

Words and the anatomical position

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Overview

Studying the medical sciences involves learning a new language, more than half of which is anatomical. A brief excursion into words and grammar is both desirable and necessary, and Table 2.1 gives some of the most commonly occurring words, prefixes and suffixes that you are unlikely to have met before in this context.

Learning Objectives

You should:

- be able to describe and demonstrate the anatomical position
- be able to demonstrate planes: coronal, sagittal, transverse
- have a reasonable working knowledge of the terms in Table 2.1
- try to discern the different components of medical and anatomical terms.

2.1 Anatomical position

Many words and descriptions assume the use of a standard position in relation to which surfaces and movements are defined. This is the anatomical position in which the body is pictured as standing erect with the palms of the hands facing forwards. This reference position is used irrespective of posture: your hand is *always* distal to your elbow, and your head *always* superior to your chest, even if you are upside down.

Relations: caution!

This word is used a great deal. It simply means geographical neighbours and it passes no comment on similarity. Related structures might be similar (e.g.

arch of aorta and pulmonary artery), or they might not (arch of aorta and left main bronchus). The oesophagus is related to the left atrium of the heart – they are close neighbours (and this may matter clinically), but they are dissimilar in form and function.

Planes and movements (Figs 2.1 and 2.2)

Study Figures 2.1 and 2.2 and understand the meaning of the terms: you will need them in clinical work.

2.2 Singular and plural

Many anatomical and medical words are from Latin and Greek with plurals that are formed in ways other than by simply adding 's' or 'es'. A few of the more obvious examples are given in Table 2.2. Refer back to this table as necessary: as you become more familiar with its contents, you will be able to predict the meanings of new words when you encounter them for the first time.

2.3 Colloquial or correct?

When you stand in the anatomical position, your head is superior to your chest. In everyday language you say that your head is above your chest. Strict anatomists frown at colloquialisms like this, but they are in common use. In this book I switch between correct and colloquial terms as seems most natural to me. On the whole, I prefer the colloquial in the hope that readability is more important than pedantic fastidiousness. You need to remember, though, that the matter takes on great importance when the patients are lying down, as they so often are.

Table 2.1 Commonly used words, prefixes and suffixes

Term	Meaning and example
ab-	Away from. Abduct: move away from midline
ad-	Towards. Adduct: move towards midline
adeno-	Related to glands
afferent	Travelling towards. Afferent nerve impulse: towards the brain and spinal cord
anastomosis	Network (usually arteries or veins) receiving inputs from more than one source (plural: anastomoses)
anterior	Front (with reference to anatomical position); see ventral
-blast	Primitive cell or structure which gives rise to other cell type or structure. Osteoblast: primitive bone-forming cell. See-cyte
brachial	Pertaining to the arm (shoulder–elbow)
branchial	Associated with the entrance to the digestive system derived from primitive buccopharyngeal structures. Branchial structures are the successors of the gill apparatus in fish
bronchial	Pertaining to the bronchi
cancer	Malignant tumour
carcinoma	Cancer of epithelial (rather than connective tissue) origin
cardiac, -um	Heart
caudal	Nearer the tail (or where it would be). The kidneys are caudal to the diaphragm
cephalic	Nearer to, or pertaining to the head
coronal	Side-to-side plane which divides the structure into a front portion and a rear portion (not necessarily equal)
cranial	Nearer the head
-cyte	Cell. Mature cell type. Osteocyte: cell type found in bone. See -blast
deep	Far, or further, from the surface (see superficial)
distal to	Further away from. The foot is distal to the thigh (see proximal)
dorsal	Towards the back (with reference to anatomical position); similar to posterior in erect humans
-ectomy	Removal. Appendectomy: removal of the appendix
efferent	Travelling away from. Efferent nerve impulse: away from the central nervous system
endo-	On the inside of. Endocardium: lining of the heart. Endometrium: lining of the uterus. Endoscopy: looking inside
endocrine	Secretion by a cell into its blood vessels (see exocrine)
epi-	On the surface of. Epithelium: all external surfaces. Epidermis: the epithelium of the skin
eversion	Turning the sole of the foot outwards (laterally)
ex-	Out of
exocrine	Secretion by a cell or group of cells into a duct for transport elsewhere (see endocrine)
extend	(Usually) straighten
extra-	Outside. Extracapsular: outside the capsule
fascia	Two meanings: Loose connective and fatty tissue, of variable thickness: superficial fascia, prevertebral fascia Fairly tough sheath or membrane: deep fascia, clavipectoral fascia
fasciculus	Group of axons of nerves all serving similar functions (same as tract)

Table 2.1 (Cont'd)

Term	Meaning and example
flex	(Usually) bend
fistula	Artificial connection between two epithelial tubes
foramen	Opening or passage, often through bone
fossa	Depression, hollow, pit
ganglion	A swelling. In the context of the nervous system, its commonest usage, a ganglion is a collection of nerve cell bodies in the peripheral nervous system. It may be a sensory ganglion (without synapses), or an autonomic ganglion (with synapses). See nucleus
gyrus	Eminence of brain tissue between two sulci (see sulcus)
haemo-	Blood. Haemostasis: stagnation or sluggish flow of blood
hiatus	Gap, opening
hilum	Place where vessels and nerves enter
hyper-	Above, increase. Hyperplasia: increased cell division. Hypertrophy: increase in size (see hypo-)
hypo-	Below, decrease. Hypogastric: under the gastric area. Hypoplasia: decrease in cell division (see hyper-)
inferior	Below (with reference to anatomical position)
infundibulum	Funnel, funnel-like part of cavity
inter-	Between
intra-	Inside. Intracapsular: inside the capsule
inversion	Turning the sole of the foot inwards (medially)
-itis	Inflammation. Gastritis: inflammation of the stomach. Arthritis: inflammation of joint
lapar-	Abdomen. Laparoscopy: looking inside the abdomen. Laparotomy: opening the abdomen
lateral	Further from the midline (see medial)
ligament	Connective tissue tying together two or more structures (usually)
limbus	Edge, rim. Limbus of foramen ovale
lumen	Central cavity of a tube (artery, vein, intestine, etc.)
meatus	Pathway or passage
medial	Nearer the midline (see lateral)
median	In the midline
meso-	Between
metrium	Uterus. Myometrium: uterine muscle; endometrium: uterine lining
mucus	Sticky liquid produced by glands. Mucus is a noun (see below)
mucous	Sticky (see serous): this is an adjective (see above)
myo-	Muscle. Myocardium: muscle of the heart
nucleus	In the context of the nervous system, a nucleus is a collection of cell bodies in the central nervous system (brain and spinal cord), all with a similar function. See ganglion
-oma	Swelling (tumour, not necessarily malignant). Lipoma: tumour of fat. Osteoma: bone tumour. Lymphoma: tumour of lymphoid tissues. Melanoma: tumour of cells containing melanin. And so on. Carcinoma: malignant tumour of epithelial (surface) derivatives. Sarcoma: malignant tumour of connective (non-surface) tissue (bone, muscle, fat)

Table 2.1 (Cont'd)

Term	Meaning and example
-ostomy	Making a permanent opening. Colostomy: permanent (or semipermanent) opening of the colon on to the abdominal surface. Tracheostomy: permanent (or semipermanent) opening into the trachea
-otomy	Making a small hole or temporary (e.g. emergency) opening. Laryngotomy: emergency opening into larynx
para-	By the side of, alongside. Paravertebral: by the side of the vertebral column
parietal	Concerning the walls of a cavity
peri-	Around or near. Periosteum: membrane covering the surface of bone
plexus	Network
posterior	Behind or rear (with reference to anatomical position); see dorsal
procto-	From proctodaeum – cloacal origin. Proctoscopy: observation of anal canal and terminal rectum
proximal to	Nearer to. The thigh is proximal to the foot. See distal
raphe	Seam. Line of union of separate parts
sagittal	Front-to-back plane which divides the structure into a right portion and a left portion (not necessarily equal)
sarcoma	Cancer of connective tissue (rather than epithelial) origin
serous	Thin, watery (see mucous)
sinus	Cavity or channel
somatic	Of, or derived from, body wall or somites: skeleton, skeletal (voluntary) muscle and associated connective tissue, and the skin and its appendages (breast, sweat glands, hair, nails, teeth). Nerves that supply these structures tend to be under voluntary control (if motor) and sensation from these structures tends to be immediately and precisely perceptible
sphincter	Muscular valve capable of closing a tube
splanchnic	Much the same as visceral – see later (splanchnic is from the Greek, visceral from the Latin. We do not need two terms, but we have them)
squamous	Flattened, scale-like
stasis	Lack of movement, stagnation. Haemostasis: stagnation of blood
synapse	The site where the terminal of one nerve transmits its electrical impulse to another, separate, nerve
sulcus	Gutter, depression
superficial	Near, or nearer, the surface (see deep)
superior	Above (with reference to anatomical position)
tendon	Attaching muscle to bone
tract	Group of axons of nerves all serving similar functions
ventral	Towards the front (belly) (with reference to anatomical position); similar to anterior in erect humans
visceral	Concerning internal organs (viscus, viscera). Nerves that supply these structures tend to be under involuntary control (if motor) and sensation from these structures tends to be vague and imprecisely perceptible or even imperceptible
viscus	Originally, hollow organ, but now used for any internal organ (liver, spleen, etc.)

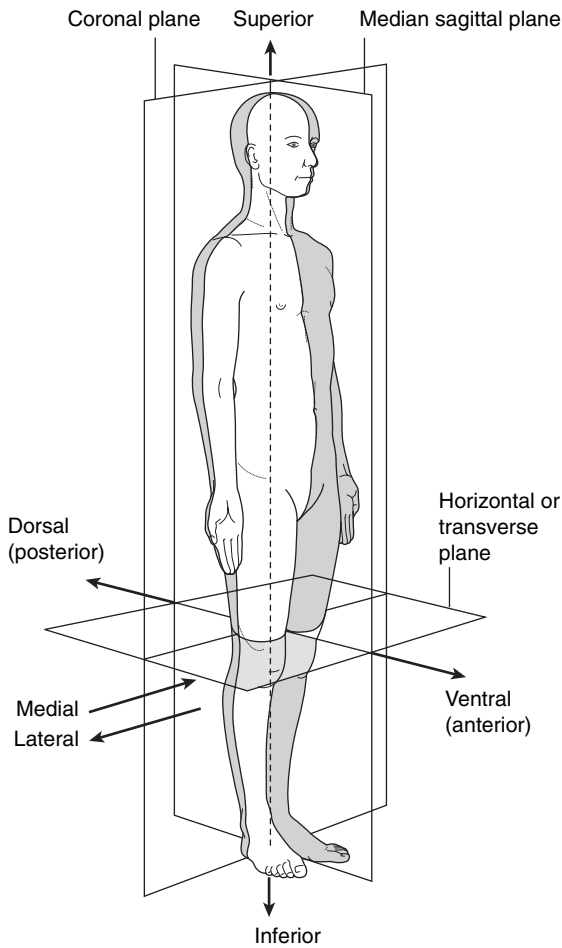


Fig. 2.1 Planes. A plane parallel to the median (sagittal) plane is a parasagittal plane.

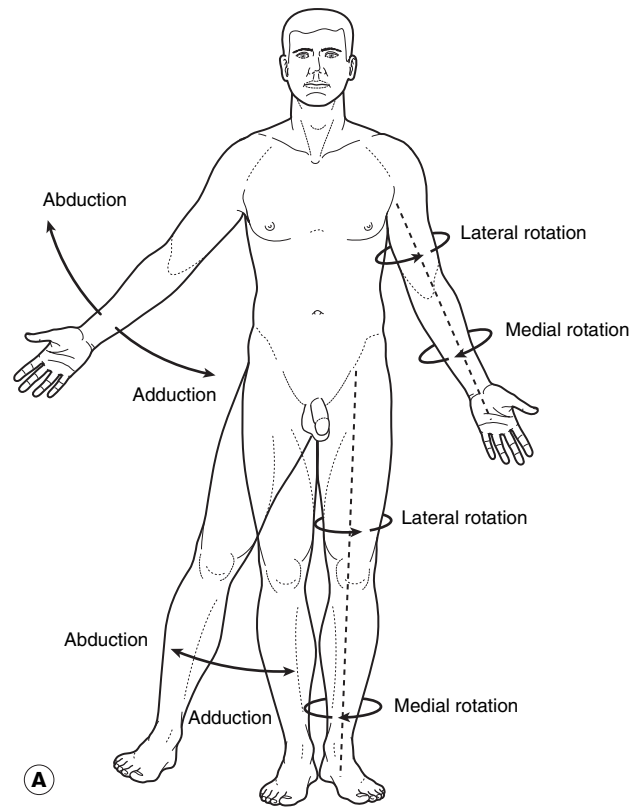


Fig. 2.2 Movements. The terms used in this figure are applicable to most joints, not just those illustrated. The exceptions are pronation and supination (elbow and wrist only), plantarflexion and dorsiflexion (ankle only), and inversion and eversion (foot only). Note that at the knee, flexion is apparently contrary to flexion at the elbow (it is not in fact: there is an embryological explanation for this, as you will see).

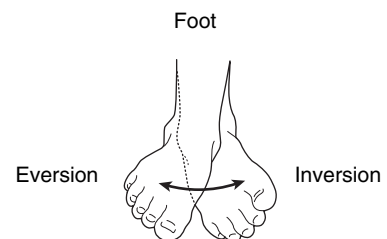
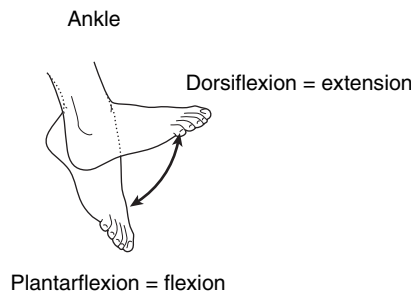
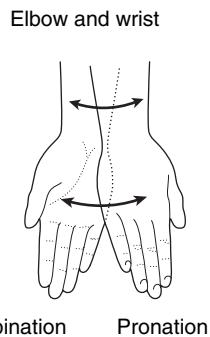
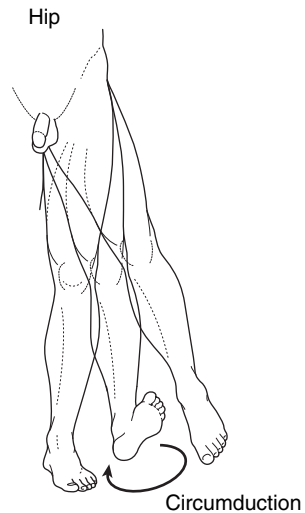
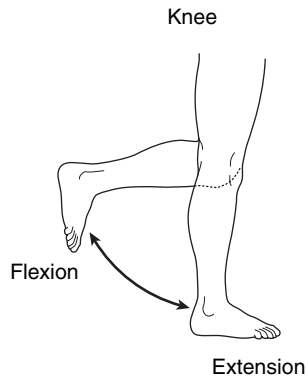
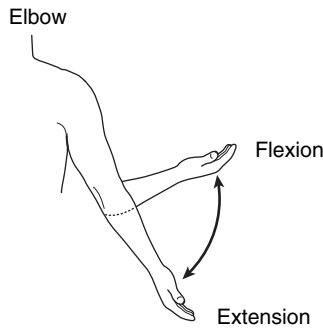


Fig. 2.2 Continued

Table 2.2 Anatomical words: singular and plural

Change in word ending	Examples	
	Singular	Plural
-um to -a	atrium, diverticulum, epithelium, hilum, etc.	atria, diverticula, epithelia, hila, etc.
-a to -ae	bursa, fossa, placenta	bursae, fossae, placentae (but see below)
-us to -i	gyrus, sulcus	gyri, sulci (see below for meatus, plexus)
-is to -es	metastasis, symphysis, testis	metastases, symphyses, testes
Other	foramen ganglion meninx (rarely used) phalanx viscus	foramina ganglia meninges phalanges viscera

Note. Classical languages should not be used wantonly: these words are now English words and so English plurals can be used, I think, wherever possible. The plurals of meatus and plexus are best rendered as meatuses and plexuses: their Latin plurals are meatus and plexus (spelt the same, pronounced differently). But I am not consistent: I prefer bursas to bursae, fossas to fossae, and placentas to placentae, but would not accept diverticulum!