

# The A to Z of Surface Anatomy



Dr A. L. Neill

BSc MSc MBBS PhD FACBS

## Introduction

This book describes the structures which lie beneath the skin which involves a recognition of the surface curves of most skeletal muscles. It ties in well with the *A to Z of Skeletal Muscles*, and of course the *A to Z of the Hair, Nails and Skin*, but all the A to Zs are cross-referenced and together are forming a set covering the all structural elements of the human body. Recently pathology as well as anatomy has been tackled by the A to Zs with The *A to Z of Bone & Joint Failure* the first book to cover the breakdown of the body's structures in this manner, expanding upon the knowledge of the *A to Z of Bones, Joints, Ligaments and the Back*.

Artists have used studied anatomy and surface anatomy to help in their creations – paintings, sculpture etc and it is important in Emergency Medicine to be able to SEE inside the body in a 3 dimensional manner.

If there is a structure/subject you want to see in the A to Zs let us know.  
anatomy.update@gmail.com

We have 2 websites and there maybe others where you can view all images of the A to Zs and any additional material please feel free to examine the new books which may be placed here and to give any suggestions after all it was due to the overwhelming number of requests for this title that this book was written placed:

<http://www.aspenpharma.com.au/atlas/student.htm>

[www.amandasatoz.com](http://www.amandasatoz.com)

## Acknowledgement

Thank you Aspenpharmacare Australia for your support and assistance in this valuable project, particularly Mr. Greg Lan, and Rob Koster. Thank you to all those who have helped when I have been rushed to finish and have made time for this project, and have faith in it, in particular Ante Mihaljevic and Phill Ryman. Thank you everyone who has provided valuable feedback and help in many ways; Richard, Peter, Robbie, Jody, Quentin and there are others too, thank you.

## Dedication

To those who read and use these books and find them helpful.

## How to use this book

The structure of the A to Zs grows and develops with each new book while the principle of listing structures in an alphabetical is maintained. Basic anatomical concepts are placed in the beginning of this book; then measurements and proportions of the body. The role of the Common Terms section is enlarged, illustrated and colour coded.

In this book the images are alphabetical whether they can be seen or not – i.e. the heart cannot be seen but its projection are indicated on the chest – but the tendons of the wrist can be visualized. All structures and regions are listed alphabetically. All entries are cross referenced in the usual manner i.e. see for go to and also see for additional images listed under that heading.

Thank you

**A.L. Neill**

BSc MSc MBBS PhD FACBS

medicalamanda@gmail

ISBN 978-1-921930-17-1

## Table of contents

Introduction	1
Acknowledgement	1
Dedication	1
How to use this Book	2
Table of Contents	3
Abbreviations	7
Common Terms used in Surface Anatomy	9
Anatomical Planes and Relations	17
Movements – general	
Upper limb & shoulder	19
Head, Neck & Back	21
Lower limb and Hip	23
Foot and Hand	24
Hand	
Grips	25
Measurements	27
Proportions and forms of human measurement	29
Human face proportions	31
Human body proportions	33
Vitruvian Man	35
(Symbol of proportionality & derivative of measurements)	

## Index of surface anatomy

Abdomen <i>see also Aorta, Trunk</i>	
dermatomes	37
bones + muscles	39
alimentary - GIT	41
non- alimentary - / liver / pancreas / spleen	43
regions	45
scars - from incisions	47
Adam's apple = Thyroid cartilage <i>see Thyroid</i>	
Adrenals <i>see Back, Trunk</i>	
Anatomical snuff box <i>see Thumb</i>	
Ankle <i>see also Foot</i>	49
Anus <i>see Perineum</i>	
Aorta	51
Appendix <i>see Abdomen GIT</i>	
Arm <i>see also Axilla, Forearm, Shoulder</i>	53
Axilla <i>see also Breast</i>	
bones , muscles boundaries	55
lymph nodes	57

Back	
lower	59
upper	<i>see Chest</i>
Belly	<i>see Abdomen</i>
Belly button	<i>see Abdomen</i>
Bladder	<i>see Kidneys, Pelvis, Uterus</i>
Breast	<i>see also Axilla</i>
arterial	61
lymphatic & venous	62
Buttock	<i>see Gluteum</i>
Caecum	<i>see Abdomen GIT</i>
Carpal tunnel	<i>see Hand</i>
Chest Wall	<i>see also Abdomen, Lungs</i>
great vessels	63
heart	64
heart valves sounds	65
incision or marks = scars	66
lungs & pleura	67
Cubital Fossa	71
Diaphragm + assoc structures	<i>see also Oesophagus</i>
	73
Duodenum	<i>see Abdomen GIT Kidneys</i>
Ear	75
Elbow	<i>see arm, cubital fossa, forearm</i>
Eye	77
Face	
arteries	81
bones	<i>see also TMJ</i>
Facial N	89
muscles	91
veins	93
Femoral triangle	
contents & borders	95
muscles & bones	97
Finger	<i>see Hand</i>
Flexor Retinaculum	<i>see Hand</i>
Foot	
dorsum	
bones	99
tendons	101
sole	
fascia / muscle layers	103
bones / dermatomes	108
Forearm	
bones	111
muscles	113

Gall Bladder <i>see Abdomen GIT, Diaphragm</i>	
Genitalia –	
female	119
male <i>see Penis Testis</i>	
Gluteum / Gluteal region	
bones	121
muscles / Sciatic N	123
Hand <i>see also grips</i>	
bones	125
dorsum extensors	127
palm	
features	129
flexors	131
flexor retinaculum	133
thenar/ hypothenar eminences	135
Head <i>see Face, Neck, Temporomandibular joint</i>	
Heart <i>see also Chest, Oesophagus</i>	137
Hip <i>see also Gluteum</i>	139
Hyoid <i>see Neck, Thyroid</i>	
Inguinal nodes superficial	141
Kidneys <i>see also Back</i>	143
Knee <i>see also lower leg, popliteal fossa, Thigh</i>	145
Large Intestine <i>see Abdomen GIT</i>	147
Leg / Lower leg	
muscles and bones	149
Liver <i>see Abdomen non-GIT, Diaphragm</i>	
Lungs <i>see also Abdomen, Chest</i>	155
Lymph nodes <i>see Axilla, Breast, Inguinal, Mouth, Neck</i>	
Mouth	
salivary glands	157
tonsil & uvula	159
Nail	161
Neck	
BVs & access points	163
LNs and veins	165
submandibular regions	167
triangles	169
Nipples <i>see Breast</i>	
Nose	173
Oesophagus	183
Ovaries <i>see Pelvis, Uterus</i>	
Pancreas <i>see Abdomen non-GIT, Kidneys</i>	
Pelvis <i>see Genitalia, Perineum, Uterus also specific organs listed</i>	

Penis	185
Perineum <i>see also Genitalia</i>	187
Phrenic N <i>see Oesophagus</i>	
Pleura <i>see Chest, Lungs</i>	
Popliteal fossa	191
Rectum <i>see Abdomen GIT, Pelvis, Perineum, Sigmoid colon</i>	
Salivary Glands <i>see Head, Mouth, Neck</i>	
Sciatic N <i>see also Gluteum</i>	193
Scrotum <i>see Femoral Triangle, Penis, Testis</i>	
Shoulder	
bones	195
BVs & Ns	197
muscles	199
Sigmoid Colon <i>see Abdomen GIT, Large Intestine</i>	
Sinuses	205
Small Intestine <i>see Abdomen GIT</i>	
Spleen <i>see Abdomen, Back, Diaphragm</i>	
Stomach <i>see also Abdomen</i>	207
Teeth <i>see Face, Mouth, TMJ</i> <i>A to Z of the Head &amp; Neck for complete map</i>	
Temporomandibular Joint	209
Testis/Testes <i>see also Femoral Triangle, Penis, Scrotum Perineum</i>	211
Thigh <i>see also Femoral Triangle, Hip &amp; Knee</i> muscle	213
Throat <i>see Mouth</i>	
Thumb	215
Thymus <i>see also Oesophagus</i>	217
Thyroid <i>see also Neck</i>	217
Tongue <i>see also Mouth</i>	219
Tonsil <i>see Mouth, Tongue</i>	
Trachea <i>see also Neck</i>	223
Trunk <i>see Abdomen, Back</i>	
Umbilicus <i>see Abdomen</i>	
Ureter <i>see Kidneys</i>	
Uterus <i>see also Pelvis</i>	225
Uvula <i>see Mouth, Tongue</i>	
Vagina <i>see Pelvis, Perineum</i>	
Vagus N <i>see Oesophagus</i>	
Womb <i>see uterus</i>	
Wrist <i>see also Hand &amp; grips</i>	227

## Abbreviations

A	= atrium, (pl atria) / actions / movements of a joint	CVA	= cerebrovascular accident = stroke
a	= artery	defn	= definition
abdo	= abdomen / abdominal	diff.	= difference(s)
ACF	= anterior cranial fossa	dist.	= distal
adj.	= adjective	DM	= dura mater
AIS	= anterior inferior iliac spine	DVT	= deep vein thrombosis
aka	= also known as	EAM	= external auditory meatus
alt.	= alternative	e.g.	= example
AM	= arachnoid mater	EC	= extracellular (outside the cell)
ANS	= autonomic nervous system	ECG	= electrocardiogram
ant	= anterior	ED	= extensor digitorum
art.	= artery	ER	= Extensor Retinaculum
AS	= Alternative Spelling, generally referring to the diff. b/n British & American spelling	FDP	= Flexor digitorum profundus
ASIS	= anterior superior iliac spine	FDS	= Flexor digitorum superficialis
assoc.	= associated with	FPB	= Flexor pollicis brevis
AV	= atrioventricular	FPL	= Flexor pollicis longus
B	= blood	FR	= Flexor Retinaculum
BBB	= blood brain barrier	Gk.	= Greek
bc	= because	H	= hormone(s)
BF	= blood flow	H	= hypochondrium
BM	= basement membrane	HB	= heart beat
b/n	= between	HF	= heart failure
BP	= brachial plexus	HR	= heart rate
bpm	= beats per minute	HS	= heart sounds
br	= branch (of a vessel)	IC	= intercostal
BS	= blood supply / blood stream	IC	= intercarpal
BV	= blood vessel(s)	ICS	= intercostal space
cap.	= capillary	IP	= interphalangeal
c.f.	= compared to	Ix	= investigation
C	= carpal	IVC	= inferior vena cava
C	= cervical	jt(s)	= joints = articulations
CC	= costal border	L	= left
CC	= costal cartilage	L	= lumbar
CH	= cerebral hemispheres	LA	= Left Atrium
cm	= cell membrane	lat.	= lateral
CNS	= central nervous system	LH	= left hypochondrium
collat.	= collateral	LL	= lower limb
CP	= cervical plexus	LIF	= left iliac fossa
Cr	= cranial	lig	= ligament
CSF	= Cerebrospinal fluid	Lt.	= Latin
CT	= connective tissue	m	= muscle
		MC	= metacarpal
		MCF	= middle cranial fossa



MCL = mid clavicular line	SVC = superior vena cava
MCP = metacarpophalangeal	SyNS = sympathetic nervous system
med. = medial	T = thoracic
MI = myocardial infarction	TMJ = temporomandibular joint
MIP = midinguinal point	UL = upper limb, arm
MT = metatarsal	V = vertebra
N = nerve	V = ventricle
NAD = normal (size, shape)	VC = vertebral column
NAD = no abnormality detected	WM = white matter
NR = nerve root	w/n = within
NS = nervous system/nerve supply	w/o = without
NT = nervous tissue	wrt = with respect to
nv = neurovascular bundle	& = and
P = pressure	<b>n</b> = intersection with
PAD = peripheral artery disease	
PaNS = parasympathetic nervous system	
Ph = phalanges	
PIIS = posterior inferior iliac spine	
pl. = plural	
PM = pia mater	
PN = peripheral nerve	
post. = posterior	
proc. = process	
prox. = proximal	
PS = pubic symphysis	
PSIS = posterior superior iliac spine	
R = right	
RA = right atrium	
RH = right hypochondrium	
RIF = Right Iliac Fossa	
S = sacral	
S1 = first heart sound	
S2 = second heart sound	
SA = sinoatrial	
SCM = sternocleidomastoid muscle	
sing. = singular	
SC = spinal cord	
SN = spinal nerve	
SP = spinal process	
SR = sarcoplasmic reticulum	
subcut. = subcutaneous	
supf = superficial	

## Common Terms used in Surface Anatomy

<b>Ablation</b>	the removal of part of the body, generally a bony part, most commonly the teeth
<b>Acromegaly</b>	a continuation of growth of the ends of cartilage covered bone (after fusion of the long bones) hence a gross change in the features (most noticeable in the jaw and digits) without growth in height, due mainly to the over activity of the pituitary gland
<b>Ala</b>	a wing, hence a wing-like process as in the Ethmoid bone <i>pl. - alae</i> . <i>Alveolus</i> Air filled bone - tooth socket adj - alveolar (as in air filled bone in the maxilla)
<b>Aneurysm</b>	a localized dilatation of an artery or heart chamber caused by disease or weakening of the muscle in the wall – tunica media.
<b>Angina/Angina Pectoris</b>	chest pain or discomfort due to lack of oxygen - anoxia or ischemia in the muscle tissue (myocardium) generally bc of coronary artery disease. Angina is a symptom of a condition called myocardial ischemia; may also manifest as : aching, burning, discomfort, heaviness, numbness, pressure, tightness, <i>and/or</i> tingling in the chest, back, neck, throat, jaw or arms.
<b>Angiography</b>	an X-ray that uses dye injected into arteries so that coronary artery anatomy can be studied wrt disease diagnosis.
<b>Ankle</b>	bend = angle usually referring to the bend just above the foot, hence the ankle is the joint b/n the foot and the lower leg
<b>Aorta</b>	the largest artery in the body and the primary BV leading from the heart to the body.
<b>Aortic Valve</b>	the valve that regulates BF from the heart to the aorta.
<b>Aperture</b>	an opening or space between bones or within a bone.
<b>Apex</b>	(of the Heart) the inferior aspect or bottom of the heart 5th ICS, L MCL, where the HB is the strongest
<b>Appendicular</b>	refers to the appendices of the axial i.e. in the skeleton, the limbs upper and lower which hang from the axial skeleton, this also includes the pectoral and pelvic girdles (not the Sacrum) adj. appendicular
<b>Areola</b>	small, open spaces as in the areolar part of the Maxilla may lead or develop into sinuses. <i>pl. areolae</i>
<b>Artery</b>	a BV that carries blood away from the heart.
<b>Arth-</b>	to do with joints hence...
<b>Articulation</b>	joint, description of the bone surfaces joining w/o the supporting structures = point of contact b/n 2 opposing bones hence the articulation of Humerus and Scapula is the articulation of the shoulder joint.
<b>Auditory exostosis</b>	a bony growth on the walls of the EAM

<b>Atrium</b>	Lt antrum = waiting room – top chambers R & L of the heart - 1/3 of the volume of the Ventricle or lower chamber. Blood flows from the atria to the Ventricles.
<b>Avulsion</b>	forceable tearing away of a structure or part of a structure as in an avulsed fracture where a fragment bone is torn away from the main bone
<b>Axis</b>	of the body - is the central part - the line through the head & spine, the axial skeleton as opposed to the appendicular
<b>Base - “of the Heart”</b>	top of the heart located in the 4th ICS
<b>Basilar</b>	relating to the base or bottom of structures
<b>Basiocranium</b>	bones of the base of the skull
<b>Boss</b>	a smooth round broad eminence - mainly in the frontal bone female > male
<b>Bregma</b>	refers to a junction of more than 2 bones in a joint as in the Bregma of the skull, junction between the coronal and sagittal sutures which in the infant is not closed and can be felt pulsating – site of the anterior fontanelle.
<b>Buccal</b>	pertaining to the cheek
<b>Calotte</b>	consists of the Calvaria from which the base has been removed.
<b>Calvaria</b>	refers to the Cranium without the facial bones attached.
<b>Canal</b>	tunnel / extended foramen as in the carotid canal at the base of the skull <i>adj. canular</i> (canicular - small canal)
<b>Caput / Kaput</b>	the head or of a head, <i>adj. - capitata</i> = having a head (c.f. decapitate)
<b>Carotid</b>	to put to sleep; compression of the common or internal carotid artery causes coma.
<b>Carpo</b>	wrist
<b>Catheter</b>	a thin, flexible tube
<b>Cavity</b>	an open area or sinus within a bone or formed by two or more bones ( <i>adj. cavernous</i> ), may be used interchangeably with fossa. Cavity tends to be more enclosed fossa a shallower bowl like space (Orbital fossa-Orbital cavity).
<b>Cavum</b>	a cave.
<b>Cephalic</b>	pertaining to the head
<b>Cervico</b>	pertaining to the neck
<b>Concha</b>	a shell shaped bone as in the ear or nose ( <i>pl. conchae adj. chonchoid</i> ) old term for this turbinate.
<b>Condyle</b>	a rounded enlargement or process possessing an articulating surface.
<b>Cornu</b>	a horn (as in the Hyoid)

<b>Corona</b>	a crown. <i>adj.</i> - <i>coronary</i> , coronoid or coronal; hence a coronal plane is parallel to the main arch of a crown which passes from ear to ear (c.f. coronal suture).
<b>Costo/Costa</b>	pertaining to the ribs
<b>Conductivity</b>	the ability to conduct an impulse to another region or another cell
<b>Congenital</b>	existing at birth.
<b>Congestive heart failure</b>	blood volume coming in is more than that pumped out - leading to fluid backup - backup from the LV results in fluid overload in the lungs - in the RV results in venous fluid retention and then swelling of dependant parts
<b>Coronary Arteries</b>	two arteries arising from the aorta that arch down over the top of the heart and branch out in additional arteries that provide B to the heart muscle – the main 4 being L main coronary artery, Circumflex coronary artery, L ant descending coronary artery, and R coronary artery. They join to form rings around the heart b/n the A & Vs and b/n the 2 Vs. These are the most commonly blocked arteries of the heart.
<b>Cranium</b>	comprises all of the bones of the skull except for the Mandible.
<b>Crest</b>	prominent sharp thin ridge of bone formed by the attachment of muscles particularly powerful ones eg Temporalis/Sagittal crest
<b>Cuneate /Cuneus</b>	a wedge / wedge-shaped
<b>Dens</b>	a tooth hence dentine and dental relating to teeth, denticulate having tooth-like projections <i>adj dentate</i> <i>See odontoid</i>
<b>Depression</b>	a concavity on a surface
<b>Diaphysis</b>	The shaft or body of a long bone. In the young this is the region between the growth plates & is composed of compact bone. <i>pl.</i> = <i>diaphyses</i> <i>adj.</i> = <i>diaphyseal</i>
<b>Diploë</b>	the cancellous bone between the inner and outer tables of the skull, <i>adj.</i> - <i>diploic</i> .
<b>Echocardiogram</b>	a study using high-frequency sound waves to picture or visualize the heart chambers, the thickness of the muscle wall, the heart valves and major BVs located near the heart. This is a non-invasive procedure.
<b>Edentulous</b>	without teeth
<b>Elbow</b>	any angular bend often in the arm, usually referring to the joint between the arm and the forearm
<b>Eminence</b>	a smooth projection or elevation on a bone as in iliopubic eminence.
<b>Endocranium</b>	refers to the interior of the “braincase” divided into the 3 major fossae anterior (for the Frontal lobes) middle (containing Temporal lobes) & posterior (for the containment of the Cerebellum).

<b>Epiphysis</b>	the end of a long bone beyond the growth plate or epiphyseal plate. Generally develops as a secondary ossification centre. There are 2 epiphyses to each long bone. Of a long bone the shafts are generally compact bone and the ends=epiphyses are trabecular bone <i>adj.= epiphyseal</i>
<b>External Auditory Meatus</b>	ear hole
<b>Exostosis</b>	a bony outgrowth from a bony surface, often due to irritation (as in swimmer's ear) and may involve ossification of surrounding tissues such as muscles or ligaments.
<b>Facet</b>	a face, a small bony surface (occlusal facet on the chewing surfaces of the teeth) seen in planar joints.
<b>Falciform</b>	relating to shapes that are in a sickle shape so falciform ligaments curve around and end in a sharp point
<b>Fissure</b>	a narrow slit or gap from cleft.
<b>Fontanelle</b>	a fountain, associated with the palpable pulsation of the brain as in the anterior fontanelle of an infant. these soft spots on the skull are cartilagenous connective tissue coverings "joints" which allow for skull cranial expansion and then become the mould for the bone development and shape joining long the sutural lines, later becoming the Bregma.
<b>Foramen</b>	a natural hole in a bone usually for the transmission of blood vessels and/or nerves. ( <i>pl. foramina</i> ).
<b>Fornix</b>	an arch
<b>Fossa</b>	a pit, depression, or concavity, on a bone, or formed from several bones as in temporomandibular fossa. Shallower and more like a "bowl" than a cavity
<b>Fovea</b>	a small pit (usually smaller than a fossa)- as in the fovea of the occlusal surface of the molar tooth.
<b>Genu / genio</b>	referring to the knee
<b>Groove</b>	long pit or furrow
<b>Hallux</b>	the big toe = the first toe
<b>Hamus</b>	a hook hence the term used for bones which "hook around other bones or where other structures are able to attach by hooking - hamulus = a small hook.
<b>Hyoid</b>	U-shaped
<b>Incisura</b>	a notch.
<b>Inter</b>	between
<b>Intra</b>	within
<b>Introitus</b>	an orifice or point of entry to a cavity or space.
<b>Joint = Articulation</b>	supporting structures
<b>Lacerum</b>	something lacerated, mangled or torn e.g. foramen lacerum small sharp hole at the base of the skull - often ripping tissue in trauma.

<b>Lacrimal</b>	related to tears and tear drops. ( <i>noun lacrima</i> )
<b>Lambda</b>	Greek letter a capital 'L' - written as an inverted V.(adj. lambdoid) - used to name the point of connection b/n 3 skull bones Occipital and L & R Temporal bones.
<b>Lamina</b>	a plate as in the lamina of the Vertebra a plate of bone connecting the vertical and transverse spines ( <i>pl. laminae</i> )
<b>Ligament</b>	a band of tissue which connects bones (articular ligaments) or viscera - organs (visceral ligaments).
<b>Linea</b>	a line as in the Nuchal lines of the Occipitum
<b>Lingual</b>	pertaining to the tongue
<b>Locus</b>	a place (c.f. location, locate, dislocate).
<b>Lymphatic</b>	a vessel which carries fluid to the heart
<b>Magnum</b>	large <i>pl magna</i>
<b>Malleus</b>	hammer (as in the ear ossicle)
<b>Mandible</b>	from the verb to chew, hence, the movable lower jaw; <i>adj. - mandibular.</i>
<b>Mastoid</b>	breast or teat shape - mastoid process of the Temporal bone.
<b>Maxilla</b>	the jaw-bone; now used only for the upper jaw; <i>adj. - maxillary.</i>
<b>Meatus</b>	a short passage; <i>adj. - meatal</i> as in external acoustic meatus connecting the outer ear with the middle ear.
<b>Mediastinum</b>	the region in the thorax b/n the lungs, ant. boundary- the sternum post. the VC, includes the heart, roots of the great vessels, oesophagus and trachea.
<b>Meniscus</b>	Gk. crescent as in the crescent shaped cartilages on the top of the Tibia
<b>Mental</b>	relating to the chin (mentum = chin <u>not</u> mens = mind).
<b>Meta</b>	an extension of: cf. metacarpal = extension of the wrist
<b>Metaphysis</b>	the slightly expanded end of the shaft of a bone.
<b>Microvasculature</b>	the network of small BVs arterioles ⇨ capillaries ⇨ venules in a tissue
<b>Minimally Invasive Heart Surgery</b>	a variety of approaches using smaller incisions to reduce the trauma of surgery and potentially speed recovery.
<b>Mitral Valve</b>	the valve that controls the BF b/n the LA & LV in the heart.
<b>Murmur</b>	a specific sound emanating from the chest in addition to the normal HS.
<b>Myocardial Infarct</b>	also called "heart attack"; the sudden interruption or insufficiency of the supply of B to the heart, typically resulting from occlusion or obstruction of a coronary artery and often characterized by severe chest pain
<b>Myocardial infarction</b>	death of myocardial tissue due to anoxia .

<b>Neurocranium</b>	the neurocranium refers only to the braincase of the skull.
<b>Non-invasive procedure</b>	a procedure that can be done outside of the body, such as an X-ray or ECG.
<b>Notch</b>	an indentation in the margin of a structure.
<b>Nucha</b>	the nape or back of the neck <i>adj.</i> - <i>nuchal</i> .
<b>Occiput</b>	the prominent convexity of the back of the head Occipitum = Occipital bone <i>adj.</i> <i>occipital</i>
<b>Occulus</b>	an eye
<b>Odontoid</b>	relating to teeth, toothlike see Dens
<b>Orbit</b>	a circle; the name given to the bony socket in which the eyeball rotates; <i>adj.</i> - <i>orbital</i> .
<b>Orifice</b>	an opening.
<b>Os</b>	a bone or pertaining to bones <i>adj.</i> <i>osseus</i>
<b>Ossification</b>	the process of turning something into bone, i.e. from one tissue to another as in cartilaginous ossification from cartilage into bone
<b>Ostium</b>	a door, an opening, an orifice.
<b>Otic</b>	pertaining to the ear
<b>Ovale</b>	oval shaped
<b>Palate</b>	a roof <i>adj.</i> - <i>palatal</i> or <i>palatine</i> .
<b>Palpitation</b>	irregular HB that can be felt by a person.
<b>Parietal</b>	pertaining to the outer wall of a cavity from paries, a wall.
<b>Parotid</b>	pertaining to a region beside or near the ear
<b>Pars</b>	a part of
<b>Pecten</b>	a comb.
<b>Perikymata</b>	transverse ridges and the grooves on the surfaces of teeth
<b>Periosteum</b>	layer of fascial tissue connective tissue on the outside of compact bone not present on articular (joint) surfaces see endostium
<b>Petrous</b>	pertaining to a rock / rocky / stoney <i>adj.</i> <i>petrosal</i>
<b>Phalanx</b>	pertaining to flanks of soldiers - phalanges a row of soldiers used for a row of fingers or toes
<b>Pollex</b>	thumb
<b>Process</b>	a general term describing any marked projection or prominence as in the mandibular process.
<b>Prominens</b>	a projection
<b>Pseudoarthrosis</b>	false or new joint due to the nonhealing of a fracture
<b>Pterion</b>	a wing; the region where the tip of the greater wing of the sphenoid meets or is close to the parietal, separating the frontal from the squamous region of the temporal bone.
<b>Pubis</b>	hairy, that part of the hip bone with hair over the surface <i>adj.</i> <i>pubic</i> <i>pl.</i> <i>pubes</i>

<b>Pulmonary Valve</b>	the heart valve located b/n the RV and the pulmonary artery that controls BF to the lungs.
<b>Ramus</b>	branch as in the superior pubic ramus the superior or higher branch of the pubic bone
<b>Recess</b>	a secluded area or pocket; a small cavity set apart from a main cavity.
<b>Rectus</b>	straight - erect
<b>Ridge</b>	elevated bony growth often roughened.
<b>Rotundum</b>	Round
<b>Sagittal</b>	an arrow, the sagittal suture is notched posteriorly, making it look like an arrow by the lambdoid sutures.
<b>Sesamoid</b>	grainlike
<b>Sigmoid</b>	S-shaped, from the letter Sigma which is S in Greek.
<b>Sinus</b>	a space usually within a bone lined with mucous membrane, such as the frontal and maxillary sinuses in the head, (also, a modified BV usually vein with an enlarged lumen for blood storage and containing no or little muscle in its wall). Sinuses may contain air, venous or arterial blood, lymph or serous fluid depending upon location and health of the subject <i>adj.</i> - <i>sinusoid</i> .
<b>Skull</b>	refers to all of the bones that comprise the head.
<b>Spheno</b>	a wedge i.e. the Sphenoid is the bone which wedges in the base of the skull between the unpaired frontal and occipital bones <i>adj.</i> - <i>sphenoid</i> .
<b>Spine</b>	a thorn <i>adj.</i> - <i>spinous</i> descriptive of a sharp, slender process/protrusion.
<b>Splanchocranium</b>	the splanchocranium refers to the facial bones of the skull.
<b>Sulcus</b>	long wide groove often due to a BV indentation
<b>Sustenaculum</b>	a supportive structure as in the sustenaculum tali = a structure which supports the Talus in the foot
<b>Suture</b>	The saw-like edge of a cranial bone that serves as joint between bones of the skull.
<b>Stylos</b>	an instrument for writing hence <i>adj.</i> - <i>styloid</i> a pencil-like structure.
<b>Symphysis</b>	a cartilagenous joint or a growth with bone-cartilage-bone
<b>Syn</b>	together in the close proximity of or fusion of 2 structures
<b>Syndesmosis</b>	tight inflexible joints b/n 2 bones little to no movement many axial joints
<b>Synostosis</b>	fusion of any joints
<b>Synovial joint</b>	any moveable joint with synovial fluid b/n the 2 opposing bones - most moving joints are synovial
<b>Talus</b>	ankle (Gk. bend)



<b>Tarsus</b>	pertaining to any bones joining the foot with the leg <i>adj.</i> - <i>tarsal</i> (Gk wickerwork referring to the basketlike structure of the os tarsus with the ligaments)
<b>Temporal</b>	refers to time and the fact that grey hair (marking the passage of time) often appears first at the site of the temporal bone.
<b>Tendon</b>	a tie or cord of collagen fibres connecting muscle with bone (as opposed to articular ligaments which connect bone with bone)
<b>Tentorium</b>	a tent.
<b>Trabecula</b>	a "little" beam i.e. supporting structure or strut <i>pl. trabeculae</i>
<b>Tricuspid Valve</b>	the heart valve that controls the BF from the RA into the RV.
<b>Trochanter</b>	pertaining to a small wheel or disc, in the Femur it is a large disc shaped tuberosity
<b>Trochlea</b>	a pulley that part of the bone or ligamentous attachment that pulls the bone in another direction as in the elbow or the ankle
<b>Tubercle</b>	a small process or bump, an eminence..
<b>Tuberculum</b>	a very small prominence, process or bump.
<b>Tuberosity</b>	a large rounded process or eminence, a swelling or large rough prominence often associated with a tendon or ligament attachment.
<b>Turbinate</b>	a child's spinning top, hence shaped like a top; an old term for the nasal conchae.
<b>Tympanum</b>	a drum <i>pl. tympani</i>
<b>Uncus</b>	a hook <i>adj.</i> - <i>uncinate</i> .
<b>Vagal maneuver</b>	stimulation of the vagal N to decrease HR and BP may cause fainting
<b>Vagina</b>	A sheath; hence, invagination is the acquisition of a sheath by pushing inwards into a structure, and evagination is similar but produced by pushing outwards <i>adj.</i> - <i>vaginal</i> .
<b>Valve</b>	there are 4 heart valves: mitral, aortic, pulmonary and tricuspid, that act as one-way "doors" between the chambers of the heart.
<b>Vein</b>	a BV which carries B to the heart
<b>Ventricles</b>	lower heart 2 chambres – 3X the volume of the atria
<b>Wormian bone</b>	extrasutural bone in the skull
<b>Zygoma</b>	a yoke , hence, the bone joining the maxillary, frontal, temporal & sphenoid bones <i>adj. zygomatic</i> .

## Anatomical Planes and Relations

**This is the anatomical position.**

**A** = Anterior Aspect from the front = or / Posterior Aspect from the back.

Used interchangeably with ventral and dorsal respectively

**B** = Lateral Aspect from either side

**C** = Transverse / Horizontal plane

**D** = Midsagittal plane = Median plane; trunk moving away from this

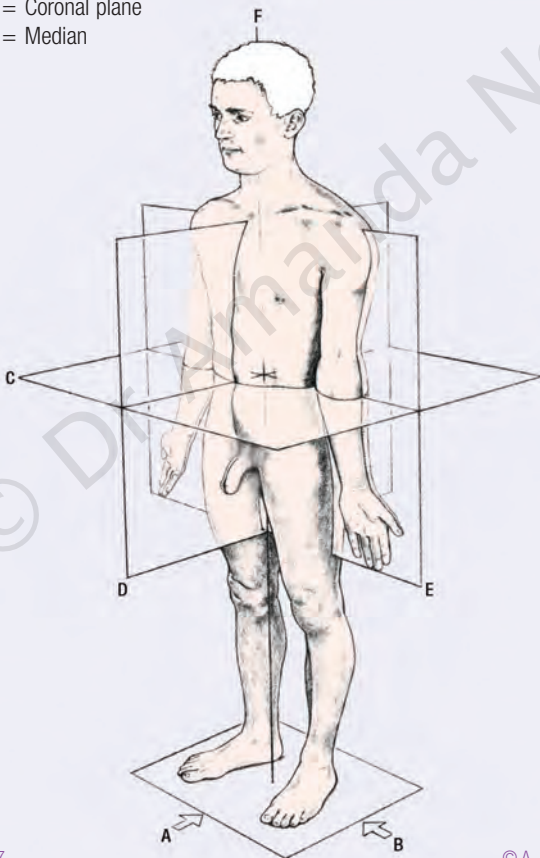
plane = lateral flexion or lateral movement. -

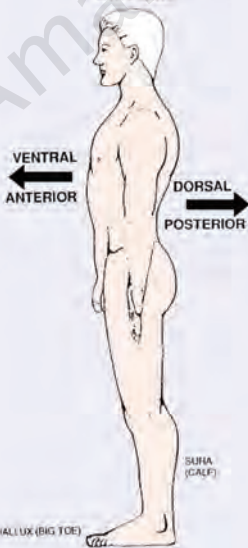
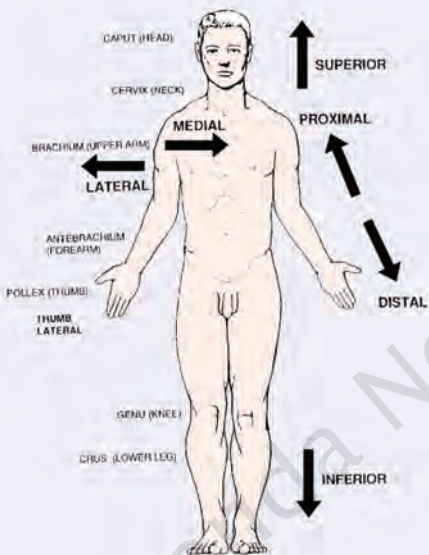
plane medial movement; limbs moving away from this direction

= abduction; limbs moving closer to this plane = adduction

**E** = Coronal plane

**F** = Median

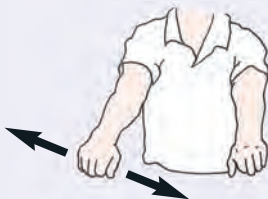




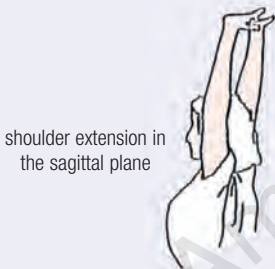
## Anatomical Movements - Upper limb & shoulder



arm extension in sagittal plane / shoulder movement



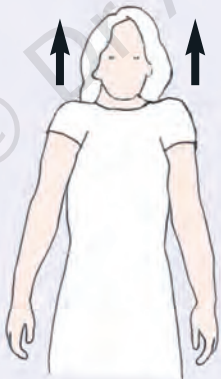
arm abduction -away from median plane / adduction-towards the median plane -shoulder movement



shoulder extension in the sagittal plane



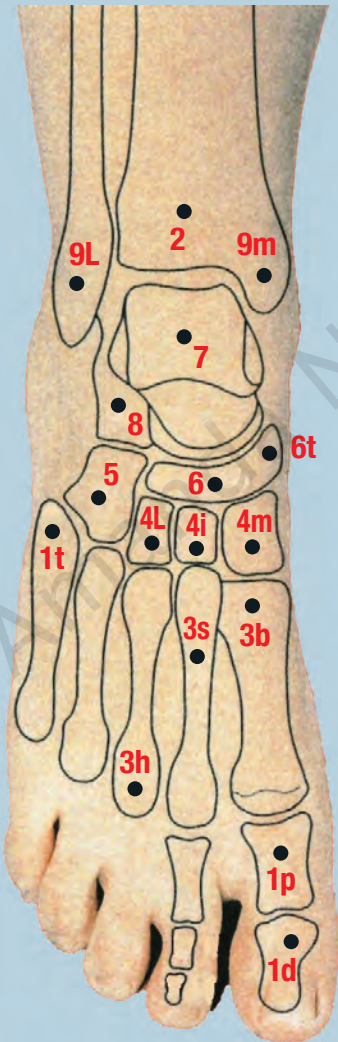
shoulder abduction in the coronal plane (with elbow flexion)



shoulder elevation  
- reverse movement shoulder depression  
shoulder movement



wrist extension  
wrist flexion



A **Foot – dorsum**

B **Tendons**

C *Anterior view -*

D *showing the tendons of the foot.*

E 1 Peroneus tertius

F 2 Extensor digitorum

b = brevis showing muscle and tendon

G L = longus

H 3 Extensor hallucis longus

I 4 Tibialis anterior

J 5 Peronius brevis

K 6 dorsalis pedis artery

L 7 1<sup>st</sup> dorsal MT artery

M

N

O

P

Q

R

S

T

U

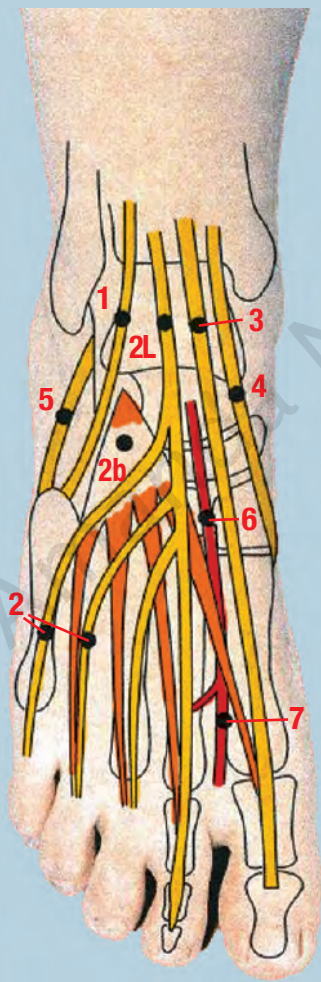
V

W

X

Y

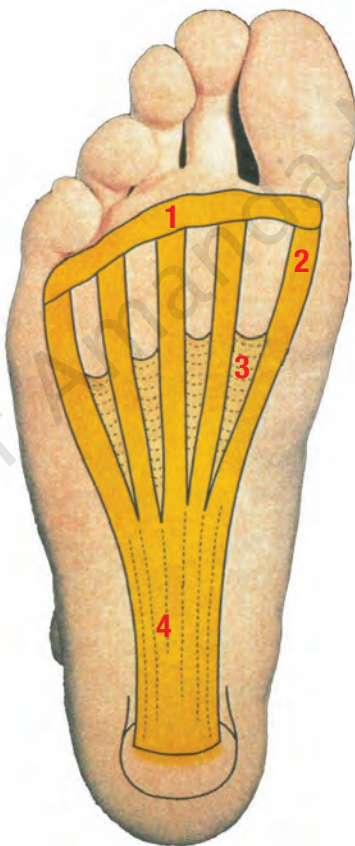
Z



A **Foot – sole Fascia**  
B **First layer of muscles**

C *Inferior view*

- D 1 superficial transverse metatarsal lig.  
E 2 digital bands – longitudinal extensions of 4 ...  
F 3 transverse bands of 4  
G 4 central aponeurosis

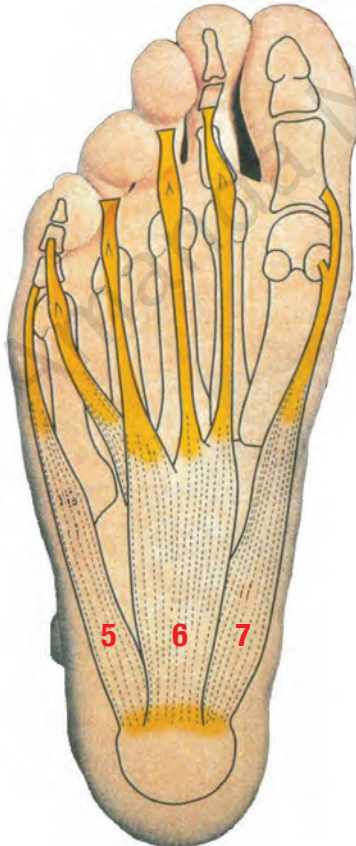




*The foot has 4 muscle layers overlaid with a strong protective fascia.*

the central aponeurosis (4) is similar to the palmar aponeurosis with extensions (2) to accommodate the extended MTs. A bridging fortified transverse ligament (1) joints all the heads of the MTs to reflect the weight bearing function of the foot

- 5 abductor digiti minimi
- 6 flexor digitorum brevis
- 7 abductor hallucis



A **Foot – sole**

B **2nd & 3rd muscle layers**

C *Inferior view*

D 1 Flexor Hallicus Longus – tendon

E 2 lumbrical muscles

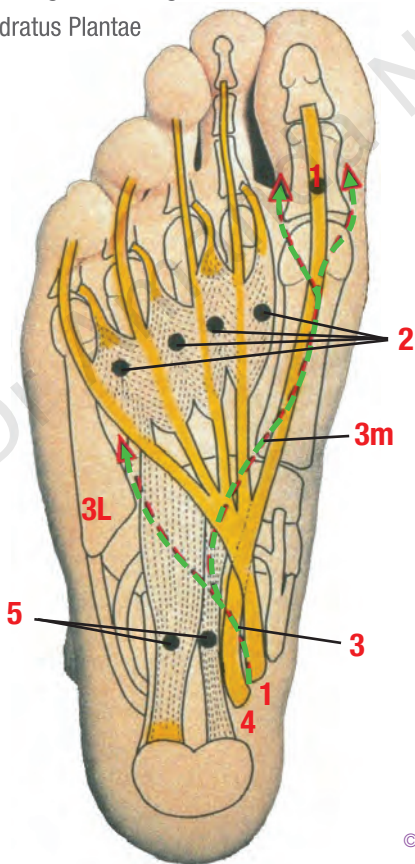
F 3 posterior tibial artery and N

L = lateral br

m = medial br

H 4 Flexor Digitorum Longus – tendons

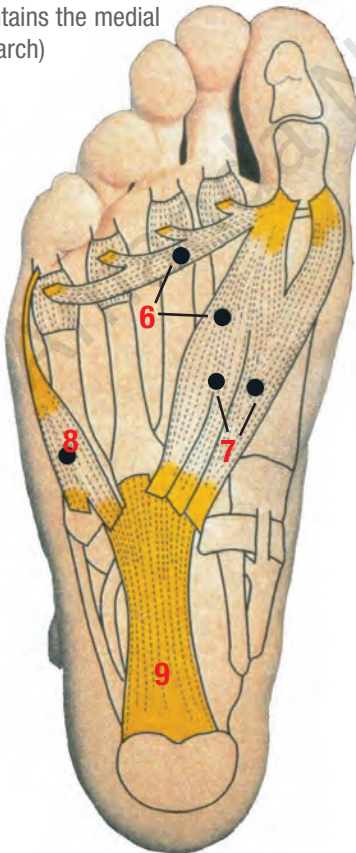
I 5 Quadratus Plantae



The 2<sup>nd</sup> layer consists of tendons to muscles which are found in the leg – the long muscles + some of the short muscles (i.e. those completely in the foot itself) – and the BVs and Ns

The 3<sup>rd</sup> layer contains the equivalent of the thenar (7) & hypothenar (8) muscles which insert into the long plantar lig (9) - technically in the 4th layer.

- 6 Abductor hallucis
- 7 Flexor hallucis brevis
- 8 Flexor digiti minimi brevis
- 9 plantar lig = spring lig  
(maintains the medial long arch)



A **Foot – sole**

B **4th muscle layer**

C **dermatomes**

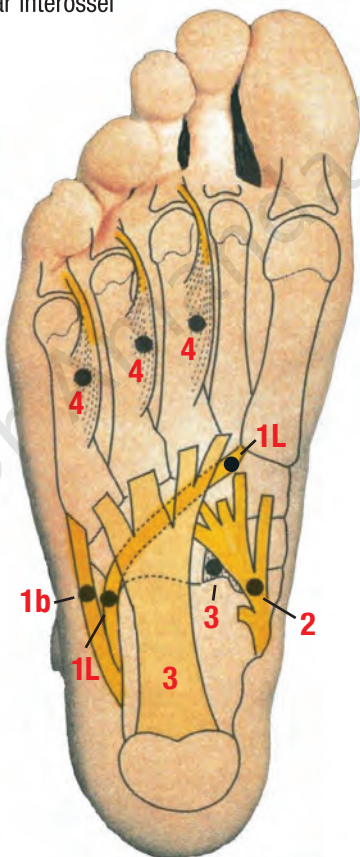
D *Inferior view*

E 1 peroneus lig b = brevis, L = longus

F 2 Tibialis posterior

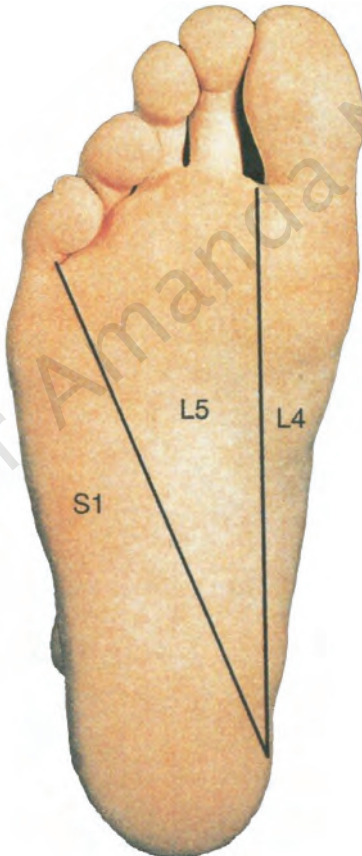
G 3 plantar calcaneo - navicular lig & long plantar lig

H 4 Plantar interossei



The 4<sup>th</sup> layer consists of tendons of muscles which are found in the leg and primarily act on the foot and ankle joint. - major lig are found here and deep to this layer which support the arches of the foot along with bony factors

Dermatome distribution of the sole of the foot can be used to test peripheral Ns



A **Foot – sole**

B **Bones**

C *Inferior view -*

D *showing the bones of the foot.*

E The bones of the foot are arranged in layers as in the hand only with longer MT bones and shorter phalanges.

F The only palpable bones of the sole are the heads of the MTs (3h) and the posterior aspect of the Calcaneus (8p), the other bones are deep to the short muscles of the foot. The sesamoid bones (2) can be felt over the head of the 1st MT embedded in the short tendons

I 1 Ph – all toes have 3 d = distal, m = middle &  
J p = proximal except the Hallux (big toe which like  
K the Thumb has only 2)

L 2 sesamoid bones

M 3 MT b = base, h = head & s = shaft

N 4 Cuneiform bones  
O i = intermediate

P L = lateral  
Q m = medial

R 5 Cuboid

S 6 Navicular

T 7 Talus

U 8 Calcaneus p = posterior / palpable aspect

V

W

X

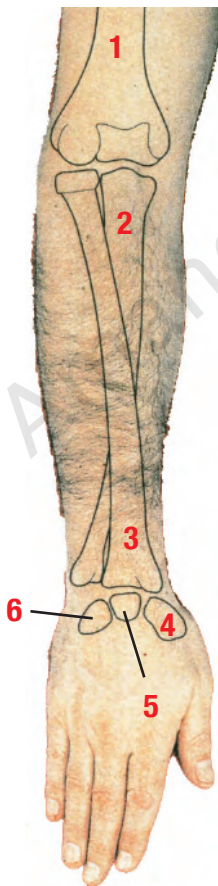
Y

Z



## A Forearm – Bones Pronation

B The forearm in the anatomical position is supinated, it may be  
C pronated by – rotating the lower end of the Radius (3) anteriorly  
D over the Ulna (2) 180° while the Humerus (1) remains unmoved this  
E is possible because of the ligaments at the elbow joint and the  
F respectively named supinators and pronator muscles (*see the A to  
Z of Skeletal muscles* for details).





## Forearm – Bones Supination

It articulates with the first layer of carpal – wrist – bones, 4 Scaphoid, 5 Lunate, 6 Triquetral.



## A Forearm – Muscles

B *Anterior (Flexor surface) -*

C *Deep layer of muscles.*

D The forearm contains the muscle bellies of most finger flexors in 3 layers: deep & 2 superficial layers on the flexor - anterior surface.

E The tendons of these muscles move under the Flexor Retinaculum (not shown - see Hand) to attach onto the digital phalanges (see the *A to Z of Skeletal muscles* for details).

F  
G 1 Biceps

H 2 Supinator

I 3 Flexor Pollicis Longus

J 4 Pronator Quadratus

K 5 Flexor Digitorum Profundus

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z



## A Forearm – Muscles

### B *Superficial layers of muscles*

C The forearm contains the muscle bellies of most finger flexors. The  
D tendons of these muscles move under the Flexor Retinaculum (not  
E shown - see Hand) to attach onto the digital phalanges (see Hand &  
the **A to Z of Skeletal Muscles** for details).

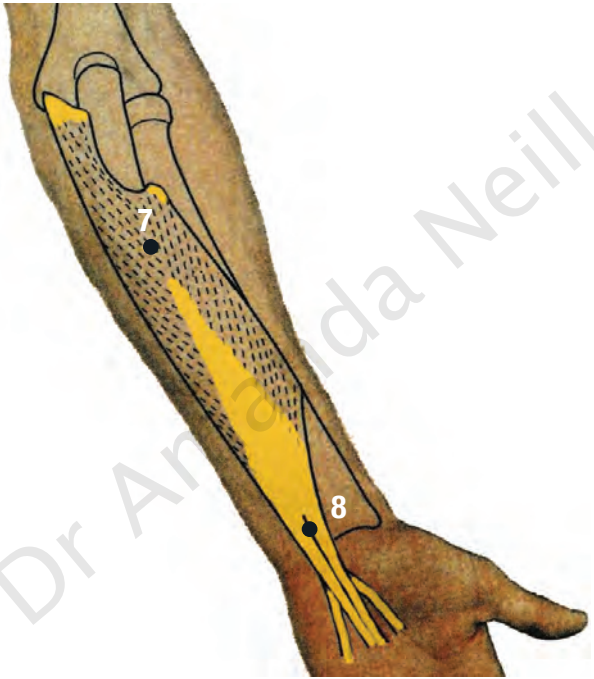


- 1 Brachioradialis
- 2 Flexor Carpi Radialis
- 3 Pronator Teres
- 4 Flexor Carpi Ulnaris
- 5 Palmaris Longus
- 6 Pisiform bone

## Forearm – Muscles

*Anterior (Flexor surface) -*

The Flexor Digitorum Superficialis is the biggest muscle belly in the forearm and lies most superficially – underneath are the rest of the superficial muscles.

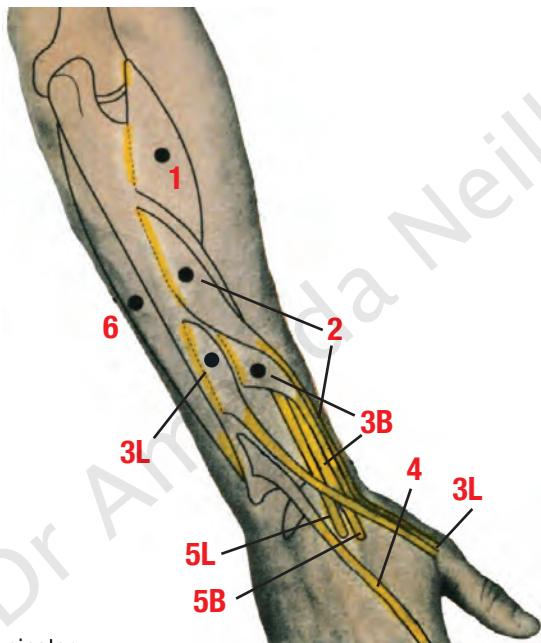


- 7 Flexor Digitorum Superficialis
- 8 tendons to the middle and ring fingers (lying anterior to the tendons to the index and little fingers)

## A Forearm – Muscles

### B *Posterior (Extensor surface) - deep layer*

C The forearm contains the muscle bellies – tendons extend to the phalanges passing under the Extensor Retinaculum (not shown - see Hand).

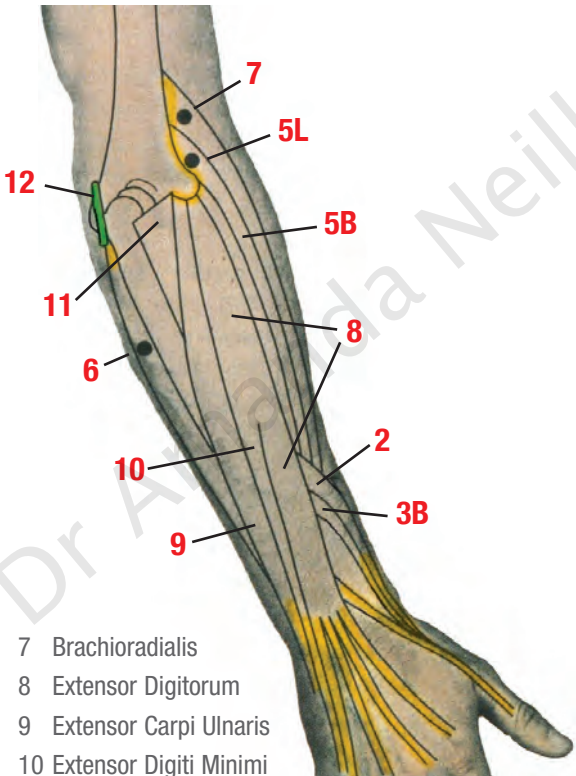


- S 1 Supinator  
T 2 Abductor Pollicis Longus  
U 3B Extensor Pollicis Brevis  
V 3L Extensor Pollicis Longus  
W 4 Extensor Indicis  
X 5B Extensor Carpi Radialis Brevis  
Y 5L Extensor Carpi Radialis Longus  
Z 6 Flexor Carpi Ulnaris

## Forearm – Muscles

### *Posterior (Extensor surface) - superficial layer*

The forearm contains the muscle bellies - tendons extend to the phalanges passing under the Extensor Retinaculum (not shown - see Hand).



- 7 Brachioradialis
- 8 Extensor Digitorum
- 9 Extensor Carpi Ulnaris
- 10 Extensor Digiti Minimi
- 11 Anconeus
- 12 Ulnar N

A **Genitalia – Female**

B *Inferior view -*

C *showing the features of the female peroneal area in detail.*  
*Note the Peroneal body is inferior to this.*

D *Medium level view*

E 1 Mons Pubis

F 2 Labia Majora

G 3 area of hair & pigmentation

H 4 area of smooth delicate skin – less pigmentation

I *Detailed level view*

J 5 Prepuce

K 6 Clitoris – enlarges on stimulation

L 7 Urethral sphincter & opening

M 8 Labia Minora – edge – engorged on stimulation

N 9 wall of the Labia Minora

O 10 vaginal opening

P 11 fourchette

Q

R

S

T

U

V

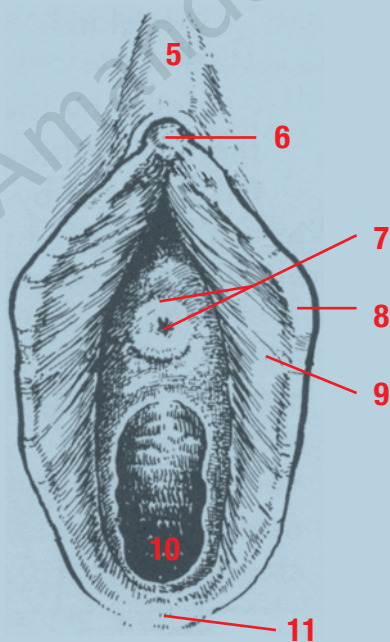
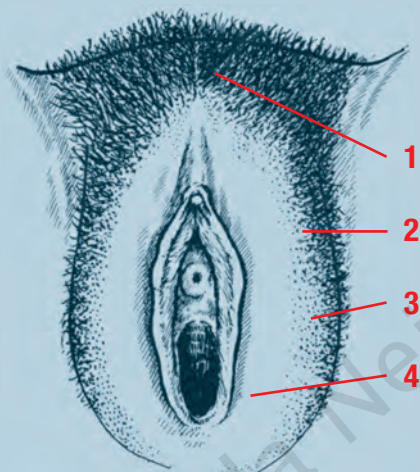
W

X

Y

Z





A **Gluteal region = Buttocks**

B **Posterior thigh = back of the leg**

C **Bones**

D 1 iliac crest

E 2 posterior iliac spine i = inferior s = superior

F 3 sciatic notch g = greater L = lesser

G 4 L4 spine

H 5 L5 spine

I 6 Sacrum

J 7 femur h = head g = greater trochanter

K L = lesser trochanter

L 8 gluteal tuberosity

M 9 linea aspera

N 10 femoral condyle L = lateral m = medial

O 11 adductor tubercle

P 12 ischeal tuberosity

Q 13 ischeal spine

R 14 sacro-iliac joint

S 15 Coccyx

T

U

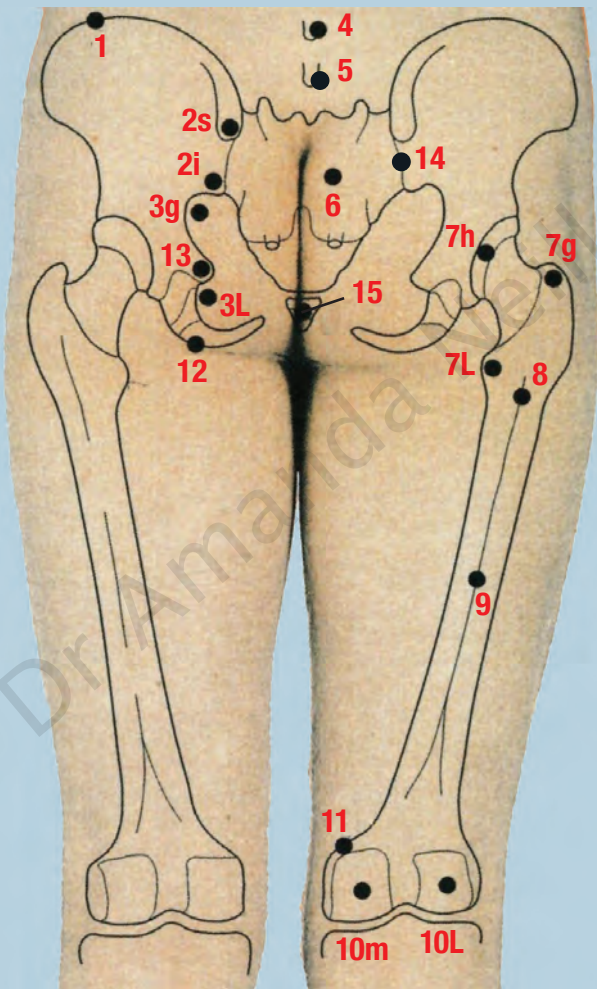
V

W

X

Y

Z



## The A to Z of Hair, Nails & Skin

ISBN 978-1-921930-02-7

The structure of the biggest & most visible organ in the body THE SKIN, is described in detail along with its associated structures. The book has 3 distinct sections each listed in the A to Z way, with clear colourful diagrams. A large Common Terms section explains & illustrates terminology on the subject. With over 230 pages & 280 illustrations it still fits in your pocket for convenience.



## The A to Z of Peripheral Nerves

ISBN 978-1-921930-05-8

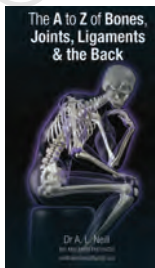
The origins, pathways, branches and functions of all the Peripheral nerves are listed alphabetically and illustrated individually. The main content includes neurological testing techniques, basic structural components of the nervous system and overviews of the major nerve plexi. It begins with a comprehensive glossary of all terms, and illustrations of basic anatomical principles. With over 230 pages and 290 illustrations this strong little book still fits in your pocket.



## The A to Z of Skeletal Muscles

ISBN 978-1-921930-18-8

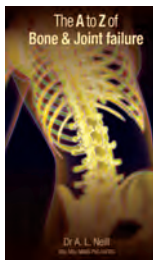
The origins, insertions, blood & nerve supply for all muscles are listed alphabetically with separate illustrations. All the major muscle groups, their common names their functions, along with cross-referencing and regional tagging are included. Basic structural components of the skeletal muscle system are included with a comprehensive glossary of all terms used in the field. With over 230 pages and 290 illustrations this strong little book still fits in your pocket



## The A to Z of Bones, Joints, Ligaments & the BACK

ISBN 978-1-921930-19-5

All the bones, joints and ligaments of the body including teeth are listed alphabetically. At least 2 views of each bone and joint are illustrated. The Range of movement and basic structure of all the skeletal components are categorized and illustrated. There is a separate section on the back – Vertebral Column where it is discussed as a functioning unit. Over 260 pages and 300 illustrations make this little pocket book invaluable.



## The A to Z of Bones and Joint Failure

ISBN 978-1-921930-04-1

All the bones, joints and ligaments of the body have been covered in the A to Z book on these tissues – so this is the follow-up book on their pathology analysing their failures due to various causes. It goes into the microstructure, development, control and formation and how these tissues interact and change under stress and with age. There are over 280 pages and 350 illustrations in this concise pocket book reference.



## The A to Z of the Heart

ISBN 978-0-9806840-6-3

The heart is comprehensively illustrated along with the great vessels. This book also includes illustrations of all the major vascular structures and describes the circulation of the major organs and systems. The clinical section contains examination and testing of the heart and blood vessel flow. Arteries, veins, capillaries and lymphatics their pathways and special features are present in this book of over 240 pages and 300 illustrations.



## The A to Z of the Digestive Tract

ISBN 978-1-921930-00-3

The Digestive tract is one long tunnel from food to faeces – its components are individually illustrated, colour tagged and listed alphabetically along with many of its adjunct organs. Their structure and functions are also clearly described along with sectional overviews. In particular detailed descriptions of the intricacies of the oral cavity, the processes of swallowing are included in this book of 240 pages and 300 illustrations.



## The A to Z of the Head and Neck Muscles & Bones

ISBN 978-1-921930-12-6

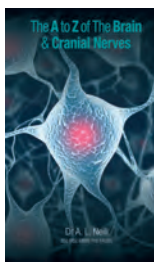
interactions between the many muscular layers of this area, listing alphabetically and illustrating each muscle individually in one section – then examining the individual bones and teeth in the same manner. The skull is also illustrated as a unit, in this book of 280 pages and 300 illustrations.



## The A to Z of Surface Anatomy

ISBN 978-1-921930-17-1

The surface anatomy of all anatomical regions and structures are illustrated at several levels from superficial to deep. Methods of locating structures deep in the body using common landmarks are illustrated cross referenced and listed alphabetically. Proportions and relations between limb and regional sizes are charted extensively. Photographs as well as detailed graphics are used extensively, in this book of 240 pages and 300 illustrations.



## The A to Z of the Brain & Cranial Nerves

ISBN 978-0-9806840-2-5

The brain as an entity and the individual structures within it are illustrated and then listed with their functions alphabetically – sections on the testing and pathways and interactions of cranial nerves are also included in a separate clinical section in this book of 240 pages and 300 illustrations.



## The A to Z of Medical Terms

ISBN 978-1-921930-01-0

This book is invaluable as a medical terminology reference – initially designed for the derivation of the anatomical terms; it has expanded to include tables of medical, pathological and other specialist terms; tables of prefixes and suffixes which allow interpretation of terms and lists of abbreviations commonly in use. It also includes forms of address, titles, major medical associations and other useful material. These colour-coded illustrated sections are clear and concise.

**Special rates for students and libraries.**

# The A to Z of Surface Anatomy



The A to Zs

Dr. A. L. NEILL

BSc MSc MBBS PhD FACBS

medicalamanda@gmail.com

[www.amandasatoz.com](http://www.amandasatoz.com)

ISBN 978-1-921930-17-1



9 781921 930171