomical terminology.

12.3 References

[1] Anderson, Kenneth N.; et al., eds. (1994). *Mosby's Medical, Nursing, & Allied Health Dictionary* (4th ed.). St. Louis: Mosby-Year Book. p. 624. ISBN 9780801672255. OCLC 312496360.

[2] Platzer (2004), p 246

[3] Knee Articulations

[4] Foot Articulations

12.4 External links

- *Flexion* at eMedicine Dictionary

Chapter 13

Vesico-uterine pouch

In human female anatomy, the **vesicouterine excavation** (or **uterovesical pouch of Meiring**) is a second, but shallower, pouch formed from the peritoneum over the uterus and bladder, continued over the intestinal surface and fundus of the uterus onto its vesical surface, which it covers as far as the junction of the body and cervix uteri, and then to the bladder. Also termed *Dunn's pouch*, this is an important anatomical landmark for chronic endometriosis. Endometrial seeding in this region causes cyclical pain in women of child bearing age. Dunn's pouch is also an important factor in retroversion of the uterus, which can frequently complicate pregnancies.

The vesicouterine excavation is close to the anterior fornix of the vagina.

13.1 Additional images

- Median sagittal section of female pelvis.

13.2 See also

- Rectouterine pouch

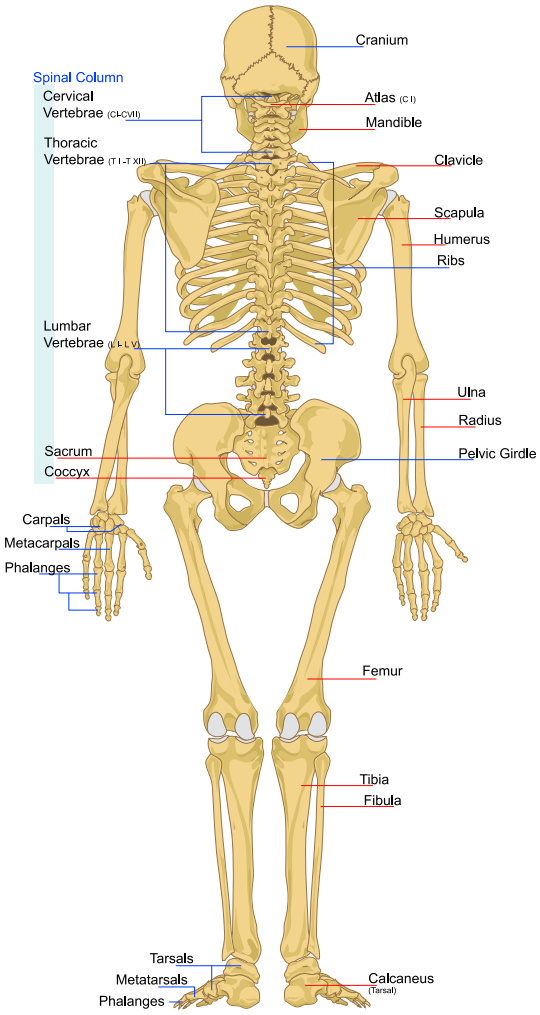
13.3 External links

- Anatomy photo:43:02-0102 at the SUNY Downstate Medical Center - "The Female Pelvis: Distribution of the Peritoneum in the Female Pelvis"
- Anatomy image:9612 at the SUNY Downstate Medical Center
- Anatomy image:9736 at the SUNY Downstate Medical Center
- Anatomy image:9758 at the SUNY Downstate Medical Center
- figures/chapter_35/35-8.HTM - Basic Human Anatomy at Dartmouth Medical School

This article incorporates text from a public domain edition of Gray's Anatomy.

Chapter 14

List of bones of the human skeleton



Back view of a skeleton of an adult human

The skeleton of an adult human consists of 206 bones. It is composed of 270 bones at birth,[1][2][3] which decreases to 206 bones by adulthood after some bones have fused together. Together, these bones form the axial skeleton and the appendicular skeleton. Many small and often variable bones, such as sesamoid bones and ossicles, are not included in this count.

14.1 Introduction

The figure of 206 bones is commonly repeated, but does have some peculiarities in its method of counting. It is taken of an adult human—the number of bones in the skeleton changes with age, as multiple bones fuse, a process which typically reaches completion in the third decade of life. In addition, the bones of the skull and face are counted as separate bones, despite being fused naturally. Some reliable sesamoid bones such as the pisiform are counted, while others, such as the hallux sesamoids, are not.

Individuals may have more or fewer bones than this owing to anatomical variations. The most common variations include additional (i.e. supernumerary) cervical ribs or lumbar vertebrae. Sesamoid bone counts also may vary among individuals.

14.2 Bones

14.2.1 Vertebral column

- The spinal vertebrae of the vertebral column (26 bones)
  - The cervical vertebrae (7)
  - The thoracic vertebrae (12)
  - The lumbar vertebrae (5)
  - The sacral vertebrae (5 at birth, later fused into one)
  - The coccygeal vertebrae (4 at birth, later fused into one)

14.2.2 Chest

- The sternum (1)
- The ribs (24, in 12 pairs), including:
  - (7) pairs called “true ribs” directly attached to the sternum (1st-7th pairs)

- (3) pairs (8th,9th and 10th pairs), also known as False ribs are attached anteriorly to each other and to the 7th rib by cartilages and synovial joints
- (2) pairs of floating ribs (11th and 12th pairs), have no anterior attachment.

14.2.3 Head

- The skull
  - The cranial bones (8)
    - The occipital bone
    - The parietal bones (2)
    - The frontal bone
    - The temporal bones (2)
    - The sphenoid bone (sometimes counted as facial)
    - The ethmoid bone (sometimes counted as facial)
  - The facial bones (15)
    - The nasal bones (2)
    - The maxillae (upper jaw) (2)
    - The lacrimal bone (2)
    - The zygomatic bone (2)
    - The palatine bone (2)
    - The inferior nasal concha (2)
    - The vomer
    - The mandible (lower jaw)
    - The hyoid bone (sometimes not counted as facial)
- In the middle ears (3 x 2)
  - malleus (2)
  - incus (2)
  - stapes (2)

14.2.4 Arm

- The bones of the upper arm
  - The clavicle
  - The scapula
  - The humerus
  - The ulna
  - The radius
- The hand (54 bones, 27 in each hand)
  - The carpus
    - scaphoid bone (2)
    - lunate bone (2)
    - triquetrum bone (2)
    - pisiform bone (2)
    - trapezium (2)
    - trapezoid bone (2)
    - capitate bone (2)
    - hamate bone (2)
  - The metacarpus (5 × 2)
  - The phalanges of the hand
    - proximal phalanges (5 × 2)
    - intermediate phalanges (4 × 2)
    - distal phalanges (5 × 2)

14.2.5 Leg

- The hip bone, comprising the fused ilium, ischium, and pubis (2)
  - The sacrum and the coccyx attach to the two hip bones to form the pelvis
- The femur
- The patella or knee cap
- The tibia
- The fibula
- The foot (52 bones in total, 26 per foot)
  - The tarsus
    - calcaneus or heel bone (2)
    - talus (2)
    - navicular bone (2)
    - medial cuneiform bone (2)
    - intermediate cuneiform bone (2)
    - lateral cuneiform bone (2)
    - cuboid bone (2)
  - The metatarsus
  - The phalanges of the foot
    - proximal phalanges (5 × 2)
    - intermediate phalanges (4 x 2)
    - distal phalanges (5 x 2)
    - The sesamoid bones

14.3 Notes

14.4 References

[1] Miller, Larry (2007-12-09). "We're Born With 300 Bones. As Adults We Have 206". Ground Report.

[2] "How many bones does the human body contain?". Ask.yahoo.com. 2001-08-08. Retrieved 2010-03-04.

[3] Exploring our human bodies. San Diego Supercomputer Center Education

Chapter 15

List of homologues of the human reproductive system

The **List of homologues of the human reproductive system** shows how indifferent embryonic organs differentiate into the respective sex organs in males and females. Müllerian ducts are also referred to as *paramesonephric ducts*, and Wolffian ducts as *mesonephric duct*.

15.1 Counterparts

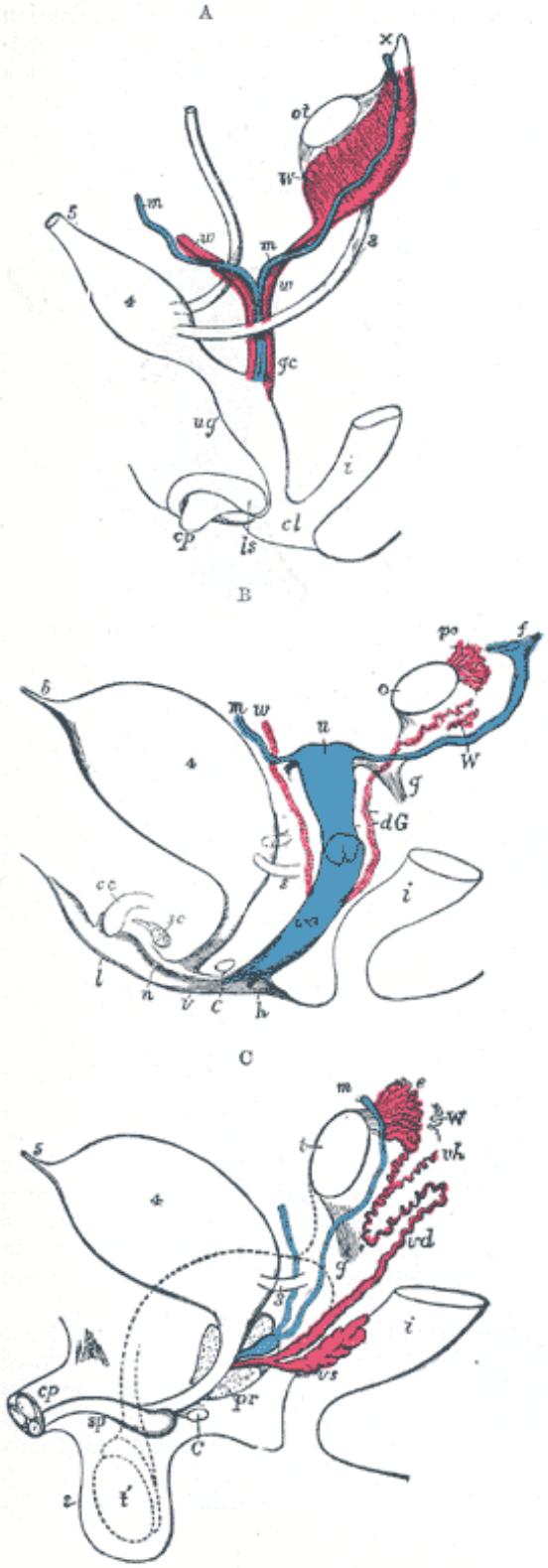
15.2 Diagram of internal differentiation

15.3 Diagram of external differentiation

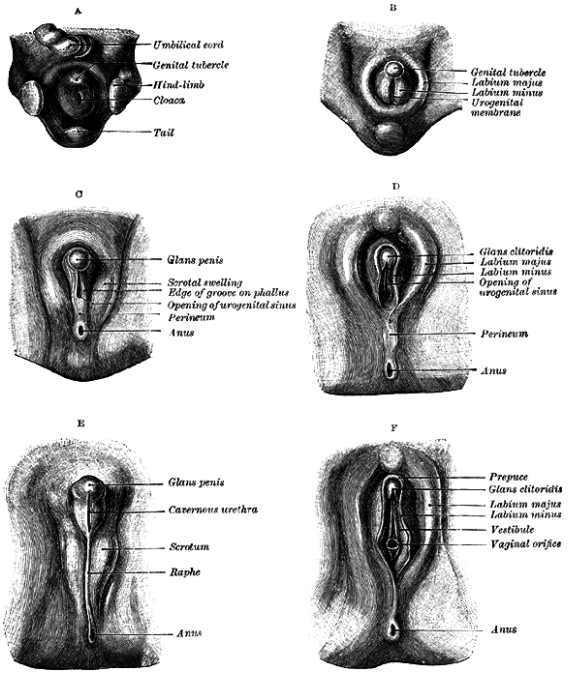
- A: Undifferentiated
- B: Female
- C: Male
- D: Female
- E: Male
- F: Female

15.4 References

[1] Cai Y (2009). "Revisiting old vaginal topics: conversion of the Müllerian vagina and origin of the "sinus" vagina". *Int J Dev Biol 2009; 53:925-34* **53** (7): 925–34. doi:10.1387/ijdb.082846yc. PMID 19598112.



Diagrams to show the development of male and female generative organs from a common type.



Stages in the development of the external sexual organs in the male and female.

Chapter 16

List of human anatomical features

The detailed list of human anatomical features below is adapted from the table of contents of the 1918 public domain edition of Gray's Anatomy.

16.1 Syndesmology

- Development of the joints
- Classification of joints
- The kind of movement admitted in joints
- Articulations of the trunk
  - Articulations of the vertebral column
  - Articulation of the atlas with the epistropheus or axis
  - Articulations of the vertebral column with the cranium
  - Articulation of the mandible
  - Costovertebral articulations
  - Sternocostal articulations
  - Articulation of the manubrium and body of the sternum
  - Articulation of the vertebral column with the pelvis
  - Articulations of the pelvis
- Articulations of the upper extremity
  - Sternoclavicular articulation
  - Acromioclavicular articulation
  - Humeral articulation or shoulder-joint
  - Elbow-joint
  - Radioulnar articulation
  - Radiocarpal articulation or wrist-joint
  - Intercarpal articulations
  - Carpometacarpal articulations
  - Intermetacarpal articulations
  - Metacarpophalangeal articulations
  - Articulations of the digits
- Articulations of the lower extremity
  - Coxal articulation or hip-joint
  - The knee-joint
  - Articulations between the tibia and fibula
  - Talocrural articulation or ankle-joint
  - Intertarsal articulations
  - Tarsometatarsal articulations
  - Intermetatarsal articulations
  - Metatarsophalangeal articulations
  - Articulations of the digits
  - Arches of the foot

16.2 Angiology

- The blood
- Development of the vascular system
- The thoracic cavity
  - The pericardium
  - The heart
  - Peculiarities in the vascular system in the fetus

16.3 Anatomical landmarks

On the trunk of the body, the chest is referred to as the thoracic area. The shoulder in general is the acromial, while the curve of the shoulder is the deltoid. The back as a general area is the dorsum or dorsal area, and the lower back as the lumbus or lumbar region. The shoulderblades are the scapular area and the breastbone is the sternal region. The abdominal area is the region between the chest and the pelvis. The breast is called the mamma or mammary, the armpit as the axilla and axillary, and the navel as the umbilicus and umbilical. The pelvis is the lower torso, between the abdomen and the thighs. The

groin, where the thigh joins the trunk, are the inguen and inguinal area.

The entire arm is referred to as the brachium and brachial, the front of the elbow as the antecubitis and antecubital, the back of the elbow as the olecranon or olecranal, the forearm as the antebrachium and antebrachial, the wrist as the carpus and carpal area, the hand as the manus and manual, the palm as the palma and palmar, the thumb as the pollex, and the fingers as the digits, phalanges, and phalangeal. The buttocks are the gluteus or gluteal region and the pubic area is the pubis.

Anatomists divide the lower limb into the thigh (the part of the limb between the hip and the knee) and the leg (which refers only to the area of the limb between the knee and the ankle). The thigh is the femur and the femoral region. The kneecap is the patella and patellar while the back of the knee is the popliteus and popliteal area. The leg (between the knee and the ankle) is the crus and crural area, the lateral aspect of the leg is the peroneal area, and the calf is the sura and sural region. The ankle is the tarsus and tarsal, and the heel is the calcaneus or calcaneal. The foot is the pes and pedal region, and the sole of the foot the planta and plantar. As with the fingers, the toes are also called the digits, phalanges, and phalangeal area. The big toe is referred to as the hallux.

16.4 See also

- List of human anatomical parts named after people
- List of regions in the human brain
- Superficial anatomy

Chapter 17

List of human anatomical parts named after people

This is a list of human anatomical parts named after people.

> For other lists of eponyms (names derived from people) see eponym.
>
> For a list of eponyms sorted by name see List of eponyms.

17.1 Alphabetical list

For clarity, entries are listed by the name of the person associated with them, so Loop of Henle is listed under H not L.

17.1.1 A

- Achilles tendon – Achilles, Greek mythological character
- Adam's apple – Adam, Biblical character
- Alcock's canal (pudendal canal) – Benjamin Alcock (1801–1859?), Irish anatomist
- Artery of Adamkiewicz – Albert Wojciech Adamkiewicz (1850–1921), Polish pathologist

17.1.2 B

- Bachmann's bundle – Jean George Bachmann (1877–1959), German-American physiologist
- Balbiani bodies – Édouard-Gérard Balbiani
- Bartholin's gland – Caspar Bartholin the Younger (1655–1738), Danish anatomist
- Batson's plexus – Oscar Vivian Batson (1894–1979), American anatomist
- Long thoracic nerve of Bell – Sir Charles Bell (1774–1842), Scottish surgeon-anatomist
- Duct of Bellini – Lorenzo Bellini (1643–1704), Italian anatomist
- Renal columns of Bertin – Exupere Joseph Bertin (1712–1781), French anatomist
- Betz cells – Vladimir Alekseyevich Betz (1834–1894), Ukrainian histologist
- Billroth's cords – Theodor Billroth (1829–1894), Austrian surgeon
- Bowman's capsule and Bowman's membrane – Sir William Bowman (1816–1892), English surgeon-anatomist
- Broca's area – Paul Broca (1824–1880), French surgeon-anatomist
- Brodmann's areas – Korbinian Brodmann (1868–1918), German neurologist
- Brunner's glands – Johann Conrad Brunner (1653–1727), Swiss anatomist
- Buck's fascia – Gurdon Buck (1807–1877), American surgeon

17.1.3 C

- Cajal cell – Santiago Ramón y Cajal (1852–1934), Spanish pathologist
- Cajal–Retzius cell – Santiago Ramón y Cajal and Gustaf Retzius (1842–1919), Swiss histologist
- Calot's triangle – Jean-François Calot (1861–1944), French surgeon
- Chassaignac tubercle – Charles Marie Édouard Chassaignac (1804–1879), French physician
- Circle of Willis – arterial circle in base of brain – Dr. Thomas Willis (1621–1675), English physician
- Clara cell – Max Clara (1899–1966), German anatomist

- Cloquet's canal
- Colles' fascia – Abraham Colles (1773–1843), Irish surgeon
- Cooper's fascia – Astley Cooper (1768–1841), English surgeon
- Cooper's iliopectineal ligament – Astley Cooper
- Cooper's suspensory ligaments – Astley Cooper
- Organ of Corti – Alfonso Corti (1822–1876), Italian microanatomist
- Cowper's glands – William Cowper (1666–1709), English surgeon-anatomist
- Cuvier ducts – Georges Cuvier (1769–1832), French Naturalist and comparative anatomist

17.1.4 D

- Darwin's tubercle – Charles Darwin (1809–1882), British Naturalist
- Denonvilliers' fascia – Charles-Pierre Denonvilliers (1808–1872), French surgeon
- Descemet's membrane – Jean Descemet (1732–1810), French physician
- Space of Disse – Joseph Disse (1852–1912), German histologist
- Dorello's canal – Primo Dorello (1872–1963), Italian Anatomist.
- Pouch of Douglas – James Douglas (1675–1742), Scottish anatomist
- Dua's layer – Harminder Dua (1967 –) British-Indian ophthalmologist

17.1.5 E

- Von Ebner's glands – Victor von Ebner (1842–1925), German histologist
- Edinger–Westphal nucleus – Ludwig Edinger (1855–1918), German neuroanatomist, and Karl Friedrich Otto Westphal (1833–1890), German neurologist
- Eustachian tube – Bartolomeo Eustachi (1500 / 1514 / 1520–1574), Italian anatomist

17.1.6 F

- Fallopian tube – Gabriele Falloppio (1523–1562), Italian anatomist

17.1.7 G

- Gallaudet's fascia – Bryan Baron Gallaudet (1853–1942), American anatomist
- Gartner's duct – Hermann Treschow Gartner (1785–1827), Danish surgeon-anatomist
- Gerdy's Fibers – Pierre Nicolas Gerdy (1797–1856), French physician
- Gerota Capsule – Dumitru Gerota (1867–1939), Romanian urology surgeon-anatomist
- Giacomini vein – Carlo Giacomini (1840-1898) Italian anatomist
- Glisson's capsule – Francis Glisson (1599?–1677), English anatomist
- Golgi apparatus and Golgi receptor – Camillo Golgi (1843–1926), Italian pathologist
- Graafian follicle – Regnier de Graaf (1641–1673), Dutch anatomist
- Gräfenberg spot (G-spot) – Ernst Gräfenberg (1881–1957), German-American gynecologist
- Great vein of Galen and the other veins of Galen – Galen (129 AD – 200 / 216 AD), an ancient Greek physician

17.1.8 H

- Hartmann's pouch – Henri Hubert Vadim Hartmann
- Hasner's Fold – Joseph Hasner (1819–1892), Austrian ophthalmologist
- Haversian canal – Clopton Havers (1657–1702), English physician
- Spiral valves of Heister – Lorenz Heister (1683–1758), German surgeon-anatomist
- Loop of Henle – F. G. J. Henle (1809–1885), German pathologist
- Canals of Hering – Karl Ewald Konstantin Hering (1834–1918), German physiologist
- Hering's nerve – Heinrich Ewald Hering (1866–1948), Austrian physician
- Herring bodies – Percy Theodore Herring (1872–1967), English physiologist
- Heschl's gyri – Richard L. Heschl (1824–1881), Austrian anatomist
- Hesselbach's triangle – Franz Kaspar Hesselbach (1759–1816), German surgeon-anatomist

- Antrum of Highmore – Nathaniel Highmore (1613–1685), English surgeon-anatomist
- Bundle of His – Wilhelm His, Jr. (1863–1934), Swiss cardiologist
- Houston's muscle (Bulbocavernous Penile Fibers) – John Houston (1802–1845), Irish anatomist
- Houston's valves – John Houston, Irish anatomist
- Canal of Huguier – Pierre Charles Huguier (1804–1878), French surgeon-gynecologist
- Hurthle cell – Karl Hürthle (1860–1945), German histologist

17.1.9 K

- Kerckring's valves – Theodor Kerckring (1638–1693), Dutch anatomist
- Kernohan notch – James Watson Kernohan (1896–1981), Irish-American pathologist
- Kiesselbach's plexus – Wilhelm Kiesselbach
- Pores of Kohn – Hans Kohn
- Krause's end-bulbs – Wilhelm Krause
- Kupffer cells – Karl Wilhelm von Kupffer

17.1.10 L

- Langer's lines – Karl Langer
- Islets of Langerhans and Langerhans cell – Paul Langerhans
- Langhans giant cell – Theodor Langhans
- Lauth's canal – Thomas Lauth
- Leydig Cells – Franz Leydig
- Crypts of Lieberkühn – Johann Nathanael Lieberkühn
- Lissauer's tract – Heinrich Lissauer
- Lister's tubercle
- Kiesselbach's plexus
- Urethral glands of Littré – Alexis Littré
- Lockwood's ligament – Charles Barrett Lockwood
- Angle of Louis – Antoine Louis
- Lovibond's angle
- Lund's node
- Crypts of Luschka, Ducts of Luschka, Foramina of Luschka, and Luschka's joints – Hubert von Luschka

17.1.11 M

- Macewen's triangle – Sir William Macewen
- Foramen of Magendie – François Magendie
- McBurney's point – Charles McBurney
- Malpighian corpuscle – Marcello Malpighi, the name given to both renal corpuscle and splenic lymphoid nodules
- Meckel's cartilage and Meckel's diverticulum – Johann Friedrich Meckel
- Meibomian glands – Heinrich Meibom
- Meissner's corpuscle and Meissner's plexus – Georg Meissner
- Merkel cell – Friedrich Sigmund Merkel
- Meyer's loop
- Möll's gland and Space of Möll – Jacob A. Möll
- Foramina of Monro – Alexander Monro
- Glands of Montgomery – William Fetherstone Montgomery
- Hydatids of Morgagni, and Lacunae of Morgagni – Giovanni Battista Morgagni
- Morison's pouch – James Rutherford Morison
- Müllerian ducts – Johannes Peter Müller

17.1.12 N

- Nissl bodies or granules and Nissl substance – Franz Nissl

17.1.13 O

- Sphincter of Oddi – Ruggero Oddi

17.1.14 P

- Pacinian corpuscles – Filippo Pacini
- Paneth cells – Joseph Paneth
- Papez circuit – James Papez
- Peyer's patches – Johann Conrad Peyer
- Poupart's ligament – François Poupart
- Prussak's space – Alexander Prussak
- Purkinje cells – Jan E. Purkinje
- Pimenta's Point

17.1.15 R

- Island of Reil – Johann Christian Reil (1759-1813)
- Node of Ranvier – Louis-Antoine Ranvier
- Rathke's pouch – Martin Heinrich Rathke
- Reichert cartilage – Karl Bogislaus Reichert
- Renshaw cells – Birdsey Renshaw (1908–1948)
- Space of Retzius and Veins of Retzius – Anders Retzius
- Riedel's lobe – Bernhard Moritz Carl Ludwig Riedel
- Rokitansky–Aschoff sinuses – Carl Freiherr von Rokitansky and Ludwig Aschoff
- Rolandic fissure and fissure of Rolando – Luigi Rolando
- Rotter's lymph nodes – Josef Rotter
- Ruffini's corpuscles – Angelo Ruffini

17.1.16 S

- Duct of Santorini – Giovanni Domenico Santorini
- Canal of Schlemm – Friedrich Schlemm
- Sertoli cell – Enrico Sertoli
- Sharpey's fibres – William Sharpey
- Shrapnell's membrane – Henry Jones Shrapnell
- Skene's gland – Alexander Skene
- Spigelian fascia – Adriaan van den Spiegel
- Stensen's duct – Niels Stensen
- Stilling's canal
- Struthers' ligament – Sir John Struthers
- Sylvian aqueduct – Franciscus Sylvius

17.1.17 T

- Thebesian foramina – Adam Christian Thebesius
- Thebesian valve – Adam Christian Thebesius
- Thebesian vein – Adam Christian Thebesius
- Thorel's pathway – Carl Thorel (1859–1938)
- White lines of Toldt – Carl Toldt
- Torcular herophili – Herophilus
- Traube's space – Ludwig Traube
- Ligament of Treitz – Václav Treitz

17.1.18 V

- Sinus of Valsalva – Antonio Maria Valsalva
- Ampulla of Vater – Abraham Vater
- Limbus of Vieussens – Raymond Vieussens
- Valve of Vieussens – Raymond Vieussens
- Vieussens valve of the Coronary Sinus – Raymond Vieussens
- Virchow–Robin spaces – Rudolf Virchow and Charles-Philippe Robin
- Virchow's node – Rudolf Virchow

17.1.19 W

- Waldeyer's tonsillar ring – Heinrich Wilhelm Gottfried von Waldeyer-Hartz
- Weibel–Palade body – Ewald R. Weibel and George Emil Palade
- Wenckebach's bundle – Karel Frederik Wenckebach
- Wernicke's area – Karl Wernicke
- Wharton's duct and Wharton's jelly – Thomas Wharton
- Circle of Willis – Thomas Willis
- Foramen of Winslow – Jean-Jacques Bénigne Winslow
- Duct of Wirsung – Johann Georg Wirsung
- Wolffian duct – Kaspar Friedrich Wolff
- Wormian bones – Ole Worm

17.1.20 Z

- Zonule of Zinn – Johann Gottfried Zinn

17.2 See also

- List of eponymous diseases
- List of eponymous medical signs
- List of eponymous medical treatments
- Lists of etymologies
- Human anatomy
- List of anatomical topics

17.3 External links

- Whonamedit, name origins in the medical field

Chapter 18

List of muscles of the human body

This is a table of muscles of the human anatomy.

There are approximately 642 skeletal muscles within the typical human, and almost every muscle constitutes one part of a pair of identical bilateral muscles, found on both sides, resulting in approximately 320 pairs of muscles, as presented in this article. Nevertheless, the exact number is difficult to define because different sources group muscles differently, e.g. regarding what is defined as different parts of a single muscle or as several muscles. Examples range from 640 to 850.[1]

The muscles of the human body can be categorized into a number of groups which include muscles relating to the head and neck, muscles of the torso or trunk, muscles of the upper limbs, and muscles of the lower limbs.

The action refers to the action of each muscle from the standard anatomical position. In other positions, other actions may be performed.

These muscles are described using anatomical terminology.

18.1 Head

18.1.1 Scalp/Eyelid

18.1.2 Extraocular muscles

18.1.3 Intraocular

18.1.4 Ear

18.1.5 Nose

18.1.6 Mouth

18.1.7 Mastication

18.1.8 Tongue

Extrinsic muscle

Intrinsic

18.1.9 Soft palate

18.1.10 Pharynx

18.1.11 Larynx

18.2 Neck

18.2.1 Cervical

18.2.2 Suprahyoid

18.2.3 Infrahyoid/Strap

18.2.4 Vertebrate

Anterior

Lateral

Posterior

| obliquus capitis superior || lateral mass of atlas|| lateral half of the inferior nuchal line || || suboccipital nerve || || |-valign="top" |- | inferior || spinous process of the axis || lateral mass of atlas || || suboccipital nerve || || |}

18.3 Torso

18.3.1 Back

18.3.2 Chest

18.3.3 Abdomen

18.3.4 Pelvis

18.3.5 Perineum

18.4 Upper limbs

18.4.1 Vertebral column

18.4.2 Thoracic walls

18.4.3 Shoulder

18.4.4 Arm

Anterior compartment

Posterior compartment

18.4.5 Forearm

Anterior compartment

Superficial

Deep

Posterior compartment

Superficial

Deep

18.4.6 Hand

Lateral volar

Thenar

Medial volar

Intermediate

18.5 Lower limb

18.5.1 Iliac region

18.5.2 Gluteal

18.5.3 Thigh

anterior compartment

posterior compartment/hamstring

medial compartment

18.5.4 Leg

anterior compartment

posterior compartment

Superficial

Deep

lateral compartment

fibularis muscles:

18.5.5 Foot

Dorsal

Plantar

1st layer

2nd layer

3rd layer

4th layer

18.6 Innervation overview

Mind Map showing a summary of Upper Limb Muscle Innervation

Mind Map Showing a summary of Lower Limb Muscle innervation

18.7 See also

- Accessory muscle

18.8 Notes

[1] Enotes

[2] exrx.net

[3] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 193

[4] Gosling *et al.* 2008, p. 200

[5] Essential Clinical Anatomy. K.L. Moore & A.M. Agur. Lippincott, 2 ed. 2002. Page 217

[6] Gosling 2008, p. 273

[7] Gosling et al. 2008, p. 266

[8] *MedicalMnemonics.com*: 255

18.9 References

- http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/dissector/muscles/muscles.html
- http://www.ptcentral.com/muscles/
- http://www.rad.washington.edu/atlas2/

18.10 External links

- Tutorial & Quizzes on Skeletal Muscular Anatomy
- Muscles of human body also at

18.11 Text and image sources, contributors, and licenses

18.11.1 Text

- **Human body** *Source:* http://en.wikipedia.org/wiki/Human%20body?oldid=635569987 *Contributors:* Borisporosin, Darkwind, Julesd, Samw, Raven in Orbit, RodC, Ke4roh, Schutz, SchmuckyTheCat, Centrx, Peoplesyak, Jackol, John Abbe, OverlordQ, Kaldari, Mike Rosoft, Discospinster, Vsmith, HCA, Xezbeth, Bender235, Rubicon, Neko-chan, Pablo X, Fallingwithstyle, Arcadian, Giraffedata, Pacula, MPerel, Alansohn, Eric Kvaalen, Mysdaao, Velella, RJFJR, SteinbDJ, Stemonitis, Henrik, TigerShark, MONGO, Tslocum, Mendaliv, Phillipedison1891, Ketiltrout, Sjö, Jake Wartenberg, Gurch, Kolbasz, Peter1219, King of Hearts, Chobot, Fwed66, Brandmeister (old), RussBot, Devahn58, ONEder Boy, Peter Delmonte, Carl Daniels, Moe Epsilon, RL0919, Nick C, Semperf, Daqron, Zzuuzz, Jacklee, Modify, Reader781, Jaranda, Mejor Los Indios, DVD R W, Snalwibma, SmackBot, Sticky Parkin, Gnangarra, Edgar181, Gilliam, Ohnoitsjamie, Skizzik, Hraefen, TimBentley, Jprg1966, Gh0sT, DHN-bot, Darth Panda, Abyssal, Danielkueh, Snowmanradio, Addshore, RedHillian, Makemi, Dreadstar, Rramir16, Eliyak, Ergative rlt, Buchanan-Hermit, Butko, Aleenf1, IronGargoyle, Doczilla, Jose77, Avant Guard, SmokeyJoe, BranStark, Iridescent, Mclowes, ChaoticLlama, Igoldste, Ouzo, Courcelles, Namiba, The Letter J, DKqwerty, Infinium, JForget, Chmee2, Hemlock Martinis, Fnlayson, Kanags, Gogo Dodo, Was a bee, Anthonyhcole, JFreeman, Eu.stefan, Skittleys, Patrickjoel, DumbBOT, Alaibot, Krylonblue83, Mattisse, Epbr123, Qwyrxian, Marek69, John254, Neil916, Yettie0711, Cool Blue, Ralphyde, Escarbot, PicklePower, Kylemcinnes, Luna Santin, Seaphoto, Osubuckeyeguy, Jj137, Res2216firestar, JAnDbot, Leuko, Hut 8.5, Acroterion, Magioladitis, Bongwarrior, VoABot II, JNW, Rivertorch, Waacstats, Rabblemaster, Catgut, Ben Ram, Allstarecho, DerHexer, Lenticel, Hbent, Wassupwestcoast, MartinBot, Ultraviolet scissor flame, Mschel, CommonsDelinker, Nono64, Pekaje, Ash, Tgeairn, Erkan Yilmaz, Manticore, J.delanoy, CFCF, Trusilver, JamesR, Uncle Dick, Derlay, Enuja, Mikael Häggström, Dmitri Yuriev, Chiswick Chap, Coin945, NewEnglandYankee, Tatrgel, DigitallyBorn, Myson45, Toxic Ninja, Treisijs, Delparnel, Bonadea, Pdcook, Homologeo, Squids and Chips, Idioma-bot, Spellcast, Wikieditor06, VolkovBot, CWii, Lear's Fool, Philip Trueman, DoorsAjar, TXiKiBoT, Tavix, Sean D Martin, Someguy1221, Sopastar, בל יבול, SayinHelloWorld, Pentalogue, Burntsauce, Cnilep, AlleborgoBot, Symane, Logan, Savardlibrary-wiki, DigitalC, Strombollii, SieBot, Servant Saber, Mycomp, יוסי, Hertz1888, Yintan, Vanished user 82345ijgeke4tg, Lamilli, Keilana, Xenophon777, Flyer22, Oda Mari, Aruton, Bijan588, Steven Zhang, IdreamofJeanie, Sunrise, Kudret abi, OKBot, Jako Spacko, X-x-blonde-x-x, Tobi4242, Jons63, Explicit, Rendog10, Sfan00 IMG, ClueBot, NickCT, Deviator13, Snigbrook, The Thing That Should Not Be, Rjd0060, Kyouraku-taichou, HealthComm, DanielDeibler, J8079s, Blanchardb, Ficbot, Dillion1231, Pointillist, Judo950, Tommy08, DragonBot, Factman00, PAH Page, Excirial, Alexbot, Pachcool4, Steamroller Assault, Iner22, MorrisRob, NuclearWarfare, Singhalawap, Jsparrish, Pat2293, Taranet, Thingg, Raggerty, Johnuniq, HumphreyW, BarretB, XLinkBot, AndreNatas, Avoided, WikHead, Donjondonjon, NellieBly, Alexius08, RyanCross, Draconius14, Kolotripa, Addbot, Morgen229, Yoenit, Ronhjones, Fieldday-sunday, Glane23, Favonian, The red weasel, Tide rolls, Gail, Funnyduds, Jarble, LuK3, Legobot, Luckas-bot, ZX81, Yobot, Qwerty61, Xhellxringerx, Froglogan, D.3emad, Maxí, AnakngAraw, AnomieBOT, DerPaul, Hairhorn, Jim1138, IRP, Piano non troppo, Kingpin13, Dinesh smita, RandomAct, Materialscientist, GapZeen, Flea10, LilHelpa, Shhimsilent, Librarotator, BalticPat22, Xqbot, Aryoadeh, Oldmanwholoves, The sock that should not be, Termininja, Niamh Taylor, Warrior 55, Skarl the Drummer, Omnipaedista, Gott wisst, Moxy, Natural Cut, Shadowjams, Erik9, Thehelpfulbot, Crying347, Prari, April101101, King of grime, Michael93555, ReneVenegas95, CT4418, Katelinds, Bfmbridge, Lautkyle1, Åkebråke, Apples34, Ahmed7172, Pinethicket, I dream of horses, Diomedea Exulans, Manuvidya, Bighairysloppyjohnson, Rident, Juggalohatchet93, Joe de Coy, FlamingTurd, Olli, Yunshui, Vrenator, Jhenderson777, Minimac, EngineerFromVega, Jfmantis, Onel5969, Mean as custard, Pi zza314159, Hajatvrc, Salvio giuliano, Donkeybollocksokay, WikitanvirBot, Immunize, Akhil.aggarwal2, ScottyBerg, Pity d foo, Pio35, Tommy2010, K6ka, Elijah12321, Leontom2108, Jules18z, Akerans, Wackywace, Empty Buffer, Ganesh Paudel, Elektrik Shoos, Congin123, H3llBot, AndrewN, Mr edit man 2, Cit helper, Rcsprinter123, Nahbios, L Kensington, Lifeisgoodnow, Donner60, IamtheLOL, Lasyat, Peter Karlsen, ClueBot NG, Mrviet90, Erik Lönnrot, Gubbzzzz, Morgankevinj huggle, LOLgalizz, Satellizer, Movses-bot, Junkyfartz, Asexual, Asukite, Widr, Antiqueight, Helpful Pixie Bot, Ren Riot, BG19bot, Battyofsteel, Nico celticfc, AvocatoBot, Amp71, Jeff1678, Altaïr, Min.neel, Ricordisamoa, NotWith, Brad7777, Glacialfox, Alnaimi22, Oleg-ch, Poljuan, 4Jays1034, Kyle12951, Tom Field, Biosthmors, HueSatLum, KATANAGOD, The Illusive Man, ChrisGualtieri, J1ozone17, Mediran, YFdyh-bot, TheJJJunk, SahilSahadevan, JYBot, Ashleighpaigeh, BearMan998, Webclient101, Mogism, RexRowan, JakobSteenberg, XtremeUser6000, Sfgiants1995, OakRunner, Hmdpsych, Trooperroger, Erectz, Faizan, Haydosslive, Xzaviur, Michipedian, Iztwoz, Eyesnore, Tyler102702, ????, Cloudyjbg27512, LT910001, My-2-bits, Sam Sailor, JEMZ1995, Huasostehd, FITNESS 4 EVER, Meteor sandwich yum, Cookiemonster122191, Londonheathrow, Geotakhm, Bmwkoop, Juliansilvestre, Slimyduck, Mariean2net, Bilorv, Concord hioz, Monkbot, Bria holthe, Josephine Serovich, Dsteinharter, BethNaught, Mama meta modal, Trackteur, Sara sarah92, Neurodavid2014, MichelleSmith8, Adephiladex, Surya002, Delvalleiv, DSmanveer, Ogbobbyjohnson23, Rapgod 2 and Anonymous: 598
- **Anatomical terminology** *Source:* http://en.wikipedia.org/wiki/Anatomical%20terminology?oldid=633481064 *Contributors:* Bull-Rangifer, CFCF, Mikael Häggström, AnomieBOT, Animalparty, ClueBot NG, BG19bot, DPL bot, Khazar2, Aftabbanoori, LT910001, Forcefully, Monkbot, Lephalala and Anonymous: 8
- **Human skeleton** *Source:* http://en.wikipedia.org/wiki/Human%20skeleton?oldid=635561625 *Contributors:* Alex.tan, Enchanter, Karen Johnson, Graft, Heron, Someone else, Patrick, Ixfd64, Sannse, Nightbringer, Arpingstone, Gjbloom, Ihcoyc, Theresa knott, Darkwind, Julesd, Tristanb, Raven in Orbit, Ec5618, Dragons flight, SEWilco, Traroth, Fvw, Renato Caniatti, Raul654, Robbot, Pingveno, Academic Challenger, Reytan, Cyrius, Cutler, Giftlite, Smjg, Pmaguire, Nunh-huh, Ævar Arnfjörð Bjarmason, Fastfission, Zigger, Xerxes314, SoCal, Everyking, Yekrats, Erich gasboy, Alexf, Antandrus, OverlordQ, MisfitToys, Jossi, Kesac, DragonflySixtyseven, Karl-Henner, DomCleal, Joyous!, Trevor MacInnis, Eisnel, Bornintheguz, Discospinster, Rich Farmbrough, Number 0, Corvun, Calair, RoyBoy, Causa sui, Bobo192, Arcadian, Jag123, Nsaa, Jjron, Alansohn, Arthena, Rd232, Keenan Pepper, BodyTag, Snowolf, Velella, Ronark, Fourthords, Bsadowski1, Cphi, George Hernandez, Woohookitty, Kurzon, WadeSimMiser, The Wordsmith, Chochopk, Kelisi, LadyofHats, Cyberman, Mandarax, Voxhumana, Rjwilmsi, Aximilli, HandyAndy, Nneonneo, Crazynas, TBHecht, Sango123, Yamamoto Ichiro, FlaBot, RobertG, RexNL, Benanhalt, Ahunt, VolatileChemical, Elfguy, The Rambling Man, Borgx, Jimp, Spaully, Witan, Chris Capoccia, Crism, Iamdalto, Eleassar, Wimt, Shanel, NawlinWiki, Slodave, PhilipO, Raven4x4x, Samir, Mieciu K, Kkmurray, Nick123, Wknight94, Epiq, Lyhana8, Closedmouth, Adilch, Urocyon, Bob Hu, Allens, Junglecat, Crystallina, True Pagan Warrior, SmackBot, Unschool, KHenriksson, Person man345, Slashme, KnowledgeOfSelf, Mdd4696, Edgar181, HalfShadow, Yamaguchi??, Gilliam, Skizzik, Bluebot, Persian Poet Gal, RayAYang, Can't sleep, clown will eat me, Snowmanradio, Pmkazouris, TheKMan, Addshore, Decltype, SnappingTurtle, MiniGeek, DMacks, LeoNomis, Kukini, NikoSilver, Kuru, John, Dilip gerba, Shlomke, Goodnightmush, Majorclanger, Ckatz, Shoraru, Slakr, Booksworm, Kizzatp, Novangelis, Fredwerner, Kvng, Xionbox, Sifaka, Pandacantante, DouglasCalvert, HisSpaceResearch, UncleDouggie, DavidOaks, Blehfu, Courcelles, Tawkerbot2, Jaeger5432, Lolabear101, KnightLago, THF, NickW557, .mdk., Anthony Bradbury, Samuell, Fair Deal, Drybittermelon, Anthonyhcole, DangApricot, Kazubon, Shirulashem, Dougweller, Christian75, DumbBOT, JodyB, Epbr123, Qwyrxian, Dimensio, Yzmo, Marek69, John254, NorwegianBlue, Doyley, Xycl0ne, Mentifisto, Hmrox, AntiVandalBot, Luna Santin, Ope-

lio, QuiteUnusual, Dr. Blofeld, Gdo01, Figma, Joehall45, MikeLynch, Res2216firestar, JAnDbot, MER-C, Hut 8.5, PhilKnight, Bongwarrior, VoABot II, AtticusX, Firebladed, WeatherExperiment, Avicennasis, Bubba hotep, Catgut, DerHexer, Patstuart, Hdt83, MartinBot, Grandia01, Church of emacs, Red Sunset, Anaxial, Mschel, Kostisl, CommonsDelinker, Nono64, LedgendGamer, 3dscience, Lt7662, Tgeairn, Slugger, J.delanoy, Pharaoh of the Wizards, Nev1, CFCF, Trusilver, Rgoodermote, Stew1223, Barts1a, Alcashion, Mikael Häggström, Coin945, NewEnglandYankee, Urzadek, Heero Kirashami, KylieTastic, Cometstyles, STBotD, Daredeval756, Uhai, APoincot, U.S.A.U.S.A.U.S.A., Vanished user 39948282, Dzenanz, Ja 62, Vinsfan368, Rebondir, Black Kite, Meiskam, 28bytes, VolkovBot, CWii, ABF, Thisisborin9, Trilinguist, Jeff G., Scipex, Ryan032, Thabit.pulak, Philip Trueman, TXiKiBoT, Philaweb, Technopat, Ann Stouter, Qxz, Bigrogerhyde, Clarince63, Seraphim, DennyColt, Corvus cornix, Jackfork, LeaveSleaves, Raymondwinn, BotKung, The unknownEX, Dirkbb, Meters, Synthebot, Monty845, Pastel kitten, Doc James, Nagy, Noisyschmidty, IndulgentReader, D. Recorder, Artypants, Dark john, Vpetite, SieBot, Tobermory6, Kyewei, Yintan, Falcofire, Rajiv1096, Cooladoola, Keilana, Reggiethegeek, Guycalledryan, Aruton, Brian R Hunter, Oxymoron83, Poindexter Propellerhead, Escape Artist Swyer, Alex.muller, Lozano5, Dillard421, Svick, Maderibeyza, StaticGull, Witchkraut, WikiLaurent, Ebnezar, Pinkadelica, Tanvir Ahmmed, Beeblebrox, De728631, Animeronin, ClueBot, Snigbrook, CaptainJae, The Thing That Should Not Be, Quinxorin, Lordqaz, Arakunem, Pirouette12345, EdibleKarma, Uncle Milty, Polyamorph, CounterVandalismBot, Leodmacleod, Gioku, Aua, Excirial, Jusdafax, Vivio Testarossa, Sklmsta, Cenarium, Iohannes Animosus, Zuzzerack, Coccyx Bloccyx, The Red, Mikaey, Thehelpfulone, La Pianista, Another Believer, Bald Zebra, Thedarkjedicat, Aitias, Versus22, Dana boomer, BlueDevil, Johnuniq, SoxBot III, Segovia69, Jmanigold, Rror, Dthomsen8, Facts707, Skarebo, WikHead, HarlandQPitt, MystBot, Zodon, Ajacques1951, Cmungall, Ooft, Jadtnr1, Addbot, ConCompS, Some jerk on the Internet, Goalsleft090, DOI bot, Haruth, TutterMouse, Jncraton, Fieldday-sunday, D0762, CanadianLinuxUser, Fluffernutter, CarsracBot, Glane23, Favonian, Christopher140691, West.andrew.g, 5 albert square, Tyw7, Crazy monkey1001, Numbo3-bot, Tide rolls, Apteva, Jarble, Lvsthrd, Alfie66, Chaldor, Luckas-bot, Yobot, 2D, Kartano, Tohd8BohaithuGh1, Fraggle81, Paepaok, Mmxx, THEN WHO WAS PHONE?, Goomba316, South Bay, Daniel 1992, Eric-Wester, Tempodivalse, Synchronism, AnomieBOT, Killiondude, Jim1138, AdjustShift, Kingpin13, Law, Ulric1313, Babajide23445, Materialscientist, Dendlai, Ennen, The High Fin Sperm Whale, Citation bot, Maxis ftw, Xqbot, Cuba. What a country, Capricorn42, Renaissancee, Tyrol5, Abce2, АлександрВв, Auxiliary Watchlist, Brandon5485, RibotBOT, Mathonius, Doppo145, Natural Cut, A.amitkumar, Dougofborg, Griffinofwales, Rooji11, George2001hi, FrescoBot, Tangent747, Amilnerwhite, Recognizance, HJ Mitchell, PantherFudge, HamburgerRadio, Citation bot 1, Amplitude101, Tocant, AstaBOTh15, Pinethicket, HRoestBot, MJ94, A8UDI, Jschnur, MastiBot, Brocam11, Jujutacular, Reconsider the static, FoxBot, Nomicks4899, Fama Clamosa, Vrenator, Lkjh0987, SeoMac, Diannaa, Rzuwig, Suffusion of Yellow, Tbhotch, Lord of the Pit, Keegscee, DARTH SIDIOUS 2, Bpavlakis, TjBot, Bento00, DexDor, 123Mike456Winston789, Hajatvrc, DASHBot, EmausBot, GeneralCheese, Immunize, Gfoley4, Heracles31, Ryan5091, RA0808, Tommy2010, Wikipelli, K6ka, IntensifyIt, Capybara123, ZéroBot, Josve05a, Bollyjeff, Lateg, ElationAviation, Cobaltcigs, Fuc dis sht, Ocaasi, Rcsprinter123, Lothar Klaic, Brandmeister, NYMets2000, Xephis11, Donner60, مراجد الزايدي, Kochankalappu, Lizaweb, DASHBotAV, 28bot, Monkeysbum, Petrb, Gwen-chan, ClueBot NG, This lousy T-shirt, Mattsnow81, Snotbot, Reedman72, Cntras, Jameslovely, Asukite, Ilurvhistury, Widr, WikiPuppies, Vibhijain, Diyar se, Helpful Pixie Bot, Theill6, Iste Praetor, Calabe1992, Martinkqwerty, Irtotalythecooliesdudealive, Cpillay2, Kinaro, Lowercase sigmabot, BG19bot, Northamerica1000, Wiki13, Xxstertoka99, Kackiearribas, Lilyonthesand, Dipankan001, Palirohan, Tiffanybn, Snow Blizzard, NotWith, Ms Mystical, Davidude666, Glacialfox, Minsbot, Klilidiplomus, Shaun, Agent 78787, Biosthmors, Riley Huntley, HueSatLum, Hghyux, W.D., Mrt3366, ChrisGualtieri, Ngoquangduong, Trollingtoiletpaper, EuroCarGT, Fartach123, Ekren, MadGuy7023, JYBot, Dexbot, Janga Tsunami 5598, Gdsafasgfdsg, Safihospfhsp, Jkfashlfhaskulf, GREATBURRITO, RichardYule, Lugia2453, JakobSteenberg, Bem Estrella, Epicgenius, JPaestpreornJeolhlna, Melonkelon, Everymorning, Wikiuser13, Clelia albano, LT910001, Ginsuloft, Victaco, Lizia7, MSRoodvoets, Simplysavvy, A.leatherd, DualVission, Chaudhrya00, Dan12456, Mclovin39, Csutric, Ryan115, Sipslice11, Monkbot, The serene republic, Constance.martinelli, NickTheRed37 and Anonymous: 1097

- **Table of muscles of the human body/End** *Source:* http://en.wikipedia.org/wiki/Table%20of%20muscles%20of%20the%20human%20body/End?oldid=617718223 *Contributors:* Arcadian, RHaworth, Bgwhite, Malcolma, Timotheus Canens, Skittleys, CFCF, Prhartcom, Temporaluser, Wilhelmina Will, Eeekster, Drpickem and GoingBatty
- **Table of muscles of the human body: Head** *Source:* http://en.wikipedia.org/wiki/List_of_muscles_of_the_human_body?oldid=635579305 *Contributors:* AxelBoldt, Topbanana, Discospinster, Neko-chan, Arcadian, Anthony Appleyard, Cburnett, Rjwilmsi, Slodave, ENeville, Grafen, ONEder Boy, SmackBot, AaronM, Mangoe, Gilliam, J. Spencer, Frap, MegA, Khazar, Rizome, Twas Now, AndrewHowse, Skittleys, Clovis Sangrail, Xantharius, CharlesHoffman, Spencer, JAnDbot, PhilKnight, Plamoa, Magioladitis, VoABot II, EagleFan, Scottalter, Schmloof, R'n'B, Nono64, Adavidb, Mikael Häggström, Belovedfreak, Prhartcom, Zumlin, Juliancolton, Funandtrvl, 28bytes, KC Panchal, Madhero88, Temporaluser, Doc James, Dan Polansky, SieBot, WereSpielChequers, This, that and the other, Radon210, Faradayplank, Manway, Drgarden, ClueBot, Gmreed2, Snigbrook, Niceguyedc, Excirial, Walking Softly, S19991002, Joecalladine, Daughter of Mímir, Addbot, DOI bot, Warpath, Diptanshu.D, Tide rolls, Luckas-bot, Yobot, Ptbotgourou, Fraggle81, Jason Recliner, Esq., A Stop at Willoughby, AnomieBOT, Rubinbot, Jim1138, Materialscientist, Jmarchn, Xqbot, 78.26, SD5, FrescoBot, Pinethicket, I dream of horses, Rushbugled13, Fumitol, Drdad, Reach Out to the Truth, KinkyLipids, John of Reading, Soundedit38, Racerx11, RA0808, Hazard-SJ, Hrvoje1234, Rollgood, Tolly4bolly, Bill william compton, ClueBot NG, Wimpus, Widr, Theopolisme, Craterib, B2322858, Stephenwanjau, Mark Arsten, Bonechamber, NotWith, EricEnfermero, Ducknish, Hilmorel, JakobSteenberg, Sriharsh1234, I am One of Many, Mutley1989, Daregym, LT910001, Akelly10, Addie.trif, BRUZZO and Anonymous: 175
- **Table of muscles of the human body: Neck** *Source:* http://en.wikipedia.org/wiki/List_of_muscles_of_the_human_body?oldid=635579305 *Contributors:* AxelBoldt, Topbanana, Discospinster, Neko-chan, Arcadian, Anthony Appleyard, Cburnett, Rjwilmsi, Slodave, ENeville, Grafen, ONEder Boy, SmackBot, AaronM, Mangoe, Gilliam, J. Spencer, Frap, MegA, Khazar, Rizome, Twas Now, AndrewHowse, Skittleys, Clovis Sangrail, Xantharius, CharlesHoffman, Spencer, JAnDbot, PhilKnight, Plamoa, Magioladitis, VoABot II, EagleFan, Scottalter, Schmloof, R'n'B, Nono64, Adavidb, Mikael Häggström, Belovedfreak, Prhartcom, Zumlin, Juliancolton, Funandtrvl, 28bytes, KC Panchal, Madhero88, Temporaluser, Doc James, Dan Polansky, SieBot, WereSpielChequers, This, that and the other, Radon210, Faradayplank, Manway, Drgarden, ClueBot, Gmreed2, Snigbrook, Niceguyedc, Excirial, Walking Softly, S19991002, Joecalladine, Daughter of Mímir, Addbot, DOI bot, Warpath, Diptanshu.D, Tide rolls, Luckas-bot, Yobot, Ptbotgourou, Fraggle81, Jason Recliner, Esq., A Stop at Willoughby, AnomieBOT, Rubinbot, Jim1138, Materialscientist, Jmarchn, Xqbot, 78.26, SD5, FrescoBot, Pinethicket, I dream of horses, Rushbugled13, Fumitol, Drdad, Reach Out to the Truth, KinkyLipids, John of Reading, Soundedit38, Racerx11, RA0808, Hazard-SJ, Hrvoje1234, Rollgood, Tolly4bolly, Bill william compton, ClueBot NG, Wimpus, Widr, Theopolisme, Craterib, B2322858, Stephenwanjau, Mark Arsten, Bonechamber, NotWith, EricEnfermero, Ducknish, Hilmorel, JakobSteenberg, Sriharsh1234, I am One of Many, Mutley1989, Daregym, LT910001, Akelly10, Addie.trif, BRUZZO and Anonymous: 175
- **Axial skeleton** *Source:* http://en.wikipedia.org/wiki/Axial%20skeleton?oldid=632921680 *Contributors:* Fuelbottle, Everyking, Brockert, Grunt, Markalex, Discospinster, Susvolans, Arcadian, Alansohn, Pinar, Supine, Cburnett, George Hernandez, LadyofHats, Chobot, Drumex, BigCow, Syrthiss, Samir, Open2universe, CIreland, JDCMAN, SchfiftyThree, DO11.10, Kvng, Dj empirical, Nilfanion, Antho-

nyhcole, Dark Samus, Aldis90, Epbr123, John254, VoABot II, MartinBot, Nono64, CFCF, Complete fanatic, Uncle Dick, Bailo26, Gregfitzy, KylieTastic, Funandtrvl, Cireshoe, Jeff G., WOSlinker, Philip Trueman, TXiKiBoT, Lxs602, Jackfork, MrChupon, SieBot, Augustus Rookwood, AS, BabyJonas, Aillema, Flyer22, Harry, Rhcastilhos, Cyfal, Pinkadelica, Drgarden, ClueBot, Bowden1029, Wikitumnus, La Pianista, Kikos, Alchemist Jack, Nutsybunny, Addbot, Fieldday-sunday, Lindert, Tide rolls, Teles, 2D, Materialscientist, Yupimanoob, OllieFury, Roux-HG, ArthurBot, Scottybunts, Auxiliary Watchlist, FrescoBot, Locomocn, HRoestBot, Hoo man, Doitenberg, Dusty777, AlFReD-NSH, Akerans, Wayne Slam, DASHBotAV, ClueBot NG, Frietjes, Chickenface99, Titodutta, Frze, Tutelary, JakobSteenberg, JamesMoose, Tentinator, Glaisher, LT910001, BruceBlaus, Joelickscake, Rightingwords, Anon685, Kingsta3939, C759 and Anonymous: 149

- **Superior thoracic aperture** *Source:* http://en.wikipedia.org/wiki/Superior%20thoracic%20aperture?oldid=634717217 *Contributors:* Taoster, Arcadian, Wouterstomp, Gurch, RussBot, Trovatore, SmackBot, Jfurr1981, Bluebot, Mattopaedia, CmdrObot, Barticus88, CFCF, Prhartcom, DRAJ 25, TXiKiBoT, Addbot, Skyerise, Victor.khoo76, Inferior Olive, Twinglemimi, WikitanvirBot, ClueBot NG, Frietjes, Iztwoz, LT910001 and Anonymous: 11

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