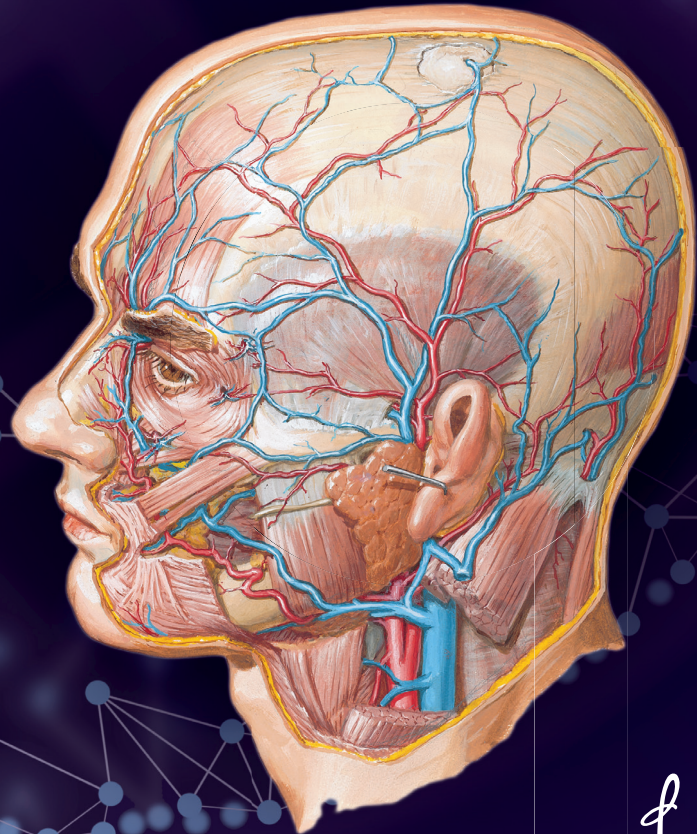


Netter's

ATLAS of SURGICAL ANATOMY

for CPT[®] CODING

Sheri Poe Bernard



*F. Netter
M.D.*

Netter's

ATLAS of SURGICAL ANATOMY
for CPT[®] CODING

Sheri Poe Bernard

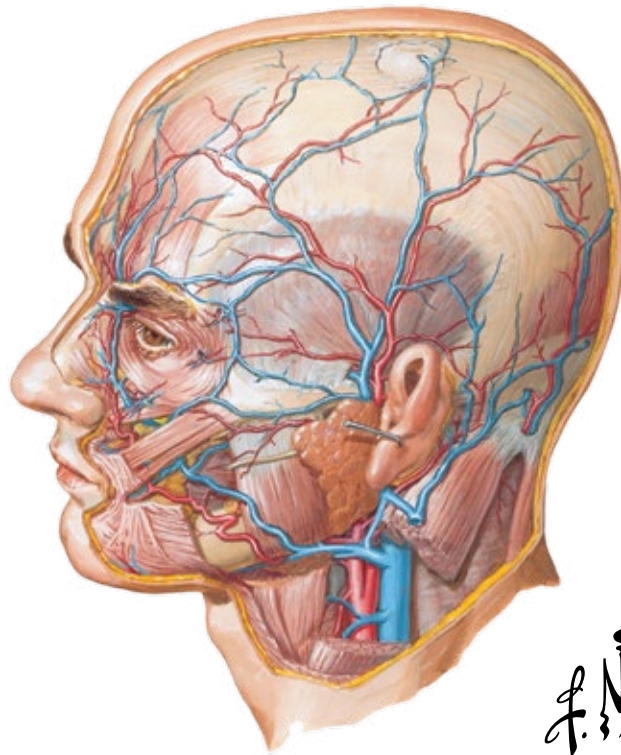
ILLUSTRATIONS BY

Frank H. Netter, MD

CONTRIBUTING ILLUSTRATORS

John A. Craig, MD

Carlos A.G. Machado, MD



*F. Netter
M.D.*

Executive Vice President, Chief Executive Officer: James L. Madara, MD
Chief Operating Officer: Bernard L. Hengesbaugh
Senior Vice President and General Manager, AMA Business Services: Mary G. Henderson, PhD
Vice President, Business Operations: Vanessa Hayden
Vice President, Coding and Reimbursement Products Portfolio: Jay Ahlman
Vice President, Sales and Marketing: Lisa Manoogian
Vice President, Product Development: Mason Meadows
Director, Print and Digital Products: Richard W. Newman
Senior Acquisition Editor: Elise Schumacher
Manager, Book and Product Development and Production: Nancy Baker
Senior Developmental Editor: Lisa Chin-Johnson
Production Specialist: Mary Ann Albanese
Director, Sales: Susan Wilson
Director, Key Account Management: Joann Skiba
Director, Product Marketing: Karen Christensen-Araujo
Director, Channel Sales: Erin Kalitowski
Marketing Manager: Rachel Dunn
Internal Reviewer: Marie Mindeman, Director, CPT Coding and Regulatory Services

Printed in the United States of America. 15 16 17 18 19 20 / TB-WI / 9 8 7 6 5 4 3 2 1

Netter's Atlas of Surgical Anatomy for CPT® Coding. Copyright © 2015 American Medical Association.
All Rights Reserved.

All Netter illustrations in this publication are owned by Elsevier Inc, Copyright © 2015.
All Rights Reserved.

CPT is a registered trademark of the American Medical Association. Copyright 1966, 1970, 1973, 1977, 1981, 1983-2014 by the American Medical Association. All Rights Reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

The AMA does not directly or indirectly practice medicine or dispense medical services. This publication does not replace the AMA's *Current Procedural Terminology* codebook or other appropriate coding authority. The coding information contained in this publication should be used only as a guide.

Additional copies of this book may be ordered by calling 800-621-8335 or AMA|Store at amastore.com. Refer to product number OP495015.

AMA publication and product updates, errata, and addendum can be found at ama-assn.org/go/ProductUpdates.

ISBN: 978-1-62202-030-0
AC33:03/15

Contents

	About Sheri Poe Bernard, CCS-P, CPC, COC	viii
	About Frank H. Netter, MD	ix
	Reviewers	x
	Illustrations List	xi
	Body Planesxv
	Introduction	xvii
CHAPTER 1	◆ Integumentary System	1
	General	2
	Integumentary System	2
	Skin, Subcutaneous, and Accessory Structures	2
	Nails	6
	Pilonidal Cyst	7
	Introduction	7
	Repair (Closure)	7
	Destruction	14
	Breast	18
CHAPTER 2	◆ Musculoskeletal System	27
	General	28
	Head	34
	Neck (Soft Tissues) and Thorax	45
	Back and Flank	48
	Spine (Vertebral Column)	48
	Abdomen	56
	Shoulder	56
	Humerus (Upper Arm) and Elbow	63

	Forearm and Wrist	69
	Hand and Fingers	79
	Pelvis and Hip Joint	87
	Femur (Thigh Region) and Knee Joint	94
	Leg (Tibia and Fibula) and Ankle Joint.	101
	Foot and Toes	109
	Application of Casts and Strapping	118
	Endoscopy/Arthroscopy.	121
CHAPTER 3	◆ Respiratory System	125
	Nose	126
	Accessory Sinuses	129
	Larynx	132
	Trachea and Bronchi	137
	Lungs and Pleura.	141
CHAPTER 4	◆ Cardiovascular System	151
	Heart and Pericardium	153
	Arteries and Veins	175
	Hemic and Lymphatic Systems	199
	Spleen	199
	General.	199
	Transplantation and Post-Transplantation Cellular Infusions	201
	Lymph Nodes and Lymphatic Channels	201
	Mediastinum and Diaphragm	205
	Mediastinum	205
	Diaphragm	205
CHAPTER 5	◆ Digestive System	209
	Lips	210
	Vestibule of Mouth.	212
	Tongue and Floor of Mouth	212
	Dentoalveolar Structures	214
	Palate and Uvula.	216
	Salivary Gland and Ducts	218
	Pharynx, Adenoids, and Tonsils	220
	Esophagus	221

		Stomach	231
		Intestines (Except Rectum)	236
		Meckel's Diverticulum and the Mesentery	243
		Appendix	244
		Colon and Rectum	244
		Anus	247
		Liver	254
		Biliary Tract	258
		Pancreas	260
		Abdomen, Peritoneum, and Omentum	262
CHAPTER 6	◆	Urinary System	273
		Urinary System	274
		Kidney	274
		Ureter	283
		Bladder	286
		Urethra	299
CHAPTER 7	◆	Male Genital System	307
		Penis	308
		Testis	316
		Epididymis	319
		Tunica Vaginalis	319
		Scrotum	321
		Vas Deferens	321
		Spermatic Cord	323
		Seminal Vesicles	323
		Prostate	323
		Reproductive System Procedures	327
		Intersex Surgery	327
CHAPTER 8	◆	Female Genital System	329
		Vulva, Perineum, and Introitus	330
		Vagina	333
		Cervix Uteri	340
		Corpus Uteri	341

	Oviduct/Ovary	347
	Ovary	348
	In Vitro Fertilization	350
	Maternity Care and Delivery	351
	Antepartum and Fetal Invasive Services.	351
	Excision	354
	Introduction	354
	Repair	354
	Vaginal Delivery, Antepartum and Postpartum Care.	357
	Cesarean Delivery	357
	Delivery After Previous Cesarean Delivery.	357
	Abortion	362
	Other Procedures	362
	Endocrine System	362
	Thyroid Gland	362
	Parathyroid, Thymus, Adrenal Glands, Pancreas, and Carotid Body	364
CHAPTER 9	◆ Nervous System	369
	Skull, Meninges, and Brain	373
	Spine and Spinal Cord	395
	Extracranial Nerves, Peripheral Nerves, and Autonomic Nervous System	408
CHAPTER 10	◆ Eye and Ocular Adnexa	431
	Eyeball	432
	Anterior Segment	434
	Posterior Segment	440
	Ocular Adnexa.	442
	Conjunctiva	446
CHAPTER 11	◆ Auditory System	451
	External Ear	452
	Middle Ear	453
	Inner Ear	456
	Temporal Bone, Middle Fossa Approach.	457
	Operating Microscope	457

APPENDIX A ♦ **Glossary** 459

APPENDIX B ♦ **Surgical Acronyms** 503

APPENDIX C ♦ **Procedural Eponyms** 507

Subject Index 515

About Sheri Poe Bernard, CCS-P, CPC, COC

Sheri Poe Bernard, CCS-P, CPC, COC, is one of the nation's leading developers of medical coding curricula and referential material. With more than 20 years of experience in coding and reimbursement publishing, training, and test development, she is an expert communicator of coding concepts.

Bernard is currently a risk adjustment consultant in coding, training, and clinical documentation improvement, as well as a freelance writer. She is a sought-after public speaker on topics including coding, reimbursement, risk adjustment, and anatomy. She pioneered training labs in which medical coders learn anatomy using physiologically similar organs from farm animals. She served for 15 years as a coding content developer at the company now known as Optum360 and was instrumental in the development of the *Coders' Desk Reference*, Encoder Pro, and additive features of the Optum360 International Classification of Diseases and

Healthcare Common Procedure Coding System Level II coding books. She was vice president of training and certification at the AAPC, where she implemented processes for content quality control and oversaw the rewrite and review of certification tests and curricula for three years. Before her employment at AAPC, Bernard served as a member of the AAPC National Advisory Board for eight years, six years as an officer. She worked for two years as a senior technical advisor for the Step-By-Step coding curriculum developed by Carol J. Buck, published by Elsevier, Inc.

Early in her career, Bernard spent 10 years as a daily news journalist and editor, including a stint as a medical reporter. Those years served to hone her research, writing, and editing skills in preparation for a career in training, education, and curriculum development for medical coding professionals.

About Frank H. Netter, MD

Frank H. Netter, MD, was an American surgeon and renowned medical illustrator. He was born in 1906 in New York City. He studied art at the Art Student's League and National Academy of Design before entering medical school at New York University, where he received his MD degree in 1931. During his student years, Netter's notebook sketches attracted the attention of the medical faculty and other physicians, allowing him to augment his income by illustrating articles and textbooks. He continued illustrating as a sideline after he established his medical practice in 1933. Ultimately, he gave up his practice in favor of a full-time commitment to art. During World War II, Netter served in the United States (US) Army and played a major role in illustrating training manuals used by the Armed Forces. After his services in the US Army during World War II, Netter began his long collaboration with the CIBA Pharmaceutical Company (now Novartis Pharmaceuticals). This 45-year partnership resulted in the production of the extraordinary collection of medical art so familiar to physicians and other medical professionals worldwide.

In 2005, Elsevier, Inc., purchased the Netter Collection and all publications from Icon Learning Systems. More than 50 publications that feature Netter's art are now available through Elsevier, Inc. Netter's works are among the finest examples of the use of illustration in the

teaching of medical concepts. The 13-book *Netter Collection of Medical Illustrations*, which includes the greater part of the more than 20,000 paintings created by Netter, became and remains one of the most famous medical works ever published. The *Netter Atlas of Human Anatomy*, first published in 1989 and now in its Sixth Edition, presents a selection of anatomical paintings from the Netter Collection. Now translated into 11 languages, it is the anatomy atlas of choice among thousands of medical and health professions students the world over.

The Netter illustrations are appreciated not only for their aesthetic qualities but, more importantly, for their intellectual content. As Netter wrote in 1949, ". . . clarification of a subject is the aim and goal of illustration. No matter how beautifully painted, how delicately and subtly rendered a subject may be, it is of little value as a medical illustration if it does not serve to make clear some medical point." Netter's planning, conception, point of view, and approach are what inform his paintings and what makes them so intellectually valuable.

Frank H. Netter, physician and artist, died in 1991. Learn more about the *Netter Collection of Medical Illustrations* at www.netterimages.com.

Reviewers

The American Medical Association and the author would like to thank the following reviewers, who have graciously taken the time to review the illustrations and/or manuscript.

Bernard R. Blais, MD

Brian P. Foley, MD

Mark H. Hyman, MD, FACP, FAADEP

Randolph E. Soo-Hoo, MD, MPH, FACOEM

Karin VanMeter, PhD

Illustrations List

FIGURE A.	Body Planes—3/4 View	xv	FIGURE 2-16.	Posterior Approach to the Cervical Spine	51
FIGURE B.	Body Aspects—Side View	xv	FIGURE 2-17.	Fractures of the Cervical Spine	52
FIGURE C.	Body Planes—Front View	xv	FIGURE 2-18.	Anterior Approach to the Cervical Spine	53
FIGURE 1-1.	Excision of Lesion	5	FIGURE 2-19.	Atlas and Axis	55
FIGURE 1-2.	Ingrown Toenail	6	FIGURE 2-20.	Anterior Abdominal Wall	57
FIGURE 1-3.	Adjacent Tissue Transfer	9	FIGURE 2-21.	Shoulder Girdle	58
FIGURE 1-4.	Blepharoplasty	13	FIGURE 2-22.	Muscles of the Shoulder	59
FIGURE 1-5.	Lund-Browder Diagram and Classification Method Table for Burn Estimations	15	FIGURE 2-23.	Rotator Cuff	61
FIGURE 1-6.	Escharotomy	16	FIGURE 2-24.	Bones of the Shoulder	62
FIGURE 1-7.	Breast	19	FIGURE 2-25.	Muscles of the Upper Arm	64
FIGURE 1-8.	Puncture Aspiration	20	FIGURE 2-26.	Ligaments of the Elbow	66
FIGURE 1-9.	Needle Core Biopsy	21	FIGURE 2-27.	Bones of the Elbow	68
FIGURE 1-10.	Nipple Reconstruction	22	FIGURE 2-28.	Muscles of the Forearm and Wrist	70
FIGURE 1-11.	Tissue Expander	23	FIGURE 2-29.	Flexor Tendons of the Wrist	73
FIGURE 1-12.	Flaps in Breast Reconstruction	24	FIGURE 2-30.	Carpal and Wrist Bones	75
FIGURE 2-1.	Percutaneous Needle Biopsy	28	FIGURE 2-31.	Colles Fracture	76
FIGURE 2-2.	Carpal Tunnel Injection	29	FIGURE 2-32.	Deep Palmar Soft Tissue	78
FIGURE 2-3.	Joint Arthrocentesis, Aspiration, or Injection	30	FIGURE 2-33.	Intrinsic Muscles of the Hand	80
FIGURE 2-4.	Application of Halo or Tongs	31	FIGURE 2-34.	Ligaments of the Fingers	82
FIGURE 2-5.	Replantation of the Forearm	33	FIGURE 2-35.	Flexor and Extensor Tendons of the Finger	83
FIGURE 2-6.	Muscles of the Head	35	FIGURE 2-36.	Bones of the Wrist and Hand	85
FIGURE 2-7.	Temporomandibular Joint and Muscles	36	FIGURE 2-37.	Hip Joint	88
FIGURE 2-8.	Lateral View of the Skull	38	FIGURE 2-38.	Muscles of the Hip	89
FIGURE 2-9.	Anterior View of the Skull	39	FIGURE 2-39.	Pelvic Fracture With No Pelvic Ring Disruption	91
FIGURE 2-10.	Le Fort I Fracture	41	FIGURE 2-40.	Femur	93
FIGURE 2-11.	Le Fort III Fracture	42	FIGURE 2-41.	Knee Joint	95
FIGURE 2-12.	Lateral View of Muscles of the Neck	44	FIGURE 2-42.	Interior of the Knee	96
FIGURE 2-13.	Ribcage Injuries	46	FIGURE 2-43.	Ligaments of the Knee	98
FIGURE 2-14.	Posterior Thoracic Wall	47	FIGURE 2-44.	Fracture of the Patella	100
FIGURE 2-15.	Anatomy of the Spine	49			

FIGURE 2-45.	Decompression Fasciotomy	102	FIGURE 4-15.	Major Arteries and Pulse Points	176
FIGURE 2-46.	Muscles of the Leg	104	FIGURE 4-16.	Major Veins	177
FIGURE 2-47.	Tibia and Fibula	106	FIGURE 4-17.	Aortic Aneurysm.	179
FIGURE 2-48.	Ligaments and Tendons of the Ankle and Foot	108	FIGURE 4-18.	Bypass Grafts	183
FIGURE 2-49.	Soft Tissue of the Foot	110	FIGURE 4-19.	Venous Valves	185
FIGURE 2-50.	Correction of Toe Deformities.	113	FIGURE 4-20.	Vascular Access	187
FIGURE 2-51A.	Bones of the Foot	114	FIGURE 4-21.	Catheter Placement	190
FIGURE 2-52.	Amputation of the Foot	117	FIGURE 4-22.	Hepatic Portal Vein and Tributaries.	193
FIGURE 2-53.	Velpau Shoulder Strapping.	118	FIGURE 4-23.	Arteries to the Brain.	197
FIGURE 2-54.	Arthroscopic Approach	120	FIGURE 4-24.	Superficial Veins of the Lower Extremity.	198
FIGURE 2-55.	Knee Arthroscopy	122	FIGURE 4-25.	The Spleen.	200
FIGURE 3-1.	Nasal Examination and Polyps	127	FIGURE 4-26.	The Lymphatic System	202
FIGURE 3-2.	The Nose.	128	FIGURE 4-27.	The Mediastinum	204
FIGURE 3-3.	The Paranasal Sinuses	130	FIGURE 4-28.	Abdominal Surface of the Diaphragm	206
FIGURE 3-4.	The Larynx and Trachea	132	FIGURE 5-1.	Mouth Features	210
FIGURE 3-5.	Radical Neck Dissection.	133	FIGURE 5-2.	The Oral Cavity	211
FIGURE 3-6.	The Larynx	135	FIGURE 5-3.	The Tongue.	213
FIGURE 3-7.	The Trachea and Pharynx	136	FIGURE 5-4.	Roof of the Mouth	215
FIGURE 3-8.	Tracheostomy	138	FIGURE 5-5.	The Salivary Glands	217
FIGURE 3-9.	Bronchi.	140	FIGURE 5-6.	Opened Posterior View of the Pharynx	219
FIGURE 3-10.	The Thoracic Cavity	142	FIGURE 5-7.	Esophagus In Situ	222
FIGURE 3-11.	Bronchopulmonary Segments.	144	FIGURE 5-8.	Esophagography and Esophagoscopy	224
FIGURE 3-12.	Chest Tube Placement.	146	FIGURE 5-9.	Stomach Anatomy and Esophagogastroduodenoscopy	226
FIGURE 3-13.	Topography of the Lung	148	FIGURE 5-10.	Duodenum In Situ	227
FIGURE 3-14.	Lymph Nodes of the Lung	149	FIGURE 5-11.	Endoscopic Retrograde Cholangiopancreatography Imaging Studies.	228
FIGURE 4-1.	The Pericardium and the Heart	152	FIGURE 5-12.	Nissen Fundoplication	230
FIGURE 4-2.	Implantable Pacing Transvenous Cardioverter-Defibrillator	154	FIGURE 5-13.	The Stomach.	232
FIGURE 4-3.	Conduction System of the Heart	156	FIGURE 5-14.	Abdominal Regions and Planes	233
FIGURE 4-4.	Path of Blood Through the Heart	158	FIGURE 5-15.	Bariatric Options.	235
FIGURE 4-5.	The Great Vessels	159	FIGURE 5-16.	The Large Intestine	237
FIGURE 4-6.	Valves of the Heart	161	FIGURE 5-17.	Gastroenteric Stomas	240
FIGURE 4-7.	Coronary Arteries and Veins	163	FIGURE 5-18.	The Small Intestine	242
FIGURE 4-8.	Coronary Artery Bypass Graft.	164	FIGURE 5-19.	Anoscopy, Sigmoidoscopy, and Colonoscopy	246
FIGURE 4-9.	Ventricular Septal Defects	166	FIGURE 5-20.	The Rectum and Anal Canal.	248
FIGURE 4-10.	Tetralogy of Fallot	167	FIGURE 5-21.	Injection and Rubber Band Ligation.	250
FIGURE 4-11.	Truncus Arteriosis and Transposition of the Great Vessels.	169	FIGURE 5-22.	Hemorrhoids	251
FIGURE 4-12.	Fetal and Newborn Circulation	170	FIGURE 5-23.	Surfaces and Bed of the Liver.	253
FIGURE 4-13.	Thoracic Aorta.	172			
FIGURE 4-14.	Pulmonary Arteries and Veins.	173			

FIGURE 5-24.	Liver Segments and Lobes	255	FIGURE 7-8.	Descent of the Testes	318
FIGURE 5-25.	Laparoscopy	257	FIGURE 7-9.	Hydrocele and Spermatocele	320
FIGURE 5-26.	The Gallbladder and Extrahepatic Bile Ducts	259	FIGURE 7-10.	Vasectomy	322
FIGURE 5-27.	The Pancreas	261	FIGURE 7-11.	Approaches to Seminal Vesicles	324
FIGURE 5-28.	The Retroperitoneum	263	FIGURE 7-12.	The Prostate, Bladder, Seminal Vesicles, and Vas (Ductus) Deferens	325
FIGURE 5-29.	The Inguinal Canal.	265	FIGURE 7-13.	Radical Prostatectomy	326
FIGURE 5-30.	Inguinal Hernias	268	FIGURE 8-1.	The Vulva, Perineum, and Introitus	331
FIGURE 5-31.	Omphalocele.	269	FIGURE 8-2.	Dissection Exposing the Perineal Body	332
FIGURE 5-32.	The Greater Omentum and Abdominal Viscera	270	FIGURE 8-3.	The Vagina and Other Internal Genitalia	334
FIGURE 6-1.	Kidney Structure.	275	FIGURE 8-4.	Pessary Therapy.	335
FIGURE 6-2.	Kidney In Situ: Posterior View	276	FIGURE 8-5.	Rectocele, Enterocele	336
FIGURE 6-3.	Renal Biopsy	277	FIGURE 8-6.	Cystocele, Urethrocele	338
FIGURE 6-4.	Kidney Transplantation	279	FIGURE 8-7.	Colposcopy.	339
FIGURE 6-5.	Renal Fusion	281	FIGURE 8-8.	The Internal Female Genitalia: Sagittal View	340
FIGURE 6-6.	Extracorporeal Shock Wave Lithotripsy	282	FIGURE 8-9.	The Uterus, Fallopian Tubes, and Ovaries.	342
FIGURE 6-7.	The Ureters	284	FIGURE 8-10.	Uterine Leiomyomas.	343
FIGURE 6-8.	Male and Female Bladder: Lateral View	287	FIGURE 8-11.	Hysteroscopy	346
FIGURE 6-9.	Male and Female Bladder: Anterior View	288	FIGURE 8-12.	The Fallopian Tube.	347
FIGURE 6-10.	Diverticula of the Bladder	289	FIGURE 8-13.	Staging Laparotomy	349
FIGURE 6-11.	Cystometrography.	290	FIGURE 8-14.	Gamete/Zygote Intrafallopian Transfer	350
FIGURE 6-12.	Exstrophy of Bladder	292	FIGURE 8-15.	Amniocentesis.	351
FIGURE 6-13.	Urinary Fistulas	294	FIGURE 8-16.	Fetal Contraction Stress Test	352
FIGURE 6-14.	Bladder Tumor Approaches	295	FIGURE 8-17.	Fetal Nonstress Test.	353
FIGURE 6-15.	Ureterocele	297	FIGURE 8-18.	Ectopic Pregnancy.	355
FIGURE 6-16.	Transurethral Resection of Prostate	298	FIGURE 8-19.	Cerclage	356
FIGURE 6-17.	The Male Urethra	300	FIGURE 8-20.	Normal Vaginal Birth	358
FIGURE 6-18.	The Female Urethra	301	FIGURE 8-21.	The Placenta.	359
FIGURE 6-19.	Urinary Extravasation	303	FIGURE 8-22.	Cesarean Birth.	360
FIGURE 6-20.	The Prostate	304	FIGURE 8-23.	The Thyroid and Parathyroid Glands	363
FIGURE 7-1.	Penile Structures	309	FIGURE 8-24.	The Thymus	365
FIGURE 7-2.	Lateral View of the Penis	310	FIGURE 8-25.	The Pancreas	366
FIGURE 7-3.	Foreskin Disorders.	311	FIGURE 8-26.	The Adrenal Glands	367
FIGURE 7-4.	Longitudinal and Cross-Section of the Penis	312	FIGURE 9-1.	Cerebrum In Situ.	370
FIGURE 7-5.	Hypospadias and Chordee.	314	FIGURE 9-2.	The Brain Stem	371
FIGURE 7-6.	The Scrotum and Spermatic Cord.	315	FIGURE 9-3.	Ventricles of the Brain.	372
FIGURE 7-7.	The Testis, Epididymis, and Ductus Deferens	317	FIGURE 9-4.	Meninges of the Brain and Spinal Cord	374

- FIGURE 9-5.** Subdural Tap and Catheter Placement 375
- FIGURE 9-6.** Burr Hole 377
- FIGURE 9-7.** The Tentorium Cerebelli 378
- FIGURE 9-8.** The Intracranial Arteries 380
- FIGURE 9-9.** Hematoma 381
- FIGURE 9-10.** Transsphenoidal Pituitary Tumor Excision 382
- FIGURE 9-11.** Craniostylosis and Encephalocele 384
- FIGURE 9-12.** Acoustic Neuroma 385
- FIGURE 9-13.** Balloon Embolization 388
- FIGURE 9-14.** Functional Areas for Neurostimulation 390
- FIGURE 9-15.** Depressed Skull Fracture 391
- FIGURE 9-16.** Cerebrospinal Fluid Circulation 393
- FIGURE 9-17.** Hydrocephalus 394
- FIGURE 9-18.** The Spinal Cord 396
- FIGURE 9-19.** Dermatomes 397
- FIGURE 9-20.** Lumbar Puncture and Epidural Injection 398
- FIGURE 9-21.** Herniations Affecting the Spinal Cord 400
- FIGURE 9-22.** Spinal Membranes and Nerve Roots 401
- FIGURE 9-23.** Thoracic Vertebrae 403
- FIGURE 9-24.** Spinal Cord Tumors 405
- FIGURE 9-25.** The Cervical Plexus 409
- FIGURE 9-26.** The Brachial Plexus 410
- FIGURE 9-27.** Lumbosacral and Coccygeal Plexuses 411
- FIGURE 9-28.** The Trigeminal Nerve 412
- FIGURE 9-29.** The Autonomic Nervous System 414
- FIGURE 9-30.** The Celiac Plexus 415
- FIGURE 9-31.** The Sympathetic Nervous System 416
- FIGURE 9-32.** The Sciatic Nerve 418
- FIGURE 9-33.** The Ulnar Nerve 419
- FIGURE 9-34.** Digital Nerve Decompression 420
- FIGURE 9-35.** Median Nerve Neuroplasty 421
- FIGURE 9-36.** The Vagus Nerve 423
- FIGURE 9-37.** The Median Nerve 425
- FIGURE 9-38.** The Cranial Nerves 426
- FIGURE 9-39.** The Facial Nerve 427
- FIGURE 9-40.** Peripheral Nerve Anatomy 428
- FIGURE 9-41.** The Foot and Ankle Nerves 429
- FIGURE 10-1.** The Eyeball 433
- FIGURE 10-2.** The Anterior Segment 435
- FIGURE 10-3.** Aqueous Flow and Pressure 437
- FIGURE 10-4.** Lens Removal and Replacement 439
- FIGURE 10-5.** The Extraocular Muscles 443
- FIGURE 10-6.** Eyelid Anatomy 445
- FIGURE 10-7.** The Lacrimal System 448
- FIGURE 11-1.** The External Ear 453
- FIGURE 11-2.** The Middle Ear 454
- FIGURE 11-3.** The Labryinth and the Auditory Nerve 456
- FIGURE 11-4.** Inner Ear Fluid 457

FIGURE A. Body Planes—3/4 View

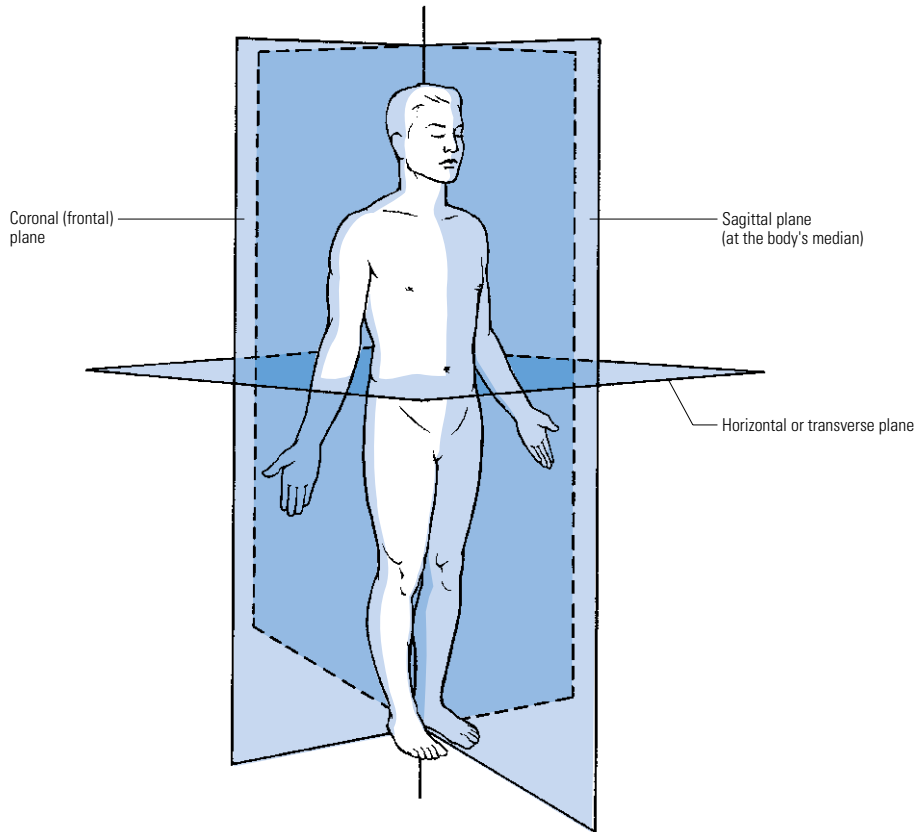


FIGURE B. Body Aspects—Side View

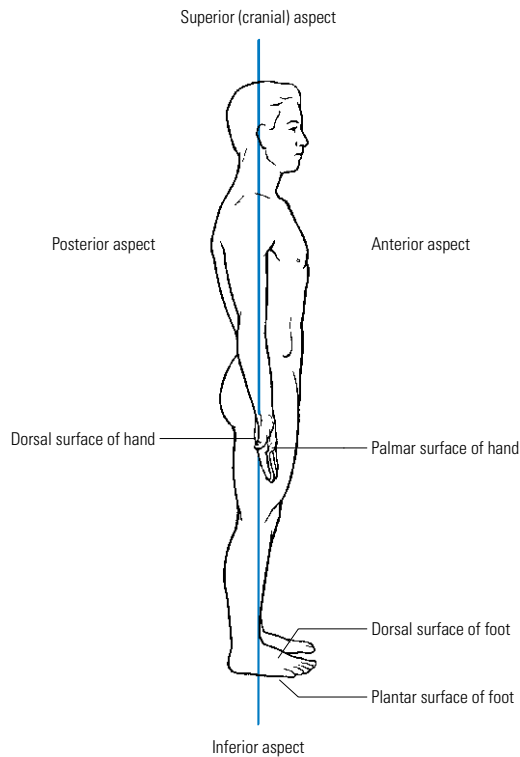
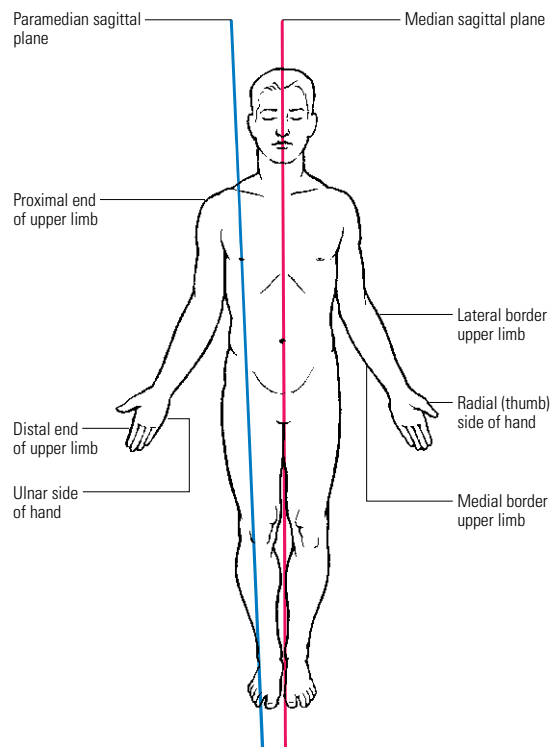


FIGURE C. Body Planes—Front View



Introduction

Netter's *Atlas of Surgical Anatomy for CPT Coding* (Netter's Surgical Coding Atlas) unites annotated CPT® codes and code descriptors from the CPT® Surgery section with clinically and significant renderings by renowned medical illustrator, Frank H. Netter, MD. This book is designed to simplify the navigation through complex operative reports for CPT code abstraction. For this book, the CPT Surgery codes are paired with corresponding Netter illustrations in a user-friendly format that includes anatomical annotations and an extensive glossary of medical terms. While the Netter's Surgical Coding Atlas does not replace the CPT codebook, it is an ideal tool for readers who wish to boost their anatomical knowledge within the context of CPT codes as they abstract codes from operative reports.

The book is simply organized to match the CPT codebook: official codes and descriptions from the Surgery section of the CPT codebook are organized in numeric order, from code 10021 through code 69990. Note that unlisted codes are the only codes that are not included in the Netter's Surgical Coding Atlas. Subsections (eg, Integumentary System, Musculoskeletal System, and Respiratory System) in the CPT Surgery section are separated as individual chapters in the Netter's Surgical Coding Atlas for easy access and reference. Smaller Surgery sections from the CPT code set (including General, Hemic and Lymphatic Systems, Mediastinum and Diaphragm, Intersex Surgery, and Endocrine System) are combined into adjacent chapters.

The Netter's Surgical Coding Atlas is an invaluable resource for CPT surgical coding with integrated anatomical instruction and illustrations. It is an incomparable book that brings anatomical and coding concepts together to serve as a reference and educational resource for both new and seasoned coders, as well as coding students. The Netter's Surgical Coding Atlas can be used by a new coder who is trying to understand the relationship of anatomy and coding and who is learning to apply and translate their understanding of anatomy in the context of CPT codes, or by a seasoned coder who is trying to glean and extract important information from an operative report to physician notes—all in context of anatomy and CPT codes simultaneously.

Features of the Netter's Surgical Coding Atlas

The Netter's Surgical Coding Atlas should not be used as a primary CPT coding reference as it contains none of the guidelines, parenthetical instructions, modifiers, and appendices found in the most current edition of the official CPT codebook. Instead, it contains, with the exception of unlisted codes, all of the official CPT codes and code descriptors from the CPT Surgery section, together with their corresponding headings, subheadings, and subsections. The code groupings are paired with corresponding Netter illustrations, captions about the illustrations, and coding annotations. The Netter's Surgical Coding Atlas is an ideal supplement and companion to the CPT codebook.

Each chapter in this book begins with an introduction and overview of the anatomical system(s) within the chapter to provide a basic understanding of pathophysiology that may affect code selection. Seven hundred Netter's illustrations are paired with specific CPT codes in the Netter's Surgical Coding Atlas. Throughout the book, a unique feature, "Coding Atlas," provides additional information and details of anatomy related to procedures within specific CPT code ranges.

Throughout the Netter's Surgical Coding Atlas, selected procedural and medical terms are set in **purple** type to indicate that definitions of these words are available in the Glossary. This comprehensive, alphabetized glossary of procedural and anatomical terms simplifies complex terminology to promote further understanding.

Coding Atlas

Coding Atlas is a unique feature of the Netter's Surgical Coding Atlas, which combines related information about CPT codes, anatomy, and pathophysiology for the group of codes that will be covered in that section of the chapter. See the following example.

Endovascular Repair of Descending Thoracic Aorta

Coding Atlas

In **endovascular** repair of the descending thoracic aorta, an **endoprosthesis** is carried through a scope to the site of an **aneurysm**, **ulcer**, or other abnormality and secured over the defect endoscopically. The thoracic aorta is the origin of several paired arteries: bronchial, mediastinal, esophageal, and pericardial. The **superior** phrenic artery also branches from the thoracic aorta, as do the **posterior** intercostal arteries. In some cases, an aneurysm bridges an area with an arterial branch, and prosthetic extension(s) are placed in the artery forking from the aorta to complete the repair.

Illustrations and Captions

Both medical procedures and human anatomy drawings from Netter are used in this book to help illustrate both the procedures and the anatomical parts relative to the specific CPT codes. The detailed labels and annotations from Netter are reproduced in the Netter's Surgical Coding Atlas as well. Note that some of the procedural illustrations from Netter may be out-of-date in terms of the depicted tools used for a procedure and for this reason, you will find that a footnote has been included for all procedural illustrations: **Note: Tools, implants, and/or equipment depicted in the illustration may be outdated but the procedural approach is valid.** An illustration of body planes is reproduced from the *CPT Professional* codebook as well. There are over 700 illustrations in this book and to help readers find these easily, an illustrations list is provided in the Front Matter of this book.

Captions serve to tie the illustrations to the codes on surrounding pages, augmenting the readers' understanding of the application of CPT codes.

Appendices

The Netter's Surgical Coding Atlas has three appendices: Glossary, Surgical Acronyms, and Procedural Eponyms. The Glossary is an alphabetized compilation of terms that are colorized throughout the book. In the glossary, these terms are defined using terms that apply across all specialties. The second appendix is entitled, Surgical Acronyms, which is a compilation of common surgical acronyms and their meanings. Finally, the third appendix is a compilation of surgical procedure eponyms and a brief description of the procedure. In addition, a subject

index, which is organized alphabetically to help readers locate procedural and anatomical information, is provided as well.

CPT Code Set Nomenclature

A basic understanding of CPT code set nomenclature is required to use this book. This nomenclature is briefly outlined here, but more information is available in the CPT codebook. The Netter's Surgical Coding Atlas was developed using the 2015 CPT code set.

Parent and Child Codes Relationship

Understanding the relationship between the parent and child codes is critical to reading CPT code descriptions. In an effort to save space on the printed page, the parent and child code's shared or common description is not listed or repeated in the child code's descriptor. The shared content appears before the semicolon in the parent code. In addition, the child code's descriptor is physically indented beneath the parent code's descriptor to show this relationship. A parent code may be followed by several child codes. See the following examples.

35901	Excision of infected graft; neck
35903	extremity
35905	thorax
35907	abdomen

Based on the example above, code 35901 is a parent code, while the other 3 codes are child codes. The common or shared part of code 35901 (the part before the semicolon) should also be considered as part of codes 35903, 35905, and 35907. Therefore, the complete descriptions for the child codes are:

35903	Excision of infected graft; extremity
35905	Excision of infected graft; thorax
35907	Excision of infected graft; abdomen

CPT Code Symbols

Many of the symbols from the CPT codebook are used in the Netter's Surgical Coding Atlas and similar to the CPT codebook, a legend is provided to explain the symbols. The following is a list of the CPT code symbols, which are presented together with the examples used in the Netter's Surgical Coding Atlas. For more information about these symbols, refer to the CPT codebook.

© **Moderate sedation code.** Conscious sedation is inherent in many surgical procedures. The moderate sedation symbol is applied to those CPT codes for which moderate

sedation services are included. Codes with this symbol should not be reported in conjunction with moderate sedation codes. For example:

⊖ **50200** Renal biopsy; percutaneous, by trocar or needle

+ Add-on code. Some surgical procedures are performed in conjunction with a primary procedure, never alone. The add-on symbol indicates that the procedure represented by the code is an additive procedure and never a primary procedure. These add-on codes often include language such as “each additional” or “List separately in addition to primary procedure” in their descriptions. Here is an example of an add-on code:

+ 66990 Use of ophthalmic endoscope (List separately in addition to code for primary procedure)

Resequenced code. Some codes in the CPT code set appear out of numerical order. Resequencing allows placement of new codes within a family of related codes, regardless of the availability of numbers for sequential code placement. Numerically placed references (ie, Code is out of numerical sequence. See . . .) are used as navigational alerts to direct the user to the location of an out-of-sequence code.

26111 Code is out of numerical sequence. See 26100-26262

26113 Code is out of numerical sequence. See 26100-26262

26115 Excision, tumor or vascular malformation, soft tissue of hand or finger, subcutaneous; less than 1.5 cm

26111 1.5 cm or greater

26116 Excision, tumor, soft tissue, or vascular malformation, of hand or finger, subfascial (eg, intramuscular); less than 1.5 cm

26113 1.5 cm or greater

⊖ **Modifier 51 exempt code.** When multiple procedures are performed during the same surgical session and by the same physician, modifier 51 is appended to any secondary procedures.

⊖ **31500** Intubation, endotracheal, emergency procedure

Unlisted Codes

Unlisted codes are not used in the Netter's Surgical Coding Atlas because they are nonspecific and cannot be annotated or illustrated. Refer to the CPT codebook for unlisted codes.

Using This Book

A good foundation in anatomy and pathophysiology is essential for any coding professional. However, there are times when documentation in an operative report challenges the limits of even the most seasoned coder. At those times, an anatomy reference is invaluable. Most anatomy references focus on clinical elements required by physicians, nurses, and other clinicians. These detailed clinical elements may not provide a coder with quick and easy answers. The Netter's Surgical Coding Atlas is designed to pair appropriate anatomical illustrations, annotations, and captions with CPT surgical code ranges for a convenient look-up anatomy reference that will save time and enhance coding accuracy.

The following operative report and Netter's Surgical Coding Atlas excerpts serve to illustrate how the book will assist coders with understanding the nomenclature of medical documentation and CPT codes to make the correct coding choices. On the facing page, two illustrations and their captions have been reproduced. These illustrations appear in the book near the codes in column 2 of the facing page. A Coding Atlas that further informs the coding decision for the operative report is included with the codes. Each element (illustrations, caption, Coding Atlas notation, codes, descriptions, and glossary terms) contributes to coder decision making. Final code selection should be verified using the CPT codebook, as key guidelines, coding notes, rules, and modifiers are available only in the official codebook.

Regular use of the Netter's Surgical Coding Atlas will enable the reader to further understand the relationship between human anatomy and surgical procedures and all in context of their appropriate CPT codes. It is also a useful tool for students who are studying anatomy and pathophysiology.

Shoulder Hemiarthroplasty

PREOPERATIVE DIAGNOSIS

Comminuted fracture, dislocation right proximal humerus

POSTOPERATIVE DIAGNOSIS

Same

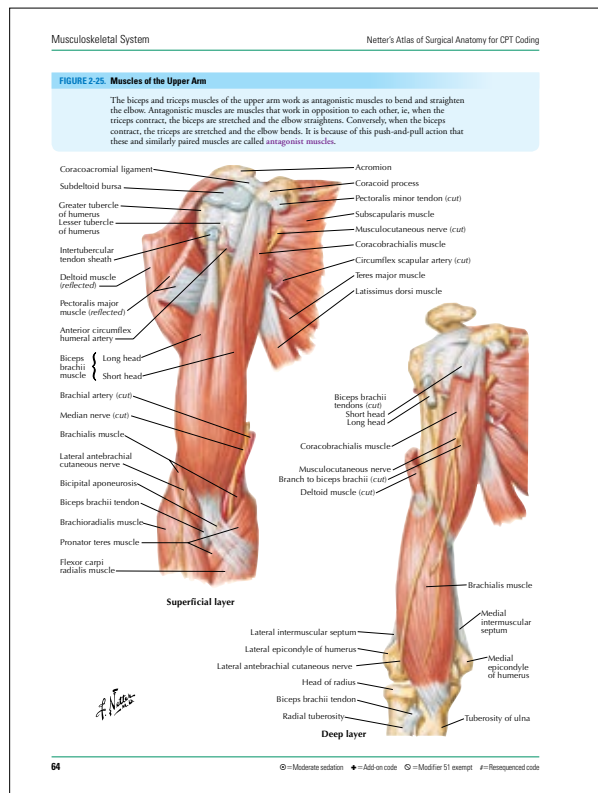
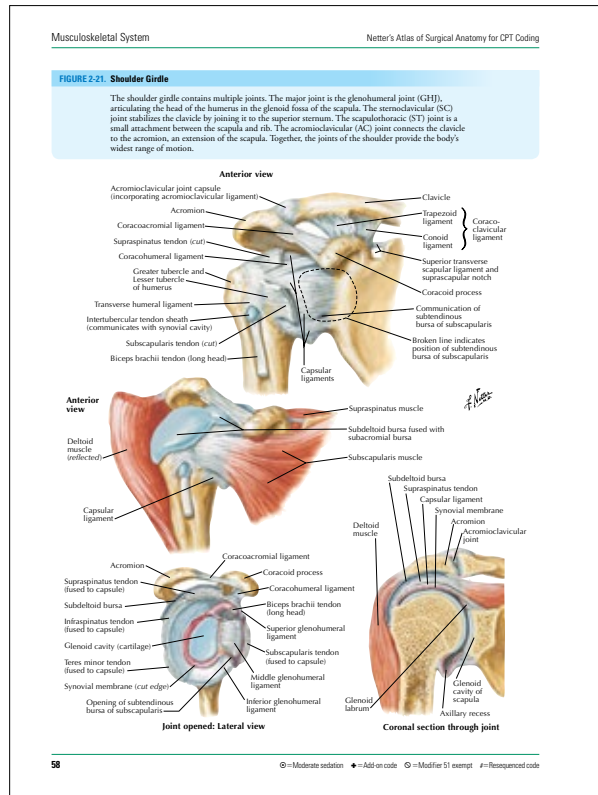
PROCEDURE

Hemiarthroplasty of right shoulder using #8 mm cemented humeral stem and 48 × 21 mm modular head replacement.

TECHNIQUE

The anesthesiologist administered general anesthesia. The patient was positioned in modified beach chair position. The right shoulder was prepped and draped in the usual manner. A longitudinal incision was made extending from lateral to the coracoid down toward the deltoid tuberosity of the humerus. This incision was taken down through the skin and subcutaneous tissues were split. Hemostasis was achieved with electrocautery. The deltoid fascia was identified. The deltopectoral interval was identified and the deltoid split just lateral to the cephalic vein. The deltoid was then retracted. There was marked hematoma and swelling within the subdeltoid bursa. This was removed. The biceps brachii tendon was identified as the landmark for the rotator interval. Mayo scissors were used to split the remaining portion of the rotator interval. The greater tuberosity portion with the rotator cuff was identified. Excess bone was removed from the greater tuberosity side to allow for closure later. The lesser tuberosity portion with the subscapularis was still attached to the humeral head, therefore, osteotome was utilized to separate the lesser tuberosity from the humeral head fragment.

Excess bone was removed from the lesser tuberosity as well. The humeral head was delivered out of the wound. It was localized to the area of the anteroinferior glenoid region. The glenoid was then inspected and noted to be intact. The fracture was at the level of the surgical neck on the proximal humerus. The canal was repaired with the broaches. The 48 x 21 mm head was the most appropriate size, matching the patient's as well as the soft tissue tension on the shoulder. The cement gun was filled and the canal was filled with the cement. The #8 stem was then impacted into place and held in position in appropriate retroversion until the cement had cured. Excess cement was removed by sharp dissection. Prior to cementation of the stem, a hole was drilled in the shaft of proximal humerus and #2 fiber wires were placed through this hole for closure later. Once the cement was cured, the modular head was impacted on to the Morse taper. The lesser tuberosity was then reapproximated back to the original site utilizing the #2 fiber wire suture that was placed in the humeral shaft as well as the holes in the humeral implant. The greater tuberosity portion with rotator cuff was also attached to the implant as well as the shaft of the humerus utilizing #2 fiber wires as well. The rotator interval was closed with #2 fiber wire in an interrupted fashion. The biceps brachii tendon was inspected within this closure. The deltoid fascia was then approximated with interrupted #2-0 Vicryl suture. Subcutaneous layer was approximated with interrupted #2-0 Vicryl and skin approximated with staples. Subcutaneous tissues were infiltrated with 0.25% Marcaine solution.



Repair, Revision, and/or Reconstruction

Coding Atlas

In **hemiarthroplasty** of the shoulder, the head of the humerus bone is replaced. In total arthroplasty, both the head of the humerus (ball) and the glenoid (socket) are replaced. In the revision of a total arthroplasty, removal of existing hardware is inherent in the procedure and not reported separately.

23440 Resection or transplantation of long tendon of biceps

23450 Capsulorrhaphy, anterior; Putti-Platt procedure or Magnuson type operation

23455 with labral repair (eg, Bankart procedure)

23460 Capsulorrhaphy, anterior, any type; with bone block

23462 with coracoid process transfer

23465 Capsulorrhaphy, glenohumeral joint, posterior, with or without bone block

23466 Capsulorrhaphy, glenohumeral joint, any type multi-directional instability

23470 Arthroplasty, glenohumeral joint; **hemiarthroplasty**

23472 total shoulder (glenoid and proximal humeral replacement (eg, total shoulder))

23473 Revision of total shoulder arthroplasty, including **allograft** when performed; humeral **or** glenoid component

23474 humeral **and** glenoid component

Glossary

allograft. Tissue for grafting from a donor of the same species.

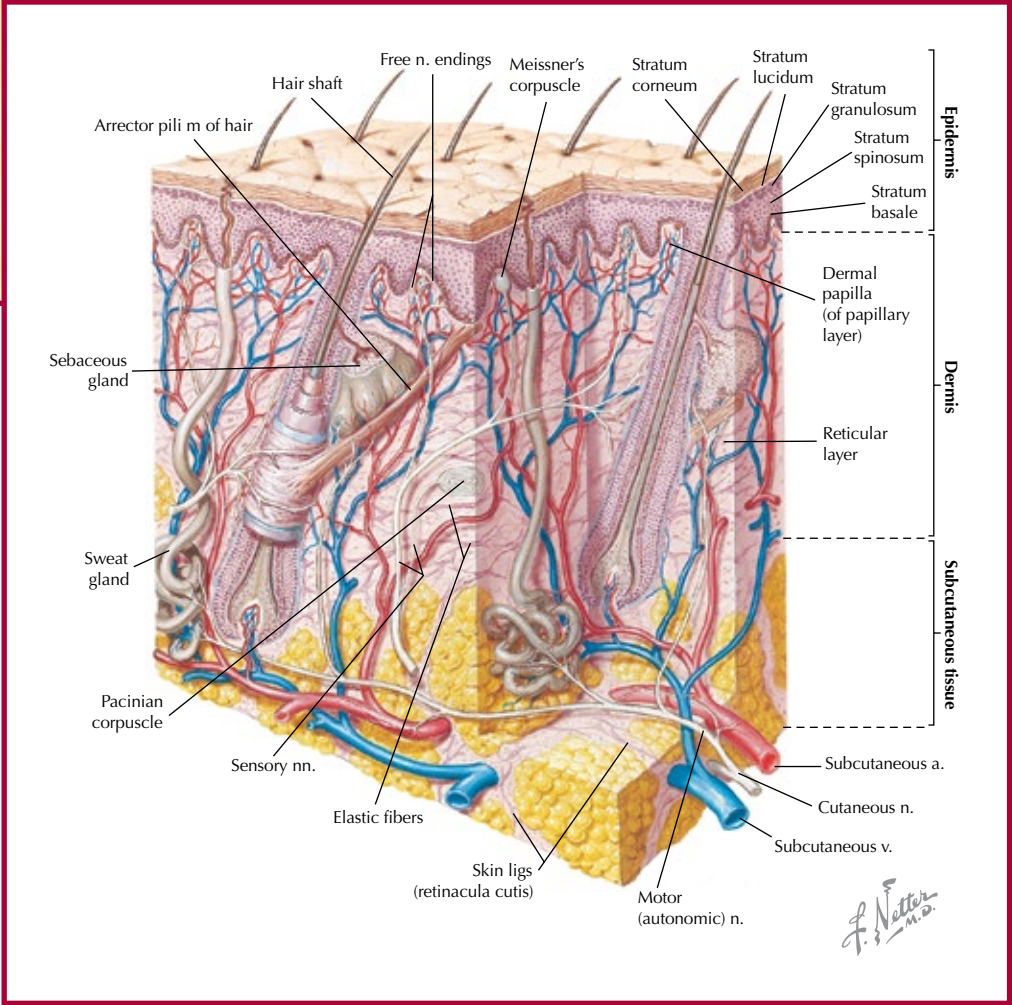
arthroplasty. Reconstructive surgery of a joint or joints to restore motion because of ankyloses or trauma or to prevent excessive motion; this repair and reconstruction may use silicone, metallic, or other implants.

capsulorrhaphy. Suture repair of a capsule, especially a joint capsule.

hemiarthroplasty. Joint reconstruction in which only one of the two surfaces of the joint is replaced with a prosthesis.

resection. Surgical removal of a section or segment of an organ or structure; in the case of muscle or tendon, this will result in the muscle being more lax than it was before surgery.

transplantation. Surgical transfer and grafting of tissue from one location to another or from one entity to another.



Integumentary System

The integumentary system includes skin, nails, hair, sebaceous and sudoriferous glands, and breast. The skin is a covering that protects other parts of the body. Skin also serves as the sensory organ of touch and is important in the regulation of body temperature. Vitamin D, which is essential to bone health, is absorbed through the skin.

The skin has three layers: epidermis, dermis, and **hypodermis**. The epidermis is the outermost protective layer of skin. It contains melanin, which gives the skin its color. The top layer of epidermis, the stratum corneum, is composed of dead cells that are shed approximately every two weeks. The epidermis is **avascular**. Underlying the epidermis is the dermis, rich with nerves, blood vessels, hair follicles, and glands. Sebaceous glands produce lubricating oil, and apocrine glands, which are associated with hair follicles, produce scent. The **eccrine glands** produce sweat that helps us regulate our body temperature. Underlying the dermis is the fatty hypodermis, also referred to as **subcutaneous** tissue. As the thickest layer of skin, the hypodermis provides insulation and absorbs shocks.

Because the skin is the body's first line of defense, it is often the site of injury. Many CPT codes in the Integumentary System are used to report treatments for injuries including wounds, burns, ulcers, and abnormal skin growths. Sometimes skin repairs require more complex procedures, such as adjacent tissue transfers, grafts, or the use of skin replacement therapies.

Skin changes as we age. The dermis contains **collagen** and elastic tissues that contribute to a youthful appearance. With age, the epidermal cells become thinner and less able to retain moisture. The dermal layer also becomes thinner. Less collagen is produced, and the elastin fibers

that prevent sagging of skin lose their elasticity. Sebaceous and sweat glands slow their production of oils and sweat. A significant number of CPT codes are used to report procedures that are performed on the integumentary system for **cosmesis**, eg, to lift or tighten skin or breast tissue or to remove subcutaneous fat, rather than for therapeutic reasons.

Toenails and fingernails are integumentary structures with six components: nail root, bed, nail plate, eponychium (cuticle), **perionychium**, and **hyponychium**. The nail root (germinal **matrix**) lies under the skin at the **proximal** nail. This is where new nail is produced. The nail plate is the exposed nail, from cuticle to fingertip, while the nail bed is the vascular tissue directly beneath the nail plate. The eponychium provides a seal between the skin and the nail plate at its base, while the perionychium is the skin boundary at the sides of the nail bed. The hyponychium is the junction between the **distal** edge nail plate and the fingertip.

The female breast is considered part of the integumentary system. It is composed primarily of **adipose** tissue with a network of **ducts** that run from the lobules, where milk is produced during lactation, to the nipple, where the milk is expressed. The breast overlies the pectoralis major muscle between the second and sixth ribs and is anchored in place by the Cooper suspensory ligaments. These ligaments stretch over time, leading to **ptosis**. The nipple is centered on the areola, which contains sebaceous glands for lubrication. A tail of adipose breast tissue, the tail of Spence, extends into the armpit. Procedures on the breast may involve more complex structures such as chest wall, ribs, or pectoral muscles. CPT codes used to report biopsy and excision associated with breast tumors do not differentiate between the sexes.

General

Coding Atlas

In **fine needle aspiration** (FNA), matter is suctioned (aspirated) through a syringe's long, slender needle (gauge 18-23) to obtain a sample of a suspicious mass. The sample then undergoes separately reported pathological examination. No tissue is cut in FNA. In some cases, imaging guidance is necessary to ensure the correct site is sampled.

- 10021** Fine needle aspiration; without imaging guidance
10022 with imaging guidance

Integumentary System

Skin, Subcutaneous, and Accessory Structures

Introduction and Removal

Coding Atlas

Catheter drainage allows for outflow of fluid from the body into a collection device. Typically, gravity facilitates the drainage. In some cases, image guidance may be required to access the site to be drained. Code 10030 is reported once for each separate catheter placed, using image guidance, in soft tissue, excluding **peritoneal**, **retroperitoneal**, **transvaginal**, **transrectal**, and **visceral** collections.

- ⊙ **10030** Image-guided fluid collection drainage by **catheter** (eg, **abscess**, **hematoma**, **seroma**, **lymphocele**, **cyst**), soft tissue (eg, extremity, abdominal wall, neck), **percutaneous**

Incision and Drainage

Coding Atlas

Integumentary **incision and drainage** (I&D) is performed to release **purulent** or pressurized fluids under or within the skin. The intent of I&D procedures is incision, not excision. These codes represent procedures in which the physician actively drains the area incised using techniques such as cavity exploration, swabbing, **lavage**, and irrigation. I&D is also used to extract **foreign bodies** from the skin or **subcutaneous** tissue. Integumentary

codes for I&D are chosen based on the type of defect (eg, **foreign body**, **pilonidal cyst**, **abscess**, **hematoma**) and whether the physician has documented that the procedure was complicated.

- 10040** Acne surgery (eg, **marsupialization**, opening or removal of multiple milia, comedones, cysts, pustules)
10060 **Incision and drainage** of **abscess** (eg, carbuncle, suppurative hidradenitis, cutaneous or subcutaneous abscess, **cyst**, **furuncle**, or **paronychia**); simple or single
10061 complicated or multiple
10080 Incision and drainage of **pilonidal cyst**; simple
10081 complicated
10120 Incision and removal of **foreign body**, subcutaneous tissues; simple
10121 complicated
10140 Incision and drainage of **hematoma**, **seroma** or fluid collection
10160 Puncture **aspiration** of abscess, hematoma, bulla, or cyst
10180 Incision and drainage, complex, postoperative wound infection

Debridement

Coding Atlas

Debridement is the removal of contaminated or damaged tissue. CPT codes 11000-11047 are used to report debridement of wounds to depths that involve **subcutaneous** tissue, muscle or **fascia**, and bone. Debridement to the level of the epidermis and dermis is reported with CPT codes 97597 and 97598. The depth reported for debridement is the deepest depth of tissue removed. When determining body surface, measure only the area that undergoes debridement. Debridement of burns is reported with codes 16020-16030. The difference between debridement and excision is that an excision requires closure. The debridement site is not closed unless the debridement is related to a repair that is the primary goal of the encounter.

- 11000** **Debridement** of extensive eczematous or infected skin; up to 10% of body surface
+ 11001 each additional 10% of the body surface, or part thereof (List separately in addition to code for primary procedure)
11004 Debridement of skin, subcutaneous tissue, muscle and fascia for **necrotizing** soft tissue infection; external genitalia and perineum
11005 abdominal wall, with or without **fascial** closure