

Foreword or Why is Memorix Anatomy revolutionary? .....	XI
Memorix Education System .....	XV
Acknowledgements to co-workers .....	XVI
Acknowledgements to student organisations .....	XVIII
Memorix team .....	XX

1

General anatomy

1 Definitions and history .....	2	8 Terms of location and direction of the human body .....	9
2 Terms and abbreviations .....	3	9 Parts of the human body .....	10
3 Histology .....	4	10 Regions of the human body .....	11
4 Embryology .....	5	11 Eponyms .....	12
5 Anatomical changes in childhood .....	6	12 Review questions and figures .....	14
6 Anatomical changes in puberty .....	7	13 Acknowledgements and references .....	16
7 Planes and lines of the human body .....	8		

2

Bones

1 General overview .....	18	5 Bones of the upper limb – Ossa membri superioris .....	42
2 Skull – Cranium .....	21	5.1 Clavicle (collarbone) – Clavicula .....	42
2.1 Frontal bone – Os frontale .....	22	5.2 Scapula (shoulder blade) – Scapula .....	43
2.2 Occipital bone – Os occipitale .....	23	5.3 Humerus – Humerus .....	44
2.3 Sphenoidal bone (sphenoid) – Os sphenoidale .....	24	5.4 Ulna (elbow bone) – Ulna .....	45
2.4 Parietal bone – Os parietale .....	26	5.5 Radius (radial bone) – Radius .....	46
2.5 Temporal bone – Os temporale .....	27	5.6 Bones of the hand – Ossa manus .....	47
2.6 Ethmoidal bone (ethmoid) – Os ethmoidale .....	30	6 Bones of the lower limb – Ossa membri inferioris .....	48
2.7 Inferior nasal concha – Concha nasalis inferior .....	30	6.1 Pelvis – Pelvis .....	49
2.8 Lacrimal bone, nasal bone and vomer .....	31	6.1.1 Hip bone (pelvic bone) – Os coxae .....	50
– Os lacrimale, os nasale et vomer .....	31	6.2 Femur (thigh bone) – Femur .....	52
2.9 Zygomatic bone – Os zygomaticum .....	31	6.3 Patella (kneecap) – Patella .....	53
2.10 Palatine bone – Os palatinum .....	32	6.4 Tibia (shinbone) – Tibia .....	53
2.11 Maxilla – Maxilla .....	33	6.5 Fibula (calf bone) – Fibula .....	54
2.12 Mandible – Mandibula .....	34	6.6 Bones of foot – Ossa pedis .....	54
2.13 Hyoid bone – Os hyoideum .....	35	7 Figures .....	57
2.14 Skull of a newborn .....	35	7.1 Cranial base .....	57
2.15 Skull anthropometry .....	36	8 Tables .....	58
3 Vertebral column – Columna vertebralis .....	37	8.1 Openings of the skull and their content .....	58
3.1 Cervical vertebrae – Vertebrae cervicales .....	38	8.2 Structures of the upper limb .....	60
3.2 Thoracic vertebrae – Vertebrae thoracicae .....	39	8.3 Structures of the lower limb .....	62
3.3 Lumbar vertebrae – Vertebrae lumbales .....	39	9 Review questions and figures .....	64
3.4 Sacrum and coccyx – Os sacrum et os coccygis .....	40	10 Acknowledgements and references .....	66
4 Thorax – Thorax .....	41		

3

Joints

1 General overview .....	68	6 Joints of the lower limb – Juncturae membri inferioris .....	82
1.1 General organisation of the synovial joint .....	69	6.1 Sacro-iliac joint – Articulatio sacroiliaca .....	82
2 Joints of the skull – Juncturae cranii .....	72	6.2 Synarthroses of the pelvic girdle – Synarthroses cinguli pelvici .....	82
3 Vertebral joints – Juncturae columnae vertebralis .....	73	6.3 Hip joint – Articulatio coxae .....	83
3.1 Vertebral synovial joints – Articulationes columnae vertebralis .....	74	6.4 Knee joint – Articulatio genus .....	84
4 Thoracic joints – Juncturae thoracis .....	75	6.5 Tibiofibular joint – Articulatio tibiofibularis .....	86
5 Joints of the upper limb – Juncturae membri superioris .....	76	6.6 Interosseous membrane of the leg and tibiofibular syndesmosis – Membrana interossea cruris et syndesmosis tibiofibularis .....	86
5.1 Sternoclavicular joint – Articulatio sternoclavicularis .....	76	6.7 Joints of the foot – Articulationes pedis .....	86
5.2 Acromioclavicular joint – Articulatio acromioclavicularis .....	76	6.7.1 Arches of the foot .....	86
5.3 Shoulder (glenohumeral) joint .....	77	7 Tables .....	90
– Articulatio humeri (glenohumeralis) .....	77	7.1 Movements of the head, neck and temporomandibular joint (muscles) .....	90
5.4 Elbow joint – Articulatio cubiti .....	78	7.2 Movements of the limbs (degree of freedom) .....	91
5.5 Distal radio-ulnar joint and radio-ulnar syndesmosis .....	79	7.3 Movements of the upper limb (muscles) .....	92
– Articulatio radioulnaris distalis et syndesmosis radioulnaris .....	79	7.4 Movements of the lower limb (muscles) .....	93
5.6 Wrist joint – Articulatio radiocarpalis .....	79	8 Review questions and figures .....	94
5.7 Joints of the hand – Articulationes manus .....	80	9 Acknowledgements and references .....	96

1 General overview.....	98	8.3 Muscles of the forearm – Musculi antebrachii.....	136
2 Muscles of the head – Musculi cranii.....	102	8.3.1 Anterior group.....	137
2.1 Facial muscles – Musculi faciei.....	102	8.3.2 Lateral group.....	139
2.2 Masticatory muscles – Musculi masticatorii.....	108	8.3.3 Posterior group.....	140
2.3 Fasciae of the head.....	109	8.4 Muscles of the hand – Musculi manus.....	142
3 Muscles of the neck – Musculi colli.....	110	8.4.1 Muscles of the thenar eminence (thumb group).....	143
3.1 Superficial muscle group – Musculi colli superficiales.....	111	8.4.2 Muscles of the hypothenar eminence (little finger group).....	144
3.2 Suprahyoid muscles – Musculi suprahyoidei.....	112	8.4.3 Interossei and lumbricals.....	145
3.3 Infrahyoid muscles – Musculi infrahyoidei.....	113	8.5 Tendinous sheaths of the upper limb	
3.4 Scaleni – Musculi scaleni.....	114	– Vaginae tendinum membri superioris.....	146
3.5 Deep muscle group – Musculi colli profundi.....	115	8.6 Fasciae of the upper limb.....	147
3.6 Cervical fascia – Fascia cervicalis.....	115	9 Muscles of the lower limb – Musculi membri inferioris.....	148
4 Muscles of the back – Musculi dorsi.....	116	9.1 Muscles of the hip joint.....	148
4.1 Superficial layer (spinohumeral muscles).....	117	9.1.1 Anterior group.....	149
4.2 2 <sup>nd</sup> layer (spinoscapular muscles).....	118	9.1.2 Posterior group.....	150
4.3 3 <sup>rd</sup> layer (spinocostal muscles).....	118	9.2 Muscles of the thigh – Musculi femoris.....	152
4.4 Muscles of the back proper – Musculi dorsi proprii.....	119	9.2.1 Anterior group.....	153
4.5 Fasciae of the back.....	123	9.2.2 Medial group.....	154
5 Muscles of the thorax – Musculi thoracis.....	124	9.2.3 Posterior group.....	155
5.1 Muscles of the thorax – thoracohumeral muscles.....	125	9.3 Muscles of the leg – Musculi cruris.....	156
5.2 Muscles of the thorax proper.....	126	9.3.1 Anterior group.....	157
5.3 Diaphragm – Diaphragma.....	127	9.3.2 Lateral group.....	157
5.4 Fasciae of the thorax.....	127	9.3.3 Posterior group.....	158
6 Muscles of the abdomen – Musculi abdominis.....	128	9.4 Muscles of the foot – Musculi pedis.....	160
6.1 Anterior group.....	128	9.4.1 Dorsal group.....	161
6.2 Lateral group.....	129	9.4.2 Medial group (group of the great toe).....	161
6.3 Posterior group.....	130	9.4.3 Lateral group (group of the little toe).....	162
6.4 Fasciae of the abdomen.....	130	9.4.4 Middle group.....	162
7 Pelvic diaphragm / pelvic floor – Diaphragma pelvis.....	131	9.4.5 Interossei and lumbricals.....	163
7.1 Fasciae of the pelvis.....	132	9.5 Tendinous sheaths of the lower limb	
8 Muscles of the upper limb – Musculi membri superioris.....	133	– Vaginae tendinum membri inferioris.....	164
8.1 Muscles of the shoulder joint.....	133	9.6 Fasciae of the lower limb.....	165
8.2 Muscles of the arm – Musculi brachii.....	134	10 Review questions and figures.....	166
		11 Acknowledgements and references.....	168

## Digestive system

169

1 General overview.....	170	6.1 Duodenum – Duodenum.....	188
2 Oral cavity – Cavitas oris.....	172	6.2 Jejunum and ileum – Jejunum et ileum.....	190
2.1 Cheek – Bucca.....	172	7 Large intestine – Intestinum crassum.....	191
2.2 Lips – Labia oris.....	173	7.1 Caecum – Caecum.....	192
2.3 Gum – Gingiva.....	173	7.1.1 Vermiform appendix – Appendix vermiformis.....	193
2.4 Teeth – Dentes.....	174	7.2 Colon – Colon.....	193
2.5 Tongue – Lingua.....	176	7.2.1 Ascending colon – Colon ascendens.....	193
2.6 Palate – Palatum.....	178	7.2.2 Transverse colon – Colon transversum.....	194
2.6.1 Hard palate – Palatum durum.....	178	7.2.3 Descending and sigmoid colon	
2.6.2 Soft palate – Palatum molle.....	179	– Colon descendens et sigmoideum.....	194
2.7 Palatine tonsil – Tonsilla palatina.....	178	7.3 Rectum – Rectum.....	195
2.8 Salivary glands – Glandulae salivariae.....	180	8 Liver – Hepar.....	196
3 Pharynx – Pharynx.....	182	9 Gallbladder – Vesica biliaris/fellea.....	199
4 Oesophagus – Oesophagus.....	185	10 Pancreas – Pancreas.....	200
5 Stomach – Gaster.....	186	11 Peritoneum – Peritoneum.....	201
6 Small intestine – Intestinum tenue.....	188	12 Review questions and figures.....	202
		13 Acknowledgements and references.....	204

## Respiratory system

205

1 General overview.....	206	8 Bronchi – Bronchi.....	215
2 Nose – Nasus.....	206	9 Lungs – Pulmones.....	216
3 Nasal cavity – Cavitas nasi.....	207	10 Pleura – Pleura.....	220
4 Paranasal sinuses – Sinus paranasales.....	208	11 Mechanics of breathing movements.....	221
5 Pharynx – Pharynx.....	209	12 Tables – Laryngeal muscles by function.....	222
6 Larynx – Larynx.....	210	13 Review questions and figures.....	222
7 Trachea – Trachea.....	214	14 Acknowledgements and references.....	224

1 General overview	226	6 Female urethra – Urethra feminina	233
2 Kidneys – Renes	227	7 Dynamics of micturition	233
3 Renal pelvis and renal calices – Pelvis renalis et calices renales	230	8 Review questions and figures	234
4 Ureter – Ureter	230	9 Acknowledgements and references	236
5 Urinary bladder – Vesica urinaria	231		

1 Development of the genital system	238	3 Female genital system – Organa genitalia feminina	249
2 Male genital system – Organa genitalia masculina	239	3.1 Ovary – Ovarium	250
2.1 Testis – Testis	240	3.2 Uterine/Fallopian tube – Tuba uterina Fallopii	251
2.2 Epididymis – Epididymis	242	3.3 Uterus – Uterus	252
2.3 Ductus deferens – Ductus deferens	243	3.4 Vagina – Vagina	254
2.4 Spermatic cord – Funiculus spermaticus	243	3.5 Female external genitalia (vulva) – Organa genitalia feminina externa (vulva)	255
2.5 Seminal glands – Glandulae vesiculosae	244	4 Perineum and its muscles – Perineum et muscoli perinei	256
2.6 Bulbo-urethral glands – Glandulae bulboourethrales	244	5 Anatomy in pregnancy	257
2.7 Prostate – Prostata	245	6 Fetal membranes, placenta and umbilical cord	258
2.8 Scrotum – Scrotum	246	7 Fetal anatomy and anatomy of labour	259
2.9 Penis – Penis	247	8 Review questions and figures	260
2.10 Male urethra – Urethra masculina	248	9 Acknowledgements and references	262

1 General overview of the blood vessels	264	4.10 Abdominal aorta – Aorta abdominalis	287
2 General overview of the heart	265	4.10.1 Coeliac trunk – Truncus coeliacus	288
3 Heart – Cor	266	4.10.2 Inferior and superior mesenteric artery – Arteria mesenterica superior et inferior	289
3.1 Right atrium – Atrium dextrum	268	4.11 Common iliac artery – Arteria iliaca communis	290
3.2 Right ventricle – Ventriculus dexter	269	4.11.1 Internal iliac artery (parietal branches) – Arteria iliaca interna	290
3.3 Left atrium – Atrium sinistrum	270	4.11.2 Internal iliac artery (visceral branches) – Arteria iliaca interna	291
3.4 Left ventricle – Ventriculus sinister	271	4.11.3 External iliac artery – Arteria iliaca externa	291
3.5 Valves – Valvae	272	4.12 Femoral and popliteal artery – Arteria femoralis et arteria poplitea	292
3.6 Cardiac skeleton – Skeleton cordis	273	4.13 Anterior and posterior tibial arteries – Arteria tibialis anterior et posterior	293
3.7 Conducting system of the heart – Complexus stimulans cordis	273	5 Veins – Venae	294
3.8 Fetal circulation	274	5.1 Superior vena cava – Vena cava superior	294
3.9 Coronary arteries – Arteriae coronariae	275	5.2 Internal jugular vein – Vena jugularis interna	295
3.10 Veins of the heart – Venae cordis	275	5.3 External jugular vein – Vena jugularis externa	296
3.11 Clinical anatomy of the heart	276	5.4 Subclavian and axillary veins – Vena subclavia et vena axillaris	296
4 Arteries – Arteriae	277	5.5 Veins of the upper limb – Venae membri superioris	297
4.1 Aorta – Aorta	277	5.6 Inferior vena cava – Vena cava inferior	297
4.2 Ascending aorta and aortic arch – Aorta ascendens et arcus aortae	277	5.7 Portal vein – Vena portae	298
4.3 Common carotid artery – Arteria carotis communis	278	5.8 Porto-caval anastomoses	298
4.4 External carotid artery – Arteria carotis externa	278	5.9 Cavo-caval anastomoses	299
4.4.1 External carotid artery – ventral and medial branches	279	5.10 Common iliac vein – Vena iliaca communis	300
4.4.2 External carotid artery – dorsal branches	280	5.10.1 Internal iliac vein – Vena iliaca interna	300
4.4.3 Superficial temporal artery – Arteria temporalis superficialis	280	5.10.2 External iliac vein – Vena iliaca externa	301
4.4.4 Maxillary artery – Arteria maxillaris	281	5.11 Veins of the lower limb – Venae membri inferioris	301
4.5 Subclavian artery – Arteria subclavia	282	6 Schemes	302
4.5.1 Vertebral artery – Arteria vertebralis	282	6.1 Schemes of the heart	302
4.5.2 Subclavian artery – other branches	283	6.2 Schemes of arteries	304
4.6 Axillary artery – Arteria axillaris	284	6.3 Schemes of veins	310
4.7 Brachial artery – Arteria brachialis	284	7 Tables	
4.8 Radial and ulnar arteries and superficial and deep palmar arches – Arteria radialis et ulnaris, arcus palmaris superficialis et profundus	285	7.1 Tables of perforators – Venae perforantes	311
4.9 Thoracic aorta – Aorta thoracica	286	8 Review questions and figures	314
		9 Acknowledgements and references	

1 General overview	318	8.5 Abdominal lymph nodes – Nodi lymphoidei abdominis	327
2 Lymphatic vessels – Vasa lymphoidea	319	8.6 Pelvic lymph nodes – Nodi lymphoidei pelvis	328
3 Thymus – Thymus	320	8.7 Lymph nodes of the lower limb	
4 Bone marrow – Medulla ossium	320	– Nodi lymphoidei membri inferioris	328
5 Spleen – Splen (lien)	321	8.8 Sentinel lymph nodes of the respiratory and digestive system	328
6 Tonsils – Tonsillae	322	8.9 Sentinel lymph nodes of the urinary and genital system	330
7 Non-encapsulated lymphoid tissue	323	9 Schemes	331
8 Lymph nodes – Nodi lymphoidei (nodi lymphatici, lymphonodi)	323	9.1 Lymphatic drainage of the abdomen and pelvis (lymph nodes)	331
8.1 Lymph nodes of the head – Nodi lymphoidei capitis	324	9.2 Lymphatic drainage of the abdomen	
8.2 Lymph nodes of the neck – Nodi lymphoidei colli	324	and pelvis (lymphatic trunks)	331
8.3 Lymph nodes of the upper limb		10 Review questions and figures	332
– Nodi lymphoidei membri superioris	325	11 Acknowledgements and references	334
8.4 Thoracic lymph nodes – Nodi lymphoidei thoracis	326		

1 General overview	336	3.10 N. X Vagus nerve – Nervus vagus	364
1.1 General structure of the spinal nerve	337	3.11 N. XI Accessory nerve – Nervus accessorius	366
1.2 Reflex arch	338	3.12 N. XII Hypoglossal nerve – Nervus hypoglossus	366
2 Spinal nerves – Nervi spinales	339	4 Autonomic nervous system (ANS)	367
2.1 Cervical plexus – Plexus cervicalis (C1–C4)	340	4.1 Sympathetic part – Pars sympathica	368
2.2 Brachial plexus – Plexus brachialis (C4–T1)	342	4.2 Parasympathetic part – Pars parasympathica	371
2.2.1 Supraclavicular part of the brachial plexus	342	4.3 Mixed autonomic plexuses	372
2.2.2 Infraclavicular part of the brachial plexus	343	4.4 Enteric nervous system	374
2.3 Thoracic plexus – Nervi thoracici (T1–T12)	346	5 Schemes	375
2.4 Lumbar plexus – Plexus lumbalis (T12–L4)	346	5.1 Scheme of the peripheral nervous system	375
2.5 Sacral plexus – Plexus sacralis (L4–S4)	348	5.2 Cervical plexus	375
2.6 Dermatomes and myotomes	350	5.3 Brachial plexus	376
2.7 Peripheral nerve fields – Areea nervinae	351	5.4 Brachial plexus – final branches	376
3 Cranial nerves – Nervi craniales	352	5.5 Lumbar and sacral plexus	378
3.1 N. I Olfactory nerve – Nervus olfactorius	354	5.6 Sacral plexus – branches	379
3.2 N. II Optic nerve – Nervus opticus	354	5.7 N. I, II, III, IV, VI	380
3.3 N. III Oculomotor nerve – Nervus oculomotorius	355	5.8 N. V	381
3.4 N. IV Trochlear nerve – Nervus trochlearis	355	5.9 N. VII, VIII, IX	382
3.5 N. V Trigeminal nerve – Nervus trigeminus	356	5.10 N. X, XI, XII	383
3.6 N. VI Abducent / Abducens nerve – Nervus abducens	360	5.11 Parasympathetic and sympathetic innervation of the head	384
3.7 N. VII Facial nerve – Nervus facialis	360	6 Review questions and figures	385
3.8 N. VIII Vestibulocochlear nerve – Nervus vestibulocochlearis	362	7 Acknowledgements and references	388
3.9 N. IX Glossopharyngeal nerve – Nervus glossopharyngeus	363		