

611(084.4)
A 64

GRAY'S

ATLAS OF ANATOMY

Richard L. Drake
A. Wayne Vogl
Adam W. M. Mitchell
Richard M. Tibbitts
Paul E. Richardson

CHURCHILL
LIVINGSTONE
ELSEVIER

Includes online access to graysatlas.com!

611(084.4)

A64

CHURCHILL
LIVINGSTONE
ELSEVIER

1600 John F. Kennedy Blvd.
Ste 1800
Philadelphia, PA 19103-2899

Б-ка ПНПУ ім. К.Д.УШИНСЬКОГО



544288

GRAY'S ATLAS OF ANATOMY

ISBN: 978-0-443-06721-1

Copyright © 2008 by Churchill Livingstone, an imprint of Elsevier Inc.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Permissions may be sought directly from Elsevier's Health Sciences Rights Department in Philadelphia, PA, USA: phone: (+1) 215 239 3804, fax: (+1) 215 239 3805, e-mail: healthpermissions@elsevier.com. You may also complete your request on-line via the Elsevier homepage (<http://www.elsevier.com>), by selecting "Customer Support" and then "Obtaining Permissions."

Notice

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our knowledge, changes in practice, treatment, and drug therapy may become necessary or appropriate. Readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of the practitioner, relying on experience and knowledge of the patient, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions. To the fullest extent of the law, neither the Publisher nor the Authors assume any liability for any injury and/or damage to persons or property arising out of or related to any use of the material contained in this book.

The Publisher

Library of Congress Cataloging-in-Publication Data

Gray's Atlas of anatomy / Richard L. Drake . . . [et al.]. – 1st ed.

p. ; cm.

Companion to: Gray's anatomy for students / Richard L. Drake, Wayne Vogl, Adam W.M. Mitchell. 2005.

Includes bibliographical references and index.

ISBN 978-0-443-06721-1

1. Anatomy--Atlases. I. Drake, Richard L., Ph.D. II. Drake, Richard L., Ph.D. Gray's anatomy for students. III. Gray, Henry, 1825--1861. Gray's anatomy. IV. Title: Atlas of anatomy.

[DNLM: 1. Anatomy--Atlases. QS 17 G784 2008]

QM25.G72 2008

611.0022'3--dc22

544288

2007017928

Acquisitions Editor: William Schmitt
Developmental Editor: Rebecca Grullow
Publishing Services Manager: Linda Van Pelt
Project Manager: Francisco Morales
Design and Art Direction: Antbits Ltd.
Marketing Manager: Theresa Dudas

"ПІВДЕННОУКРАЇНСЬКИЙ
НАЦІОНАЛЬНИЙ ПЕДАГОГІЧНИЙ
УНІВЕРСИТЕТ ІМЕНІ К.Д.УШИНСЬКОГО"
БІБЛІОТЕКА

Printed in Canada

Last digit is the print number: 9 8 7 6 5 4 3 2 1

Working together to grow
libraries in developing countries

www.elsevier.com | www.bookaid.org | www.sabre.org

ELSEVIER

BOOK AID
International

Sabre Foundation

1 THE BODY

Anatomical position, terms, and planes 2
 Anatomical planes and imaging 3
 Surface anatomy: anterior view 4
 Surface anatomy: posterior view 5
 Skeleton: anterior 6
 Skeleton: posterior 7
 Muscles: anterior 8
 Muscles: posterior 9
 Vascular system: arteries 10
 Vascular system: veins 11
 Lymphatic system 12
 Nervous system 13
 Sympathetics 14
 Parasympathetics 15
 Dermatomes 16
 Cutaneous nerves 17

2 BACK

Surface anatomy 20
 Vertebral column 21
 Regional vertebrae 22
 Cervical vertebrae 23
 Thoracic vertebrae 26
 Lumbar vertebrae 28
 Sacrum 31
 Intervertebral foramina and discs 32
 Intervertebral disc problems 33
 Joints and ligaments 35
 Back musculature: surface anatomy 36
 Superficial musculature 37
 Intermediate musculature 39
 Deep musculature 40
 Back musculature: transverse section 42
 Suboccipital region 43
 Spinal nerves 44
 Spinal cord 45
 Spinal cord vasculature 46
 Venous drainage of spinal cord 47

Meninges 48
 Spinal cord: imaging 50
 Transverse section: thoracic region 52
 Dermatomes and cutaneous nerves 53

3 THORAX

Surface anatomy with bones 56
 Bony framework 57
 Ribs 59
 Articulations 60
 Breast 62
 Pectoral region 64
 Thoracic wall muscles 66
 Diaphragm 67
 Arteries of the thoracic wall 68
 Veins of the thoracic wall 69
 Nerves of the thoracic wall 70
 Lymphatics of the thoracic wall 71
 Intercostal nerves and arteries 72
 Pleural cavities and mediastinum 73
 Parietal pleura 74
 Surface projections of pleural recesses 75
 Right lung 76
 Left lung 77
 Lung lobes: surface relationship 78
 Lung lobes: imaging 79
 Bronchial tree 80
 Bronchopulmonary segments 81
 Pulmonary vessels and plexus 82
 Pulmonary vessels: imaging 83
 Mediastinum 85
 Pericardium 86
 Pericardial layers 87
 Anterior surface of heart 88
 Base and diaphragmatic surface of heart 89
 Right atrium 90
 Right ventricle 91
 Left atrium 92
 Left ventricle 93
 Aortic valve and cardiac skeleton 94
 Cardiac chambers and heart valves 95

CONTENTS

Coronary vessels	96	Arterial supply of viscera	147
Coronary arteries and variations	97	Stomach	148
Cardiac conduction system	99	Spleen	149
Auscultation points and heart sounds	100	Arteries of stomach and spleen	150
Cardiac innervation	101	Duodenum	152
Superior mediastinum: thymus	102	Small intestine	154
Superior mediastinum: veins and arteries	103	Large intestine	156
Superior mediastinum: arteries and nerves	104	Ileocecal junction	158
Superior mediastinum: imaging	105	Gastrointestinal tract: imaging	159
Superior mediastinum: veins and trachea	106	Mesenteric arteries	160
Mediastinum: imaging	107	Liver	162
Mediastinum: view from right	108	Vessels of the liver	164
Mediastinum: imaging – view from right	109	Segments of the liver	165
Mediastinum: view from left	110	Pancreas and gallbladder	166
Mediastinum: imaging – view from left	111	Vasculature of pancreas and duodenum	169
Posterior mediastinum	112	Venous drainage of viscera	170
Mediastinum: imaging	114	Portosystemic anastomoses	172
Transverse section: TVIII level	118	Posterior wall	173
Dermatomes and cutaneous nerves	119	Vessels of the posterior wall	174
Visceral efferent (motor) innervation of the heart	120	Diaphragm	175
Visceral afferents	121	Kidneys	176

4 ABDOMEN

Surface anatomy	124	Gross structure of kidneys	178
Quadrants and regions	125	Kidneys: imaging	179
Abdominal wall	126	Renal vasculature	180
Muscles	128	Branches of the abdominal aorta	182
Muscles: rectus sheath	131	Inferior vena cava	183
Vessels of the abdominal wall	132	Abdominal aorta and inferior vena cava: imaging	184
Arteries and lymphatics of the abdominal wall	133	Lumbar plexus	186
Nerves of the abdominal wall	134	Lumbar plexus: cutaneous distribution	187
Dermatomes and cutaneous nerves	135	Lymphatics	188
Inguinal region	136	Abdominal innervation	189
Inguinal canal	138	Splanchnic nerves	190
Inguinal hernias	140	Visceral efferent (motor) innervation diagram	191
Anterior abdominal wall	141	Visceral afferent (sensory) innervation and referred pain diagram	192
Greater omentum	142	Kidney and ureter visceral afferent (sensory) diagram	194
Abdominal viscera	143		
Peritoneal cavity	144		
Abdominal sagittal section	145		
Abdominal coronal section	146		

5 PELVIS AND PERINEUM

Surface anatomy and articulated pelvis in men	198
Surface anatomy and articulated pelvis in women	200
Pelvic girdle	202

<i>Pelvic girdle: imaging</i>	203	<i>Pudendal nerve</i>	251
<i>Lumbosacral joint</i>	204	<i>Vasculature of perineum</i>	252
<i>Sacro-iliac joint</i>	205	<i>Nerves of perineum</i>	253
<i>Pelvic inlet and outlet</i>	206	<i>Lymphatics of pelvis and perineum in men</i>	254
<i>Orientation of pelvic girdle and pelvic brim</i>	207	<i>Lymphatics of pelvis and perineum in women</i>	255
<i>Pelvic viscera and perineum in men</i>	208	<i>Lymphatics</i>	256
<i>Pelvic viscera and perineum in men: imaging</i>	209	<i>Dermatomes</i>	257
<i>Pelvic viscera and perineum in women</i>	210	<i>Innervation of reproductive system in men</i>	258
<i>Pelvic viscera and perineum in women: imaging</i>	211	<i>Innervation of reproductive system in women</i>	259
<i>Lateral wall of pelvic cavity</i>	212	<i>Innervation of bladder</i>	260
<i>Floor of pelvic cavity: pelvic diaphragm</i>	213	<i>Pelvic cavity imaging in men</i>	261
<i>Rectum and bladder in situ</i>	216	<i>Pelvic cavity imaging in women</i>	264
<i>Rectum</i>	217		
<i>Bladder in men</i>	218		
<i>Bladder in women</i>	219		
<i>Reproductive system in men</i>	220		
<i>Prostate</i>	221		
<i>Prostate and seminal vesicles</i>	223		
<i>Scrotum</i>	224		
<i>Testes</i>	225		
<i>Penis</i>	226		
<i>Reproductive system in women</i>	227		
<i>Uterus and ovaries</i>	228		
<i>Uterus</i>	229		
<i>Uterus: imaging</i>	230		
<i>Pelvic fascia</i>	231		
<i>Arterial supply of pelvis</i>	232		
<i>Venous drainage of pelvis</i>	233		
<i>Vasculature of the pelvic viscera</i>	234		
<i>Vasculature of uterus</i>	235		
<i>Venous drainage of prostate and penis</i>	236		
<i>Venous drainage of rectum</i>	237		
<i>Sacral and coccygeal nerve plexuses</i>	238		
<i>Pelvic nerve plexus</i>	239		
<i>Hypogastric plexus</i>	240		
<i>Surface anatomy of the perineum</i>	241		
<i>Borders and ceiling of the perineum</i>	244		
<i>Deep pouch and perineal membrane</i>	245		
<i>Muscles and erectile tissues in men</i>	246		
<i>Erectile tissue in men: imaging</i>	247		
<i>Muscles and erectile tissues in women</i>	248		
<i>Erectile tissue in women: imaging</i>	249		
<i>Internal pudendal artery and vein</i>	250		
		6 LOWER LIMB	
		<i>Surface anatomy</i>	272
		<i>Bones of the lower limb</i>	273
		<i>Pelvic bones and sacrum</i>	274
		<i>Articulated pelvis</i>	275
		<i>Proximal femur</i>	276
		<i>Hip joint</i>	277
		<i>Hip joint: structure and arterial supply</i>	279
		<i>Gluteal region: attachments and superficial musculature</i>	280
		<i>Gluteal region: superficial and deep muscles</i>	281
		<i>Gluteal region: arteries and nerves</i>	282
		<i>Distal femur and proximal tibia and fibula</i>	284
		<i>Thigh: muscle attachments</i>	285
		<i>Thigh: anterior superficial musculature</i>	286
		<i>Thigh: posterior superficial musculature</i>	287
		<i>Thigh: anterior compartment muscles</i>	288
		<i>Thigh: medial compartment muscles</i>	289
		<i>Femoral triangle</i>	290
		<i>Anterior thigh: arteries and nerves</i>	291
		<i>Anterior thigh: arteries</i>	292
		<i>Thigh: posterior compartment muscles</i>	293
		<i>Posterior thigh: arteries and nerves</i>	294
		<i>Transverse sections: thigh</i>	296
		<i>Knee joint</i>	298
		<i>Ligaments of the knee</i>	300
		<i>Menisci and cruciate ligaments</i>	302
		<i>Knee: bursa and capsule</i>	306
		<i>Knee surface: muscles, capsule, and arteries</i>	307

CONTENTS

<i>Popliteal fossa</i>	308	<i>Glenohumeral joint</i>	356
<i>Tibia and fibula</i>	309	<i>Muscle attachments</i>	358
<i>Bones of the foot</i>	310	<i>Pectoral region</i>	360
<i>Bones and joints of the foot</i>	313	<i>Deep pectoral region</i>	361
<i>Talus and calcaneus</i>	314	<i>Walls of the axilla</i>	362
<i>Ankle joint</i>	315	<i>The four rotator cuff muscles</i>	364
<i>Ligaments of the ankle joint</i>	316	<i>Deep vessels and nerves of the shoulder</i>	366
<i>Leg: muscle attachments</i>	319	<i>Axillary artery</i>	367
<i>Posterior leg: superficial muscles</i>	320	<i>Brachial artery</i>	368
<i>Posterior compartment: deep muscles</i>	321	<i>Brachial plexus</i>	369
<i>Posterior leg: arteries and nerves</i>	322	<i>Medial and lateral cords</i>	370
<i>Lateral compartment: muscles</i>	323	<i>Posterior cord</i>	371
<i>Anterior leg: superficial muscles</i>	324	<i>Distal end of humerus and proximal end of</i>	
<i>Anterior compartment: muscles</i>	325	<i>radius and ulna</i>	372
<i>Anterior leg: arteries and nerves</i>	326	<i>Muscle attachments</i>	373
<i>Leg: cutaneous nerves</i>	327	<i>Anterior compartment: muscles</i>	374
<i>Transverse sections: leg</i>	328	<i>Anterior compartment: arteries and nerves</i>	376
<i>Foot: muscle attachments</i>	330	<i>Veins of the arm</i>	377
<i>Foot: ligaments</i>	331	<i>Posterior compartment: muscles</i>	378
<i>Dorsum of foot</i>	333	<i>Posterior compartment: arteries and nerves</i>	380
<i>Dorsum of foot: arteries and nerves</i>	334	<i>Lymphatics of the arm</i>	381
<i>Plantar aponeurosis</i>	336	<i>Transverse sections: arm</i>	382
<i>Plantar region (sole) musculature: first layer</i>	337	<i>Anterior cutaneous nerves of the arm</i>	384
<i>Plantar region (sole) musculature: second layer</i>	338	<i>Posterior cutaneous nerves of the arm</i>	385
<i>Plantar region (sole) musculature: third layer</i>	339	<i>Elbow joint</i>	386
<i>Plantar region (sole) musculature: fourth layer</i>	340	<i>Elbow joint: capsule and ligaments</i>	388
<i>Plantar region (sole): arteries and nerves</i>	341	<i>Cubital fossa</i>	390
<i>Dorsal hood and tarsal tunnel</i>	343	<i>Radius and ulna</i>	391
<i>Superficial veins of the lower limb</i>	344	<i>Bones of the hand and wrist joint</i>	392
<i>Lymphatics of the lower limb</i>	345	<i>Imaging of the hand and wrist joint</i>	393
<i>Anterior cutaneous nerves and dermatomes</i>		<i>Bones of the hand</i>	394
<i>of the lower limb</i>	346	<i>Joints and ligaments of the hand</i>	395
<i>Posterior cutaneous nerves and dermatomes</i>		<i>Muscle attachments of forearm</i>	396
<i>of the lower limb</i>	347	<i>Anterior compartment of forearm: muscles</i>	397
		<i>Anterior compartment of forearm: arteries and</i>	
		<i>nerves</i>	400
		<i>Posterior compartment of forearm: muscles</i>	401
		<i>Posterior compartment of forearm: arteries and</i>	
		<i>nerves</i>	403
		<i>Transverse sections: forearm</i>	404
		<i>Carpal tunnel</i>	406
		<i>Muscle attachments of the hand</i>	408
		<i>Superficial palmar region (palm) of hand</i>	409

7 UPPER LIMB

<i>Surface anatomy</i>	350
<i>Bones of the upper limb</i>	351
<i>Bony framework of shoulder</i>	352
<i>Scapula</i>	353
<i>Clavicle: joints and ligaments</i>	354
<i>Proximal humerus</i>	355

<i>Tendon sheaths of hand</i>	410	<i>Innervation of the lacrimal gland</i>	463
<i>Lumbrical muscles</i>	411	<i>Muscles of the eyeball</i>	464
<i>Intrinsic muscles of hand</i>	412	<i>Innervation of the orbit and eyeball</i>	465
<i>Palmar region (palm) of hand: arteries and nerves</i>	414	<i>Eye movements</i>	466
<i>Arteries of the hand</i>	416	<i>Vasculature of orbit</i>	467
<i>Innervation of the hand: median and ulnar nerves</i>	417	<i>Eyeball</i>	468
<i>Dorsum of hand</i>	418	<i>Eye imaging</i>	469
<i>Dorsal hoods</i>	419	<i>Ear surface and sensory innervation</i>	472
<i>Dorsum of hand: arteries</i>	420	<i>Ear</i>	473
<i>Dorsum of hand: nerves</i>	421	<i>Middle ear</i>	474
<i>Anatomical snuffbox</i>	422	<i>Internal ear</i>	476
<i>Superficial veins and lymphatics of forearm</i>	423	<i>Ear imaging</i>	477
<i>Anterior cutaneous nerves of forearm</i>	424	<i>Temporal and infratemporal fossae</i>	478
<i>Posterior cutaneous nerves of upper limb</i>	425	<i>Bones of the temporal and infratemporal fossae</i>	479

8 HEAD AND NECK

<i>Surface anatomy with bones</i>	428	<i>Parasympathetic innervation</i>	484
<i>Bones of the skull</i>	429	<i>Arteries and veins of temporal and</i>	
<i>Skull: anterior view</i>	430	<i>infratemporal fossae</i>	485
<i>Skull: lateral view</i>	432	<i>Pterygopalatine fossa</i>	486
<i>Skull: posterior view</i>	434	<i>Neck surface anatomy</i>	488
<i>Skull: superior view and roof</i>	435	<i>Bones of the neck</i>	489
<i>Skull: inferior view</i>	436	<i>Compartments and fascia of the neck</i>	490
<i>Skull: cranial cavity</i>	437	<i>Superficial veins of the neck</i>	491
<i>Ethmoid, lacrimal bone, inferior concha, and vomer</i>	438	<i>Muscles of the neck</i>	492
<i>Maxilla and palatine bone</i>	439	<i>Nerves in the neck</i>	494
<i>Skull: muscle attachments</i>	440	<i>Cranial nerves in the neck</i>	495
<i>Scalp and meninges</i>	442	<i>Cervical plexus and sympathetic trunk</i>	496
<i>Dural partitions</i>	443	<i>Arteries of the neck</i>	498
<i>Dural arteries and nerves</i>	444	<i>Root of the neck: arteries</i>	500
<i>Dural venous sinuses</i>	445	<i>Lymphatics of the neck</i>	502
<i>Brain</i>	446	<i>Pharynx</i>	504
<i>Brain: imaging</i>	448	<i>Muscles of the pharynx</i>	506
<i>Cranial nerves</i>	450	<i>Innervation of the pharynx</i>	508
<i>Arterial supply to brain</i>	452	<i>Vasculature of the pharynx</i>	509
<i>Cutaneous distribution of trigeminal nerve [V]</i>	455	<i>Larynx</i>	510
<i>Facial muscles</i>	456	<i>Laryngeal cavity</i>	512
<i>Vasculature, facial nerve [VII] and lymphatics</i>	458	<i>Muscles of the larynx</i>	513
<i>Deep arteries and veins of parotid region</i>	459	<i>Innervation of the larynx</i>	514
<i>Bony orbit</i>	460	<i>Thyroid gland</i>	515
<i>Section through orbit and structures of eyelid</i>	461	<i>Vasculature of the thyroid gland</i>	516
<i>Eyelids and lacrimal apparatus</i>	462	<i>Nose and paranasal sinuses</i>	518

CONTENTS

<i>Nasal cavity: bones</i>	519	<i>Muscles and salivary glands of the oral cavity</i>	530
<i>Nasal cavity: mucosal linings</i>	520	<i>Vessels and nerves of the tongue</i>	531
<i>Vasculature and innervation of the nasal cavity</i>	521	<i>Tongue</i>	532
<i>Sinus imaging</i>	522	<i>Hard and soft palate</i>	533
<i>Oral cavity: bones</i>	524	<i>Palate</i>	534
<i>Teeth</i>	525	<i>Innervation of oral cavity</i>	535
<i>Teeth: imaging</i>	526	<i>Cranial nerves</i>	536
<i>Anatomy of teeth</i>	527	<i>Visceral efferent (motor) pathways in the head</i>	538
<i>Vessels and nerves supplying teeth</i>	528		
<i>Innervation of teeth and gums</i>	529	INDEX	541