

CLINICALLY ORIENTED Anatomy

SIXTH EDITION

Introduction

1 Thorax

2 Abdomen

3 Pelvis and Perineum

4 Back

5 Lower Limb

6 Upper Limb

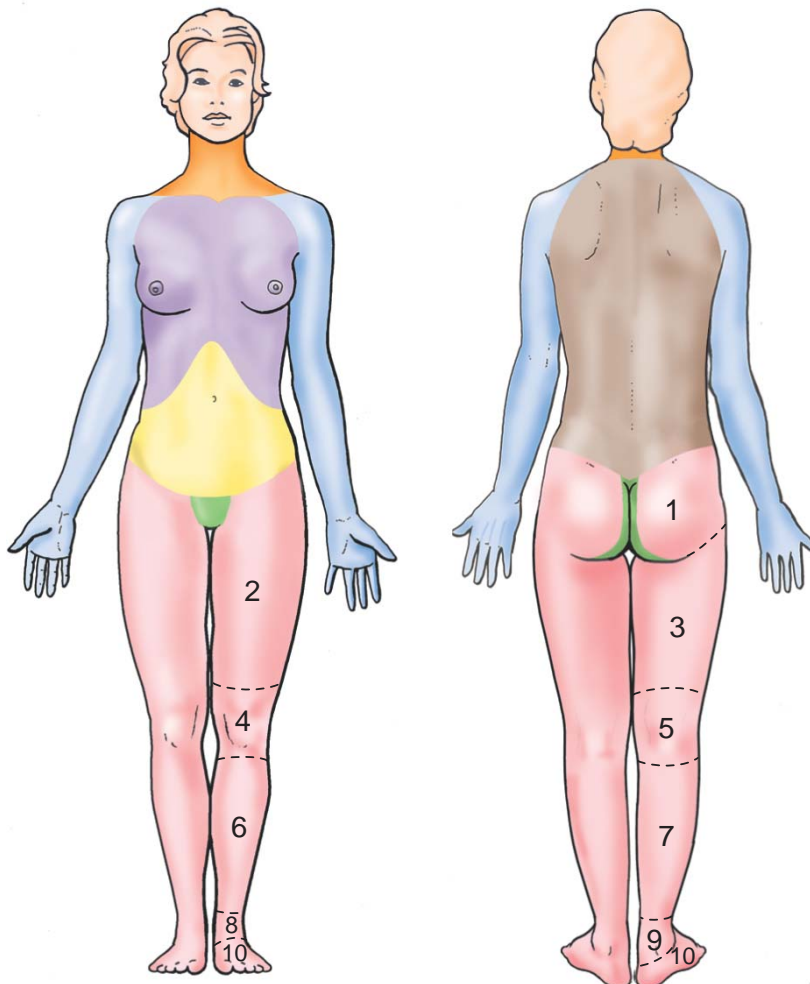
7 Head

8 Neck

9 Cranial Nerves

Key Major Parts of the Body

Head	Thorax	Abdomen	Lower limb
Neck	Back	Pelvis/perineum	Upper limb



CLINICALLY ORIENTED Anatomy

SIXTH EDITION

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In loving memory of Marion,

My best friend, wife, colleague, mother of our five children and grandmother of our nine grandchildren for her love, unconditional support, and understanding. • (KLM)

To Muriel

My bride, best friend, counselor, and mother of our sons; and to our family—Tristan, Lana, Elijah and Finley; Denver, and Skyler—with love and great appreciation for their support, understanding, good humor, and—most of all—patience. • (AFD)

To my husband, Enno, and my children, Erik and Kristina, for their support and encouragement. • (AMRA)

To Our Students

You will remember some of what you hear, much of what you read, more of what you see, and almost all of what you experience and understand fully.



**Keith L. Moore, Ph.D.,
F.I.A.C., F.R.S.M., F.A.A.A.**

Dr. Moore has been the recipient of many prestigious awards and recognition. He has received the highest awards for excellence in human anatomy education at the medical, dental, graduate, and undergraduate levels—and for his remarkable record of textbook publications in clinically oriented anatomy and embryology—from both the American Association of Anatomists (AAA: **Distinguished Educator Award**, 2007) and the American Association of Clinical Anatomists (AACA:

Honored Member Award, 1994). In 2008 Dr. Moore was inducted as a Fellow of the American Association of Anatomists. The rank of Fellow honors distinguished members who have demonstrated excellence in science and their overall contributions to the medical sciences. Recently Dr. Moore was awarded **Honorary Membership** in the Società Italiana di Anatomia e Istologia (SIAI) as acknowledgment of his outstanding merits as a scientist, educator, and writer.

Arthur F. Dalley II

Preface

Nearly a third of a century has passed since the first edition of *Clinically Oriented Anatomy* appeared on bookstore shelves. Although the factual basis of anatomy is remarkable among basic sciences for its longevity and consistency, this book has evolved markedly since its inception. This is a reflection of changes in the clinical application of anatomy, new imaging technologies that reveal living anatomy in new ways, and improvements in graphic and publication technology that enable superior demonstration of this information. Efforts continue to make this book even more student friendly and authoritative. The sixth edition has been thoroughly reviewed by students, anatomists, and clinicians for accuracy and relevance and revised with significant new changes and updates.

KEY FEATURES

Clinically Oriented Anatomy has been widely acclaimed for the relevance of its clinical correlations. As in previous editions, the sixth edition places clinical emphasis on anatomy that is important in physical diagnosis for primary care, interpretation of diagnostic imaging, and understanding the anatomical basis of emergency medicine and general surgery. Special attention has been directed toward assisting students in learning the anatomy they will need to know in the twenty-first century, and to this end new features have been added and existing features updated.

Clinical correlations. Popularly known as “blue boxes,” the clinical information sections have grown, and many of them are now supported by photographs and/or dynamic color illustrations to help with understanding the practical value of anatomy. In response to our readers’ suggestions, the blue boxes have been grouped together within chapters, enabling presentation of topics with less interruption of the running text.

Bottom line summaries. A new feature in the fifth edition, frequent “bottom line” boxes summarize the preceding information, ensuring that primary concepts do not become lost in the many details necessary for thorough understanding. These summaries provide a convenient means of ongoing review and underscore the big picture point of view.

Anatomy described in a practical, functional context. A more realistic approach to the musculoskeletal system emphasizes the action and use of muscles and muscle groups in daily activities, emphasizing gait and grip. The eccentric

contraction of muscles, which accounts for much of their activity, is now discussed along with the concentric contraction that is typically the sole focus in anatomy texts. This perspective is important to most health professionals, including the growing number of physical and occupational therapy students using this book.

Surface anatomy and medical imaging. Surface anatomy and medical imaging, formerly presented separately, are now integrated into the chapter, presented at the time each region is being discussed, clearly demonstrating anatomy’s relationship to physical examination and diagnosis. Both natural views of unobstructed surface anatomy and illustrations superimposing anatomical structures on surface anatomy photographs are components of each regional chapter. Medical images, focusing on normal anatomy, include plain and contrast radiographic, MRI, CT, and ultrasonography studies, often with correlative line art as well as explanatory text, to help prepare future professionals who need to be familiar with diagnostic images.

Case studies, accompanied by clinico-anatomical problems and USMLE-style multiple-choice questions. Interactive case studies and multiple-choice questions are available to our readers online at <http://thePoint.lww.com>, providing a convenient and comprehensive means of self-testing and review.

Extensive art program. The extensive art program initiated in the fourth edition has been extended and revised. An effort has been made to ensure that all the anatomy presented and covered in the text is also illustrated. The text and illustrations have been developed to work together for optimum pedagogical effect, aiding the learning process and markedly reducing the amount of searching required to find structures. The great majority of the clinical conditions are now supported by photographs and/or color illustrations; multipart illustrations often combine dissections, line art, and medical images; most tables appear in color and are illustrated to aid the student’s understanding of the structures described.

Terminology. The terminology fully adheres to *Terminologia Anatomica* (1998), approved by the International Federation of Associations of Anatomists (IFAA). Although the official English-equivalent terms are used throughout the book, when new terms are introduced, the Latin form, used in Europe, Asia, and other parts of the world, is also provided. The roots and derivations of terms are provided to help students understand meaning and increase retention. Eponyms, although not endorsed by the IFAA, appear in parentheses in this edition—for example, sternal angle

(angle of Louis)—to assist students who will hear eponymous terms during their clinical studies.

RETAINED AND IMPROVED FEATURES

Students and faculty have told us what they want and expect from *Clinically Oriented Anatomy*, and we listened:

- A *comprehensive text* enabling students to fill in the blanks, as time allotted for lectures continues to decrease, laboratory guides become exclusively instructional, and multiauthored lecture notes develop inconsistencies in comprehension, fact, and format.
- A *resource capable of supporting areas of special interest and emphasis* within specific anatomy courses that *serves the anatomy needs of students during both the basic science and the clinical phases of their studies*.
- A *thorough Introduction* that covers important systemic information and concepts basic to the understanding of the anatomy presented in the subsequent regional chapters. Students from many countries and backgrounds have written to express their views of this book—gratifyingly, most are congratulatory. Health professional students have more diverse backgrounds and experiences than ever before. Curricular constraints often result in unjustified assumptions concerning the prerequisite information necessary for many students to understand the presented material. The Introduction includes efficient summaries of functional systemic anatomy. Students' comments specifically emphasized the need for a systemic description of the nervous system and the peripheral autonomic nervous system (ANS) in particular.
- Routine facts (such as muscle attachments, innervations, and actions) presented in *tables organized to demonstrate shared qualities and illustrated to demonstrate the provided information*. *Clinically Oriented Anatomy* provides more tables than any other anatomy textbook.
- *Illustrated clinical correlations* that not only describe but also *show anatomy as it is applied clinically*.
- *Illustrations that facilitate orientation*. Many orientation figures have been added, along with arrows to indicate the locations of the inset figures (areas shown in close-up views) and viewing sequences. Almost all illustrations have been completely relabeled, moving the viewpoint out of the legend and next to each part of every illustration. Labels have been placed to minimize the distance between label and object, with leader lines running the most direct course possible.

ADDITIONAL FEATURES FOR THE SIXTH EDITION

- Many new full-color illustrations, including many multi-part illustrations combining dissections, line art, and

medical images such as CTs and MRIs have been added to this edition.

- Blue boxes are classified to indicate the type of clinical information covered:



Anatomical variations icon. These blue boxes feature anatomical variations that may be encountered in the dissection lab or in practice, emphasizing the clinical importance of awareness of such variations.



Life cycle icon. These blue boxes emphasize prenatal developmental factors that affect postnatal anatomy and anatomical phenomena specifically associated with stages of life—childhood, adolescence, adult, and advanced age.



Trauma icon. The effect of traumatic events—such as fractures of bones or dislocations of joints—on normal anatomy and the clinical manifestations and dysfunction resulting from such injuries are featured in these blue boxes.



Diagnostic procedures icon. Anatomical features and observations that play a role in physical diagnosis are targeted in these blue boxes.



Surgical procedures icon. These blue boxes address such topics as the anatomical basis of surgical procedures, such as the planning of incisions, and the anatomical basis of regional anesthesia.



Pathology icon. The effect of disease on normal anatomy, such as cancer of the breast, and anatomical structures or principles involved in the confinement or dissemination of disease within the body are the types of topics covered in these blue boxes.

- **Boldface type** indicates the main entries of anatomical terms, when they are introduced and defined. In the index, the page numbers of these main entries also appear in boldface type, so that the main entries can be easily located. Boldface type is also used to introduce clinical terms in the clinical correlation (blue) boxes. *Italic type* indicates anatomical terms important to the topic and region of study or labeled in an illustration that is being referenced.
- Useful content outlines appear at the beginning of every chapter.
- Instructor's resources and supplemental materials, including images exportable for *Power Point* presentation, are available through <http://thePoint.lww.com>.

We welcome Anne M. R. Agur, Ph.D., to the team of authors for the sixth edition. From the outset, *Clinically Oriented Anatomy* has utilized materials from *Grant's Atlas*, for which Anne has had responsibility since 1991. Anne made significant contributions to previous editions of *Clinically Oriented*

Anatomy beyond the sharing of materials from *Grant's Atlas*, and has been involved in—and been an asset to—every stage of the development of this new edition.

COMMITMENT TO EDUCATING STUDENTS

This book is written for health science students, keeping in mind those who may not have had a previous acquaintance with anatomy. We have tried to present the material in an interesting way so that it can be easily integrated with what will be taught in more detail in other disciplines such as physical diagnosis, medical rehabilitation, and surgery. We hope

this text will serve two purposes: to educate and to excite. If students develop enthusiasm for clinical anatomy, the goals of this book will have been fulfilled.

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ABBREVIATIONS

a., aa.	artery, arteries
ant.	anterior
B.C.E.	before the Common (Christian) era
C	cervical
C.E.	Common (Christian) era
Co	coccygeal
dim.	diminutive
e.g.	for example
et al.	and others
F	female
Fr.	French
G.	Greek
i.e.	that is
inf.	inferior

L	liter, lumbar
L.	Latin
lev.	levator
lit.	literally
M	male
m., mm.	muscle, muscles
Mediev.	medieval
Mod.	modern
post.	posterior
S	sacral
sup.	superior, superioris
supf.	superficial
T	thoracic
TA	<i>Terminologia Anatomica</i>
v., vv.	vein, veins
vs.	versus

Acknowledgments

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Keith L. Moore
Arthur F. Dalley II
Anne M. R. Agur

Contents

Preface / vii
Acknowledgments / xi
List of Clinical Blue Boxes / xix
Figure Credits / xxiii

Introduction to Clinically Oriented Anatomy / 1

APPROACHES TO STUDYING ANATOMY / 2
Regional Anatomy / 2
Systemic Anatomy / 3
Clinical Anatomy / 4
ANATOMICOMEDICAL TERMINOLOGY / 4
Anatomical Position / 5
Anatomical Planes / 5
Terms of Relationship and Comparison / 6
Terms of Laterality / 7
Terms of Movement / 7
ANATOMICAL VARIATIONS / 12
INTEGUMENTARY SYSTEM / 12
FASCIAS, FASCIAL COMPARTMENTS, BURSAE,
AND POTENTIAL SPACES / 16
SKELETAL SYSTEM / 19
Cartilage and Bones / 19
Bone Markings and Formations / 21
Joints / 25
MUSCLE TISSUE AND MUSCULAR SYSTEM / 29
Types of Muscle (Muscle Tissue) / 29
Skeletal Muscles / 31
Cardiac Striated Muscle / 36
Smooth Muscle / 36
CARDIOVASCULAR SYSTEM / 37
Vascular Circuits / 37
Blood Vessels / 37
LYMPHOID SYSTEM / 43
NERVOUS SYSTEM / 46
Central Nervous System / 47
Peripheral Nervous System / 47
Somatic Nervous System / 57
Autonomic Nervous System / 57
MEDICAL IMAGING TECHNIQUES / 66

1 Thorax / 71

OVERVIEW OF THORAX / 72
THORACIC WALL / 72

Skeleton of Thoracic Wall / 74
Thoracic Apertures / 78
Joints of Thoracic Wall / 79
Movements of Thoracic Wall / 81
Muscles of Thoracic Wall / 86
Fascia of Thoracic Wall / 91
Nerves of Thoracic Wall / 91
Vasculature of Thoracic Wall / 93
Breasts / 98
Surface Anatomy of Thoracic Wall / 99
VISCERA OF THORACIC CAVITY / 106
Pleurae, Lungs, and Tracheobronchial Tree / 108
Overview of Mediastinum / 127
Pericardium / 128
Heart / 135
Superior Mediastinum and Great Vessels / 160
Posterior Mediastinum / 166
Anterior Mediastinum / 171
Surface Anatomy of Heart and Mediastinal Viscera / 171

2 Abdomen / 181

OVERVIEW: WALLS, CAVITIES, REGIONS,
AND PLANES / 183
ANTEROLATERAL ABDOMINAL WALL / 184
Fascia of Anterolateral Abdominal Wall / 186
Muscles of Anterolateral Abdominal Wall / 187
Neurovasculature of Anterolateral Abdominal Wall / 193
Internal Surface of Anterolateral Abdominal Wall / 201
Inguinal Region / 202
Spermatic Cord, Scrotum, and Testis / 206
Surface Anatomy of Anterolateral Abdominal Wall / 210
PERITONEUM AND PERITONEAL CAVITY / 217
Embryology of Peritoneal Cavity / 218
Peritoneal Formations / 219
Subdivisions of Peritoneal Cavity / 221
ABDOMINAL VISCERA / 226
Overview of Abdominal Viscera and Digestive Tract / 226
Esophagus / 229
Stomach / 230
Small Intestine / 239
Large Intestine / 246
Spleen / 263
Pancreas / 265
Liver / 268

Biliary Ducts and Gallbladder / 277
 Kidneys, Ureters, and Suprarenal Glands / 290
 Summary of Innervation of Abdominal Viscera / 301
 DIAPHRAGM / 306
 Vessels and Nerves of Diaphragm / 307
 Diaphragmatic Apertures / 308
 Actions of Diaphragm / 309
 POSTERIOR ABDOMINAL WALL / 309
 Fascia of Posterior Abdominal Wall / 310
 Muscles of Posterior Abdominal Wall / 311
 Nerves of Posterior Abdominal Wall / 312
 Vessels of Posterior Abdominal Wall / 313
 SECTIONAL MEDICAL IMAGING OF ABDOMEN / 321

3 Pelvis and Perineum / 326

INTRODUCTION TO PELVIS AND PERINEUM / 327
 PELVIC GIRDLE / 327
 Bones and Features of Pelvic Girdle / 328
 Orientation of Pelvic Girdle / 330
 Joints and Ligaments of Pelvic Girdle / 330
 PELVIC CAVITY / 338
 Walls and Floor of Pelvic Cavity / 338
 Peritoneum and Peritoneal Cavity of Pelvis / 343
 Pelvic Fascia / 345
 NEUROVASCULAR STRUCTURES OF PELVIS / 349
 Pelvic Arteries / 350
 Pelvic Veins / 355
 Lymph Nodes of Pelvis / 355
 Pelvic Nerves / 357
 PELVIC VISCERA / 362
 Urinary Organs / 362
 Rectum / 368
 Male Internal Genital Organs / 376
 Female Internal Genital Organs / 382
 Lymphatic Drainage of Pelvic Viscera / 400
 PERINEUM / 402
 Fasciae and Pouches of Urogenital Triangle / 404
 Features of Anal Triangle / 409
 Male Urogenital Triangle / 418
 Female Urogenital Triangle / 428
 SECTIONAL MEDICAL IMAGING OF PELVIS AND PERINEUM / 434

4 Back / 439

OVERVIEW OF BACK AND VERTEBRAL COLUMN / 440
 VERTEBRAE / 440
 Structure and Function of Vertebrae / 440
 Regional Characteristics of Vertebrae / 443
 Ossification of Vertebrae / 453
 Variations in Vertebrae / 455
 VERTEBRAL COLUMN / 464

Joints of Vertebral Column / 464
 Movements of Vertebral Column / 470
 Curvatures of Vertebral Column / 470
 Vasculature of Vertebral Column / 472
 Nerves of Vertebral Column / 473
 MUSCLES OF BACK / 482
 Extrinsic Back Muscles / 482
 Intrinsic Back Muscles / 482
 Surface Anatomy of Muscles of Back / 492
 Suboccipital and Deep Neck Muscles / 492
 CONTENTS OF VERTEBRAL CANAL / 496
 Spinal Cord / 496
 Spinal Nerve Roots / 496
 Spinal Meninges and Cerebrospinal Fluid / 498
 Vasculature of Spinal Cord and Spinal Nerve Roots / 501

5 Lower Limb / 508

OVERVIEW OF LOWER LIMB / 510
 DEVELOPMENT OF LOWER LIMB / 510
 BONES OF LOWER LIMB / 512
 Arrangement of Lower Limb Bones / 512
 Hip Bone / 514
 Femur / 516
 Tibia and Fibula / 520
 Bones of Foot / 522
 Surface Anatomy of Bones of Foot / 524
 FASCIA, VEINS, LYMPHATICS, EFFERENT VESSELS, AND CUTANEOUS NERVES OF LOWER LIMB / 532
 Subcutaneous Tissue and Fascia / 532
 Venous Drainage of Lower Limb / 532
 Lymphatic Drainage of Lower Limb / 534
 Cutaneous Innervation of Lower Limb / 536
 Motor Innervation of Lower Limb / 538
 POSTURE AND GAIT / 542
 Standing at Ease / 542
 Walking: The Gait Cycle / 542
 ANTERIOR AND MEDIAL REGIONS / 545
 Organization of Proximal Lower Limb / 545
 Anterior Thigh Muscles / 545
 Medial Thigh Muscles / 548
 Neurovascular Structures and Relationships in Anteromedial Thigh / 551
 Surface Anatomy of Anterior and Medial Regions of Thigh / 557
 GLUTEAL AND POSTERIOR THIGH REGIONS / 562
 Gluteal Region: Buttocks and Hip Region / 562
 Muscles of Gluteal Region / 563
 Posterior Thigh Region / 569
 Neurovascular Structures of Gluteal and Posterior Thigh Regions / 572
 Surface Anatomy of Gluteal and Posterior Thigh Regions / 578

POPLITEAL FOSSA AND LEG / 584
 Popliteal Region / 584
 Anterior Compartment of Leg / 587
 Lateral Compartment of Leg / 595
 Posterior Compartment of Leg / 596
 Surface Anatomy of Leg / 603
 FOOT / 609
 Skin and Fascia of Foot / 610
 Muscles of Foot / 610
 Neurovascular Structures and Relationships in Foot / 614
 Surface Anatomy of Ankle Region and Foot / 622
 JOINTS OF LOWER LIMB / 626
 Hip Joint / 626
 Knee Joint / 634
 Tibiofibular Joints / 645
 Ankle Joint / 647
 Foot Joints / 650
 Surface Anatomy of Joints of Knee, Ankle, and Foot / 656

6 Upper Limb / 670

OVERVIEW / 672
 COMPARISON OF UPPER AND LOWER LIMBS / 673
 BONES OF UPPER LIMB / 673
 Clavicle / 673
 Scapula / 675
 Humerus / 676
 Bones of Forearm / 677
 Bones of Hand / 679
 Surface Anatomy of Upper Limb Bones / 680
 FASCIA, EFFERENT VESSELS, CUTANEOUS
 INNERVATION, AND MYOTOMES OF
 UPPER LIMB / 688
 Fascia of Upper Limb / 688
 Venous Drainage of Upper Limb / 689
 Lymphatic Drainage of Upper Limb / 692
 Cutaneous Innervation of Upper Limb / 693
 Motor Innervation (Myotomes) of Upper Limb / 693
 PECTORAL AND SCAPULAR REGIONS / 697
 Anterior Axioappendicular Muscles / 697
 Posterior Axioappendicular and Scapulohumeral
 Muscles / 700
 Scapulohumeral (Intrinsic Shoulder) Muscles / 704
 Surface Anatomy of Pectoral, Scapular,
 and Deltoid Regions / 707
 AXILLA / 713
 Axillary Artery / 715
 Axillary Vein / 718
 Axillary Lymph Nodes / 719
 Brachial Plexus / 721
 ARM / 731
 Muscles of Arm / 731
 Brachial Artery / 736

Veins of Arm / 737
 Nerves of Arm / 737
 Cubital Fossa / 739
 Surface Anatomy of Arm and Cubital Fossa / 739
 FOREARM / 744
 Compartments of Forearm / 744
 Muscles of Forearm / 746
 Arteries of Forearm / 757
 Veins of Forearm / 760
 Nerves of Forearm / 761
 Surface Anatomy of Forearm / 764
 HAND / 771
 Fascia and Compartments of Palm / 771
 Muscles of Hand / 773
 Long Flexor Tendons and Tendon Sheaths in Hand / 779
 Arteries of Hand / 779
 Veins of Hand / 782
 Nerves of Hand / 782
 Surface Anatomy of Hand / 786
 JOINTS OF UPPER LIMB / 793
 Sternoclavicular Joint / 794
 Acromioclavicular Joint / 796
 Glenohumeral Joint / 796
 Elbow Joint / 800
 Proximal Radio-Ulnar Joint / 804
 Distal Radio-Ulnar Joint / 806
 Wrist Joint / 809
 Intercarpal Joints / 809
 Carpometacarpal and Intermetacarpal Joints / 811
 Metacarpophalangeal and Interphalangeal Joints / 812

7 Head / 820

OVERVIEW / 822
 CRANIUM / 822
 Facial Aspect of Cranium / 822
 Lateral Aspect of Cranium / 827
 Occipital Aspect of Cranium / 827
 Superior Aspect of Cranium / 829
 External Surface of Cranial Base / 829
 Internal Surface of Cranial Base / 830
 Walls of Cranial Cavity / 835
 Regions of Head / 836
 FACE AND SCALP / 842
 Face / 842
 Scalp / 843
 Muscles of Face and Scalp / 844
 Nerves of Face and Scalp / 849
 Superficial Vasculature of Face and Scalp / 855
 Surface Anatomy of Face / 859
 CRANIAL MENINGES / 865
 Dura Mater / 865
 Arachnoid Mater and Pia Mater / 872

Meningeal Spaces / 872
 BRAIN / 878
 Parts of Brain / 878
 Ventricular System of Brain / 878
 Arterial Blood Supply of Brain / 882
 Venous Drainage of Brain / 883
 EYE, ORBIT, ORBITAL REGION, AND EYEBALL / 889
 Orbits / 889
 Eyelids and Lacrimal Apparatus / 891
 Eyeball / 893
 Extraocular Muscles of Orbit / 898
 Nerves of Orbit / 903
 Vasculature of Orbit / 905
 Surface Anatomy of Eye and Lacrimal Apparatus / 907
 PAROTID AND TEMPORAL REGIONS,
 INFRATEMPORAL FOSSA, AND
 TEMPOROMANDIBULAR JOINT / 914
 Parotid Region / 914
 Temporal Region / 916
 Infratemporal Fossa / 916
 ORAL REGION / 928
 Oral Cavity / 928
 Lips, Cheeks, and Gingivae / 928
 Teeth / 930
 Palate / 934
 Tongue / 938
 Salivary Glands / 943
 PTERYGOPALATINE FOSSA / 951
 Pterygopalatine Part of Maxillary Artery / 951
 Maxillary Nerve / 951
 NOSE / 955
 External Nose / 955
 Nasal Cavities / 956
 Vasculature and Innervation of Nose / 959
 Paranasal Sinuses / 960
 EAR / 966
 External Ear / 966
 Middle Ear / 967
 Internal Ear / 973

8 Neck / 981

OVERVIEW / 982
 BONES OF NECK / 982
 Cervical Vertebrae / 982

Hyoid Bone / 984
 FASCIA OF NECK / 985
 Cervical Subcutaneous Tissue and Platysma / 985
 Deep Cervical Fascia / 987
 SUPERFICIAL STRUCTURES OF NECK:
 CERVICAL REGIONS / 989
 Sternocleidomastoid Region / 989
 Posterior Cervical Region / 992
 Lateral Cervical Region / 992
 Anterior Cervical Region / 999
 Surface Anatomy of Cervical Regions and
 Triangles of Neck / 1005
 DEEP STRUCTURES OF NECK / 1012
 Prevertebral Muscles / 1012
 Root of Neck / 1012
 VISCERA OF NECK / 1018
 Endocrine Layer of Cervical Viscera / 1018
 Respiratory Layer of Cervical Viscera / 1021
 Alimentary Layer of Cervical Viscera / 1032
 Surface Anatomy of Endocrine and Respiratory Layers
 of Cervical Viscera / 1039
 LYMPHATICS OF NECK / 1051

9 Cranial Nerves / 1053

OVERVIEW / 1054
 OLFACTORY NERVE (CN I) / 1061
 OPTIC NERVE (CN II) / 1062
 OCULOMOTOR NERVE (CN III) / 1064
 TROCHLEAR NERVE (CN IV) / 1065
 TRIGEMINAL NERVE (CN V) / 1065
 Ophthalmic Nerve (CN V₁) / 1067
 Maxillary Nerve (CN V₂) / 1067
 Mandibular Nerve (CN V₃) / 1067
 ABDUCENT NERVE (CN VI) / 1067
 FACIAL NERVE (CN VII) / 1068
 VESTIBULOCOCHLEAR NERVE (CN VIII) / 1070
 GLOSSOPHARYNGEAL NERVE (CN IX) / 1071
 VAGUS NERVE (CN X) / 1074
 SPINAL ACCESSORY NERVE (CN XI) / 1075
 HYPOGLOSSAL NERVE (CN XII) / 1077

Appendix A: References and Suggested Readings / 1083
 Index / 1087

List of Clinical Blue Boxes

Introduction to Clinically Oriented Anatomy

Integumentary System. Skin Color Signs in Physical Diagnosis; Skin Incisions and Scarring; Stretch Marks in Skin; Skin Injuries and Wounds / 14

Fascias. Fascial Planes and Surgery / 19

Bones. Accessory Bones; Heterotopic Bones; Trauma to Bone and Bone Changes; Osteoporosis; Sternal Puncture; Bone Growth and the Assessment of Bone Age; Effects of Disease and Diet on Bone Growth; Displacement and Separation of Epiphyses; Avascular Necrosis / 21

Joints. Joints of Newborn Cranium; Degenerative Joint Disease; Arthroscopy / 28

Skeletal Muscle. Muscle Dysfunction and Paralysis; Absence of Muscle Tone; Muscle Soreness and “Pulled” Muscles; Growth and Regeneration of Skeletal Muscle; Muscle Testing / 35

Cardiac and Smooth Muscle. Hypertrophy of Myocardium and Myocardial Infarction; Hypertrophy and Hyperplasia of Smooth Muscle / 37

Cardiovascular System. Arteriosclerosis: Ischemia and Infarction; Varicose Veins / 42

Lymphoid System. The Spread of Cancer; Lymphangitis, Lymphadenitis, and Lymphedema / 45

Central and Peripheral Nervous System. Damage to CNS; Rhizotomy; Nerve Degeneration and Ischemia of Nerves / 53

1 Thorax

Thoracic Wall. Chest Pain; Rib Fractures; Flail Chest; Thoracotomy, Intercostal Space Incisions, and Rib Excision; Supernumerary Ribs; Protective Function and Aging of Costal Cartilages; Ossified Xiphoid Processes; Sternal Fractures; Median Sternotomy; Sternal Biopsy; Sternal Anomalies; Thoracic Outlet Syndrome; Dislocation of Ribs; Separation of Ribs; Paralysis of Diaphragm / 83

Muscles and Neurovasculature of Thoracic Wall. Dyspnea: Difficult Breathing; Extrapleural Intrathoracic Surgical Access; Herpes Zoster Infection of Spinal Ganglia; Intercostal Nerve Block / 96

Breasts. Changes in Breasts; Breast Quadrants; Carcinoma of Breast; Mammography; Surgical Incisions of Breast; Polymastia, Polythelia, and Amastia; Breast Cancer in Men; Gynecomastia / 104

Pleurae, Lungs, and Tracheobronchial Tree. Injuries of Cervical Pleura and Apex of Lung; Injury to Other Parts of Pleurae; Pulmonary Collapse; Pneumothorax, Hydrothorax, and Hemothorax; Thoracentesis; Insertion of a Chest Tube; Pleurectomy and Pleurodesis; Thoracoscopy; Pleuritis (Pleurisy); Variations in Lobes of Lung; Appearance of Lungs and Inhalation of Carbon Particles and Irritants; Auscultation of Lungs and Percussion of Thorax; Aspiration of Foreign Bodies; Bronchoscopy; Lung Resections; Segmental Atelectasis; Pulmonary Embolism; Lymphatic Drainage and Pleural Adhesion; Hemoptysis; Bronchogenic Carcinoma; Lung Cancer and Mediastinal Nerves; Pleural Pain; Chest X-ray / 120

Mediastinum Overview and Pericardium. Levels of Viscera Relative to Mediastinal Divisions; Mediastinoscopy and Mediastinal Biopsies; Widening of Mediastinum; Surgical Significance of Transverse Pericardial Sinus; Exposure of Venae Cavae; Pericarditis, Pericardial Rub, and Pericardial Effusion; Cardiac Tamponade; Pericardiocentesis; Positional Abnormalities of the Heart / 132

Heart. Cardiac Catheterization; Embryology of Right Atrium; Septal Defects; Percussion of Heart; Stroke or Cerebrovascular Accident; Basis for Naming Cusps of Aortic and Pulmonary Valves; Valvular Heart Disease; Echocardiography; Coronary Angiography; Coronary Artery Disease or Coronary Heart Disease; Coronary Atherosclerosis; Angina Pectoris; Coronary Bypass Graft; Coronary Angioplasty; Collateral Circulation via Smallest Cardiac Veins; Electrocardiography; Coronary Occlusion and Conducting System of Heart; Artificial Cardiac Pacemaker; Restarting Heart; Fibrillation of Heart; Defibrillation of Heart; Cardiac Referred Pain / 151

Superior, Posterior, and Anterior Mediastinum. Age Changes in Thymus; Aortic Angiography; Variations of Great Arteries; Aneurysm of Ascending Aorta; Coarctation of Aorta; Injury to Recurrent Laryngeal Nerves; Blockage of Esophagus; Laceration of Thoracic Duct; Variations of Thoracic Duct; Alternate Venous Routes to the Heart; Radiography of the Mediastinum, CT and MRI of the Mediastinum / 174

2 Abdomen

Fascia and Muscles of Anterolateral Abdominal Wall. Clinical Significance of Fascia and Fascial Spaces of Abdominal Wall; Protuberance of Abdomen; Abdominal Hernias. **Neurovasculature of Anterolateral Abdominal Wall.** Palpation of Anterolateral Abdominal Wall; Superficial Abdominal Reflexes; Injury to Nerves of Anterolateral Abdominal Wall; Abdominal Surgical Incisions; Reversal of Venous Flow and Collateral Pathways of Superficial Abdominal Veins / 197

Internal Surface of Anterolateral Abdominal Wall and Inguinal Region. Undescended Testis; External Supravesical Hernia; Postnatal Patency of Umbilical Vein; Metastasis of Uterine Cancer to Labium Majus. **Spermatic Cord, Scrotum, and Testis.** Inguinal Hernias; Cremasteric Reflex; Cysts and Hernias of Canal of Nuck; Hydrocele of Spermatic Cord and/or Testis; Hematocele of Testis; Torsion of Spermatic Cord; Anesthetizing Scrotum; Spermatocele and Epididymal Cyst; Vestigial Remnants of Embryonic Genital Ducts; Varicocele; Cancer of Testis and Scrotum / 211

Peritoneum and Peritoneal Cavity. Patency and Blockage of Uterine Tubes; The Peritoneum and Surgical Procedures; Peritonitis and Ascites; Peritoneal Adhesions and Adhesiotomy; Abdominal Paracentesis; Intraperitoneal Injection and Peritoneal Dialysis; Functions of Greater Omentum; Abscess Formation; Spread of Pathological Fluids; Flow of Ascitic Fluid and Pus; Fluid in Omental Bursa; Intestine in Omental Bursa; Severance of Cystic Artery / 223

Esophagus and Stomach. Esophageal Varices; Pyrosis; Displacement of Stomach; Hiatal Hernia; Pylorospasm; Congenital Hypertrophic Pyloric Stenosis; Carcinoma of Stomach; Gastrectomy and Lymph Node Resection; Gastric Ulcers, Peptic Ulcers, *Helicobacter pylori*, and Vagotomy; Visceral Referred Pain. **Small and Large Intestine.** Duodenal Ulcers; Developmental Changes in Mesoduodenum; Paraduodenal Hernias; Brief Review of Embryological Rotation of Midgut; Navigating Small Intestine; Ischemia of Intestine; Ileal Diverticulum; Position of Appendix; Appendicitis; Appendectomy; Mobile Ascending Colon; Colitis, Colectomy, Ileostomy, and Colostomy; Colonoscopy; Diverticulosis; Volvulus of Sigmoid Colon / 254

Spleen and Pancreas. Rupture of Spleen; Splenectomy and Splenomegaly; Accessory Spleen(s); Splenic Needle Biopsy and Splenoportography; Blockage of Hepatopancreatic Ampulla and Pancreatitis; Endoscopic Retrograde Cholangiopancreatography; Accessory Pancreatic Tissue; Pancreatectomy; Rupture of Pancreas; Pancreatic Cancer. **Liver, Biliary Ducts, and Gallbladder.** Palpation of Liver; Subphrenic Abscesses; Hepatic Lobectomies and Segmentectomy; Rupture of Liver; Aberrant Hepatic Arteries; Variations in Relationships of Hepatic Arteries; Hepatomegaly; Cirrhosis of Liver; Liver Biopsy; Mobile Gallbladder; Variations in Cystic and Hepatic Ducts; Accessory Hepatic Ducts; Gallstones; Gallstones in the Duodenum; Cholecystectomy; Portal Hypertension; Portosystemic Shunts / 281

Kidneys, Ureters, and Suprarenal Glands. Palpation of Kidneys; Perinephric Abscess; Nephroptosis; Renal Transplantation; Renal Cysts; Pain in Pararenal Region; Accessory Renal Vessels; Renal Vein Entrapment Syndrome; Congenital Anomalies of the Kidneys and Ureters; Renal and Ureteric Calculi / 298

Diaphragm. Hiccups; Section of a Phrenic Nerve; Referred Pain From Diaphragm; Rupture of Diaphragm and Herniation of Viscera; Congenital Diaphragmatic Hernia. **Posterior Abdominal Wall.** Psoas Abscess; Posterior Abdominal Pain; Partial Lumbar Sympathectomy; Pulsations of Aorta and Abdominal Aortic Aneurysm; Collateral Routes for Abdominopelvic Venous Blood / 316

3 Pelvis and Perineum

Pelvic Girdle. Variations in Male and Female Pelves; Pelvic Diameters (Conjugates); Pelvic Fractures; Spondylolysis and Spondylolisthesis; Relaxation of Pelvic Ligaments and Increased Joint Mobility in Late Pregnancy / 334

Pelvic Cavity. Injury to Pelvic Floor; Prenatal “Relaxation” Training for Participatory Childbirth / 348

Neurovascular Structures of Pelvis. Iatrogenic Injury of Ureters; Ligation of Internal Iliac Artery and Collateral Circulation in Pelvis; Injury to Pelvic Nerves / 361

Urinary Organs and Rectum. Iatrogenic Compromise of Ureteric Blood Supply; Ureteric Calculi; Cystocele—Hernia of Bladder; Suprapubic Cystotomy; Suprapubic Cystotomy; Cystoscopy; Clinically Significant Differences Between Male and Female Urethrae; Rectal Examination; Resection of Rectum / 373

Male Internal Genital Organs. Male Sterilization; Abscesses in Seminal Glands; Hypertrophy of Prostate / 381

Female Internal Genital Organs. Infections of Female Genital Tract; Patency of Uterine Tubes; Ligation of Uterine Tubes; Ectopic Tubal Pregnancy; Remnants of Embryonic Ducts; Bicornate Uterus; Disposition of Uterus and Uterine Prolapse; Manual Examination of Uterus; Lifetime Changes in Normal Anatomy of Uterus; Cervical Cancer, Cervical Examination, and Pap Smear; Hysterectomy; Distension of Vagina; Digital Examination Through Vagina; Vaginal Fistulae; Culdoscopy and Culdocentesis; Laparoscopic Examination of Pelvic Viscera; Anesthesia for Childbirth / 391

Perineum. Disruption of Perineal Body; Episiotomy; Rupture of Urethra in Males and Extravasation of Urine; Starvation and Rectal Prolapse; Pectinate Line—A Clinically Important Landmark; Anal Fissures and Perianal Abscesses; Hemorrhoids; Anorectal Incontinence / 414

Male Urogenital Triangle. Urethral Catheterization; Distension of Scrotum; Palpation of Testes; Hypospadias; Phimosis, Paraphimosis, and Circumcision; Impotence and Erectile Dysfunction / 425

Female Urogenital Triangle. Female Circumcision; Vulvar Trauma; Infection of Greater Vestibular Glands; Pudendal and Ilioinguinal Nerve Blocks; Exercises for Increased Development of Female Perineal Muscles; Vaginismus / 432

4 Back

Vertebrae. Vertebral Body Osteoporosis; Laminectomy; Dislocation of Cervical Vertebrae; Fracture and Dislocation of Atlas; Fracture and Dislocation of Axis; Lumbar Spinal Stenosis; Cervical Ribs; Caudal Epidural Anesthesia; Injury of Coccyx; Abnormal Fusion of Vertebrae; Effect of Aging on Vertebrae; Anomalies of Vertebrae / 456

Vertebral Column. Aging of Intervertebral Discs; Herniation of Nucleus Pulposus; Fracture of Dens; Rupture of Transverse Ligament of Atlas; Rupture of Alar Ligaments; Fractures and Dislocations of Vertebrae; Injury and Disease of Zygapophysial Joints; Back Pain; Abnormal Curvatures of Vertebral Column / 474

Muscles of Back. Back Strains and Sprains; Reduced Blood Supply to Brainstem / 495

Contents of Vertebral Canal. Compression of Lumbar Spinal Nerve Roots; Myelography; Development of Meninges and Subarachnoid Space; Lumbar Spinal Puncture; Spinal Anesthesia; Epidural Anesthesia (Blocks); Ischemia of Spinal Cord; Spinal Cord Injuries / 505

5 Lower Limb

Bones of Lower Limb. Lower Limb Injuries; Injuries of Hip Bone; Coxa Vara and Coxa Valga; Dislocated Epiphysis of Femoral Head; Femoral Fractures; Tibial Fractures; Fractures Involving Epiphysal Plates; Fibular Fractures; Bone Grafts; Calcaneal Fractures; Fractures of Talar Neck; Fractures of Metatarsals; Os Trigonum; Fracture of Sesamoid Bones / 525

Fascia, Veins, Lymphatics, and Nerves of Lower Limb. Compartment Syndromes and Fasciotomy; Varicose Veins, Thrombosis, and Thrombophlebitis; Saphenous Vein Grafts; Saphenous Cutdown and Saphenous Nerve Injury; Enlarged Inguinal Lymph Nodes; Regional Nerve Blocks of Lower Limbs; Abnormalities of Sensory Function / 540

Anterior and Medial Regions of Thigh. Hip and Thigh Contusions; Psoas Abscess; Paralysis of Quadriceps; Chondromalacia Patellae; Patellar Fractures; Abnormal Ossification of Patella; Patellar Tendox Reflex; Transplantation of Gracilis; Groin Pull; Injury to Adductor Longus; Palpation, Compression, and Cannulation of Femoral Artery; Laceration of Femoral Artery; Potentially Lethal Misnomer; Saphenous Varix; Location of Femoral Vein; Cannulation of Femoral Vein; Femoral Hernias; Replaced or Accessory Obturator Artery / 558

Gluteal and Posterior Thigh Regions. Trochanteric Bursitis; Ischial Bursitis; Hamstring Injuries; Injury to Superior Gluteal Nerve; Anesthetic Block of Sciatic Nerve; Injury to Sciatic Nerve; Intragluteal Injections / 581

Popliteal Fossa and Leg. Popliteal Abscess and Tumor; Popliteal Pulse; Popliteal Aneurysm and Hemorrhage; Injury to Tibial Nerve; Containment and Spread of Compartmental Infections in Leg; Tibialis Anterior Strain (Shin Splints); Fibularis Muscles and Evolution of Human Foot; Injury to Common Fibular Nerve and Footdrop; Deep Fibular Nerve Entrapment; Superficial Fibular Nerve Entrapment; Fabella in Gastrocnemius; Calcaneal Tendinitis; Ruptured Calcaneal Tendon; Calcaneal Tendon Reflex; Absence of Plantarflexion; Gastrocnemius Strain; Calcaneal Bursitis; Venous Return From Leg; Accessory Soleus; Posterior Tibial Pulse / 604

Foot. Plantar Fasciitis; Infections of Foot; Contusion of Extensor Digitorum Brevis; Sural Nerve Grafts; Anesthetic Block of Superficial Fibular Nerve; Plantar Reflex; Medial Plantar Nerve Entrapment; Palpation of Dorsalis Pedis Pulse; Hemorrhaging Wounds of Sole of Foot; Lymphadenopathy / 624

Joints of Lower Limb. Bipedalism and Congruity of Articular Surfaces of Hip Joint; Fractures of Femoral Neck; Surgical Hip Replacement; Necrosis of Femoral Head in Children; Dislocation of Hip Joint; Genu Valgum and Genu

Varum; Patellar Dislocation; Patellofemoral Syndrome; Knee Joint Injuries; Arthroscopy of Knee Joint; Aspiration of Knee Joint; Bursitis in Knee Region; Popliteal Cysts; Knee Replacement; Ankle Injuries; Tibial Nerve Entrapment; Hallux Valgus; Hammer Toe; Claw Toes; Pes Planus (Flatfoot); Clubfoot (Talipes equinovarus) / 659

6 Upper Limb

Bones of Upper Limb. Upper Limb Injuries; Variations of Clavicle; Fracture of Clavicle; Ossification of Clavicle; Fracture of Scapula; Fractures of Humerus; Fractures of Radius and Ulna; Fracture of Scaphoid; Fracture of Hamate; Fracture of Metacarpals; Fracture of Phalanges / 683

Pectoral, Scapular, and Deltoid Regions. Absence of Pectoral Muscles; Paralysis of Serratus Anterior; Triangle of Auscultation; Injury of Spinal Accessory Nerve (CN XI); Injury of Thoracodorsal Nerve; Injury to Dorsal Scapular Nerve; Injury to Axillary Nerve; Fracture–Dislocation of Proximal Humeral Epiphysis; Rotator Cuff Injuries / 709

Axilla. Arterial Anastomoses Around Scapula; Compression of Axillary Artery; Aneurysm of Axillary Artery; Injuries to Axillary Vein; Role of Axillary Vein in Subclavian Vein Puncture; Enlargement of Axillary Lymph Nodes; Dissection of Axillary Lymph Nodes; Variations of Brachial Plexus; Brachial Plexus Injuries; Brachial Plexus Block / 726

Arm and Cubital Fossa. Bicipital Myotatic Reflex; Biceps Tendinitis; Dislocation of Tendon of Long Head of Biceps Brachii; Rupture of Tendon of Long Head of Biceps Brachii; Interruption of Blood Flow in Brachial Artery; Fracture of Humeral Shaft; Injury to Musculocutaneous Nerve; Injury to Radial Nerve in Arm; Venipuncture in Cubital Fossa; Variation of Veins in Cubital Fossa / 741

Forearm. Elbow Tendinitis or Lateral Epicondylitis; Mallet or Baseball Finger; Fracture of Olecranon; Synovial Cyst of Wrist; High Division of Brachial Artery; Superficial Ulnar Artery; Measuring Pulse Rate; Variations in Origin of Radial Artery; Median Nerve Injury; Pronator Syndrome; Communications Between Median and Ulnar Nerves; Injury of Ulnar Nerve at Elbow and in Forearm; Cubital Tunnel Syndrome; Injury of Radial Nerve in Forearm (Superficial or Deep Branches) / 766

Hand. Dupuytren Contracture of Palmar Fascia; Hand Infections; Tenosynovitis; Laceration of Palmar Arches; Ischemia of Digits (Fingers); Lesions of Median Nerve; Carpal Tunnel Syndrome; Trauma to Median Nerve; Ulnar Canal Syndrome; Handlebar Neuropathy; Radial Nerve Injury in Arm and Hand Disability; Dermatoglyphics; Palmar Wounds and Surgical Incisions / 789

Joints of Upper Limb. Dislocation of Sternoclavicular Joint; Ankylosis of Sternoclavicular Joint; Dislocation of Acromioclavicular Joint; Calcific Supraspinatus Tendinitis; Rotator Cuff Injuries; Dislocation of Glenohumeral Joint; Axillary Nerve Injury; Glenoid Labrum Tears; Adhesive Capsulitis of Glenohumeral Joint; Bursitis of Elbow; Avulsion of Medial Epicondyle; Ulnar Collateral Ligament Reconstruction; Dislocation of Elbow Joint; Subluxation and Dislocation of Radial Head; Wrist Fractures and Dislocations; Bull Rider's Thumb; Skier's Thumb / 813

7 Head

Cranium. Head Injuries; Headaches and Facial Pain; Injury to Superciliary Arches; Malar Flush; Fractures of Maxillae and Associated Bones; Fractures of Mandible; Resorption of Alveolar Bone; Fractures of Calvaria; Surgical Access to Cranial Cavity: Bone Flaps; Development of Cranium; Age Changes in Face; Obliteration of Cranial Sutures; Age Changes in Cranium; Craniosynostosis and Cranial Malformations / 837

Face and Scalp. Facial Lacerations and Incisions; Scalp Injuries; Scalp Wounds; Scalp Infections; Sebaceous Cysts; Cephalohematoma; Flaring of Nostrils; Paralysis of Facial Muscles; Infra-orbital Nerve Block; Mental and Incisive Nerve Blocks; Buccal Nerve Block; Trigeminal Neuralgia; Lesions of Trigeminal Nerve; Herpes Zoster Infection of Trigeminal Ganglion; Testing Sensory Function of CN V; Injuries to Facial Nerve; Compression of Facial Artery; Pulses of Arteries of Face and Scalp; Stenosis of Internal Carotid Artery; Scalp Lacerations; Squamous Cell Carcinoma of Lip / 860

Cranial Cavity and Meninges. Fracture of Pterion; Thrombophlebitis of Facial Vein; Blunt Trauma to Head; Tentorial Herniation; Bulging of Diaphragma Sellae; Occlusion of Cerebral Veins and Dural Venous Sinuses; Metastasis of Tumor Cells to Dural Sinuses; Fractures of Cranial Base; Dural Origin of Headaches; Leptomenigitis; Head Injuries and Intracranial Hemorrhage / 874

Brain. Cerebral Injuries; Cisternal Puncture; Hydrocephalus; Leakage of Cerebrospinal Fluid; Anastomoses of Cerebral Arteries and Cerebral Embolism; Variations of Cerebral Arterial Circle; Strokes; Brain Infarction; Transient Ischemic Attacks / 885

Orbital Region, Orbit, and Eyeball. Fractures of Orbit; Orbital Tumors; Injury to Nerves Supplying Eyelids; Inflammation of Palpebral glands; Hyperemia of Conjunctiva; Subconjunctival Hemorrhages; Development of Retina; Retinal Detachment; Pupillary Light Reflex; Uveitis; Ophthalmoscopy; Papilledema; Presbyopia and Cataracts; Coloboma of Iris; Glaucoma; Hemorrhage into Anterior Chamber; Artificial Eye; Corneal Reflex; Corneal Abrasions and Lacerations; Corneal Ulcers and Transplants; Horner Syndrome; Paralysis of Extraocular Muscles/Palsies of Orbital Nerves: Blockage of Central Artery of Retina; Blockage of Central Vein of Retina / 909

Parotid and Temporal Regions, Infratemporal Fossa, and Temporomandibular Joint. Parotidectomy; Infection of Parotid Gland; Abscess in Parotid Gland; Sialography of Parotid Duct; Blockage of Parotid Duct; Accessory Parotid Gland; Mandibular Nerve Block; Inferior Alveolar Nerve Block; Dislocation of TMJ; Arthritis of TMJ / 926

Oral Region. Cleft Lip; Cyanosis of Lips; Large Labial Frenulum; Gingivitis; Dental Caries, Pulpitis and Tooth Abscesses; Supernumerary Teeth (Hyperdontia); Extraction of Teeth; Dental Implants; Nasopalatine Block; Greater Palatine Block; Cleft Palate; Gag Reflex; Paralysis of Genioglossus; Injury to Hypoglossal Nerve; Sublingual Absorption of Drugs; Lingual Carcinoma; Frenectomy; Excision of Submandibular Gland and Removal of a Calculus; Sialography of Submandibular Ducts / 946

Pterygopalatine Fossa. Transantral Approach to Pterygopalatine Fossa / 954

Nose. Nasal Fractures; Deviation of Nasal Septum; Rhinitis; Epistaxis; Sinusitis; Infection of Ethmoidal Cells; Infection of Maxillary Sinuses; Relationship of Teeth to Maxillary Sinus; Transillumination of Sinuses / 963

Ear. External Ear Injury; Otoloscopic Examination; Acute Otitis Externa; Otitis Media; Perforation of Tympanic Membrane; Mastoiditis; Blockage of Pharyngotympanic Tube; Paralysis of Stapedius; Motion Sickness; Dizziness and Hearing Loss; Ménière Syndrome; High Tone Deafness; Otic Barotrauma / 977

8 Neck

Bones of Neck. Cervical Pain; Injuries of Cervical Vertebral Column; Fracture of Hyoid Bone / 985

Cervical Fascia. Paralysis of Platysma; Spread of Infections in Neck / 988

Superficial Structures of Neck: Cervical Regions. Congenital Torticollis; Spasmodic Torticollis; Subclavian Vein Puncture; Right Cardiac Catheterization; Prominence of External Jugular Vein; Severance of External Jugular Vein; Lesions of Spinal Accessory Nerve (CN XI); Severance of Phrenic Nerve, Phrenic Nerve Block, and Phrenic Nerve Crush; Nerve Blocks in Lateral Cervical Region; Injury to Suprascapular Nerve; Ligation of External Carotid Artery; Surgical Dissection of Carotid Triangle; Carotid Occlusion and Endarterectomy; Carotid Pulse; Carotid Sinus Hypersensitivity; Role of Carotid Bodies; Internal Jugular Pulse; Internal Jugular Vein Puncture / 1007

Deep Structures of Neck. Cervicothoracic Ganglion Block; Lesion of Cervical Sympathetic Trunk / 1017

Viscera of Neck. Thyroid Ima Artery; Thyroglossal Duct Cysts; Aberrant Thyroid Gland; Accessory Thyroid Glandular Tissue; Pyramidal Lobe of Thyroid Gland; Enlargement of Thyroid Gland; Thyroidectomy; Injury to Recurrent Laryngeal Nerves; Inadvertent Removal of Parathyroid Glands; Fractures of Laryngeal Skeleton; Laryngoscopy; Valsalva Maneuver; Aspiration of Foreign Bodies and Heimlich Maneuver; Tracheostomy; Injury to Laryngeal Nerves; Superior Laryngeal Nerve Block; Cancer of Larynx; Age Changes in Larynx; Foreign Bodies in Laryngopharynx; Sinus Tract from Piriform Recess; Tonsillectomy; Adenoiditis; Branchial Fistula; Branchial Sinuses and Cysts; Esophageal Injuries; Tracheo-Esophageal Fistula; Esophageal Cancer; Zones of Penetrating Neck Trauma / 1040

Lymphatics in Neck. Radical Neck Dissections / 1052

9 Summary of Cranial Nerves

Cranial Nerves. Olfactory Nerve; Optic Nerve; Oculomotor Nerve; Trochlear Nerve; Trigeminal Nerve; Abducent Nerve; Facial Nerve; Vestibulocochlear Nerve; Glossopharyngeal Nerve; Vagus Nerve; Spinal Accessory Nerve; Hypoglossal Nerve / 1078

Figure Credits

INTRODUCTION

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Fig. 1.34A & C *Grant's Atlas of Anatomy*. 9th ed. Fig. 1.26A & B.

Fig. 1.34B & D *Essential Clinical Anatomy*. 3rd ed. Fig. 1.15A & B.

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Fig. 1.57A *Grant's Atlas of Anatomy*. 11th ed.

Fig. 1.57B *Grant's Atlas of Anatomy*. 9th ed.

Fig. 1.62 *Modified from Grant's Atlas of Anatomy*. 11th ed.

Fig. 1.63 *Grant's Atlas of Anatomy*. 9th ed.

Fig. 1.65 *Grant's Atlas of Anatomy*. 9th ed.

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Fig. B1.19 The Developing Human: Clinically Oriented Embryology. 7th ed. Figs. 14-15 and 14-14, p. 345–346.
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Fig. B1.23 Siemens Medical Solutions USA, Inc.
Fig. B1.24 Grant's Atlas of Anatomy. 11th ed.
Fig. B1.26 Anatomical Chart Company.
Fig. B1.28 Stedman's Medical Dictionary. 27th ed. (artist: Neil O. Hardy, Westport, CT).
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Fig. B1.32 Grant's Atlas of Anatomy. 11th ed.
Fig. B1.33 Grant's Atlas of Anatomy. 11th ed.
Fig. B1.34 Clinical Radiology: The Essentials. 2nd ed.
Fig. B1.37 Cross-Sectional Anatomy. P. 25.
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Fig. 2.9A Grant's Atlas of Anatomy. 12th ed.
Fig. 2.9B Grant's Atlas of Anatomy. 11th ed.
Fig. 2.12 Essential Clinical Anatomy. 2nd ed.
Fig. 2.13 Grant's Atlas of Anatomy. 11th ed.
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Fig. 2.38A Grant's Atlas of Anatomy. 11th ed.
Fig. 2.39A Grant's Atlas of Anatomy. 11th ed.
Fig. 2.39B Grant's Atlas of Anatomy. 9th ed.
Fig. 2.42A Grant's Atlas of Anatomy. 11th ed.
Fig. 2.43C Stedman's Medical Dictionary. 27th ed. (artist: Neil O. Hardy, Westport, CT).
Fig. 2.44B & C Grant's Atlas of Anatomy. 9th ed.
Fig. 2.48B Grant's Dissector. 12th ed.
Fig. 2.53A *Modified from* Grant's Atlas of Anatomy. 11th ed.
Fig. 2.57A Grant's Method of Anatomy. 9th ed.
Fig. 2.57B Grant's Method of Anatomy. 9th ed.
Fig. 2.58C Stedman's Medical Dictionary. 27th ed. (artist: Neil O. Hardy, Westport, CT).
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Fig. 2.64B Grant's Atlas of Anatomy. 11th ed.
Fig. 2.64C & D Grant's Atlas of Anatomy. 9th ed.
Fig. 2.64E Grant's Dissector. 12th ed.
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Fig. 2.79 Grant's Atlas of Anatomy. 11th ed.
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Fig. 2.95B Grant's Atlas of Anatomy. 12th ed. Fig. 2.71B.
Fig. 2.95C Grant's Atlas of Anatomy. 9th ed.
Fig. 2.97B Grant's Atlas of Anatomy. 11th ed.
Fig. 2.98A Grant's Atlas of Anatomy. 11th ed.
Fig. 2.98C Grant's Dissector. 12th ed.
Fig. 2.99 Grant's Atlas of Anatomy. 11th ed.
Fig. 2.101 Grant's Atlas of Anatomy. 11th ed.
Fig. 2.102A Grant's Atlas of Anatomy. 11th ed.
Fig. 2.102B & C Cross-Sectional Anatomy.
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Fig. 2.104 Grant's Atlas of Anatomy. 11th ed.
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Fig. B2.15D Stedman's Medical Dictionary. 27th ed. (artist: Neil O. Hardy, Westport, CT).
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Fig. B2.19 Stedman's Medical Dictionary. 27th ed.
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Fig. 3.2B & C *Modified from* Grant's Atlas of Anatomy. 11th ed.

Fig. 3.3A Grant's Atlas of Anatomy. 11th ed.

Fig. 3.4B Grant's Atlas of Anatomy. 9th ed.

Fig. 3.5A Grant's Atlas of Anatomy. 9th ed.

Fig. 3.5B & C Grant's Atlas of Anatomy. 11th ed. Figs. 4-19A and 4-19B, p. 295.

Fig. 3.7B Grant's Atlas of Anatomy. 9th ed.

Fig. 3.9A Essential Clinical Anatomy. 3rd ed. T3-3C, p. 213.

Fig. 3.9B–D Grant's Atlas of Anatomy. 11th ed.

Fig. 3.13A & C Grant's Atlas of Anatomy. 12th ed. Figs 3-49D and 3-49A, p. 258 and 259.

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Fig. 3.14B *Based on* DeLancey JO. Structure support of the urethra as it relates to stress urinary incontinence: The hammock hypothesis. *Am J Obstet Gynecol* 1994;170:1713–1720.

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Fig. 3.21 Grant's Atlas of Anatomy. 11th ed.

Fig. 3.28B Essential Clinical Anatomy. 3rd ed. Fig. 3-9A, p. 225.

Fig. 3.29 *Modified from* Grant's Atlas of Anatomy. 11th ed.

Fig. 3.30A Grant's Atlas of Anatomy. 9th ed.

Fig. 3.35 Grant's Atlas of Anatomy. 9th ed.

Fig. 3.36A Grant's Atlas of Anatomy. 9th ed.

Fig. 3.36B Grant's Atlas of Anatomy. 12th ed. Fig. 3-23C, p. 220.

Fig. 3.37 Essential Clinical Anatomy. 3rd ed. Fig. 3-11B, p. 227.

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Fig. 3.43A Grant's Atlas of Anatomy. 12th ed. Fig. 3-22A, p. 232.

Fig. 3.45 Grant's Atlas of Anatomy. 12th ed. Fig. 3-32C, p. 233.

Fig. 3.48 Grant's Atlas of Anatomy. 12th ed. Figs. 3-40A, 3-17B, 3-30B, and 3-40B, p. 228 and p. 244.

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Fig. 3.64 Grant's Atlas of Anatomy. 11th ed.

Fig. 3.65 *Modified from* Grant's Atlas of Anatomy. 11th ed.

Fig. 3.67A & C Grant's Atlas of Anatomy. 12th ed. Fig. 3.47A & B, p. 253.

Fig. 3.69 Grant's Atlas of Anatomy. 12th ed. Fig. 3-62B, p. 272.

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Fig. 3.70B Grant's Atlas of Anatomy. 12th ed. Fig. 3-60B, p. 270.

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Fig. 3.73C, E, G, & H Grant's Atlas of Anatomy. 12th ed. Figs. 3-33A, 3-65A, 3-65B, and 3-70F, p. 234, p. 275, and p. 281.

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Fig. 4.21 Grant's Atlas of Anatomy. 11th ed.
Fig. 4.26 Grant's Atlas of Anatomy. 11th ed.
Fig. 4.28 Grant's Atlas of Anatomy. 11th ed.
Fig. 4.29 Grant's Atlas of Anatomy. 11th ed.
Fig. 4.30 Student Atlas of Anatomy.
Fig. 4.31 Student Atlas of Anatomy.
Fig. 4.32 Grant's Atlas of Anatomy. 9th ed.
Fig. 4.38 Grant's Atlas of Anatomy. 9th ed.
Fig. 4.40 Grant's Atlas of Anatomy. 11th ed.
Fig. 4.43 Grant's Atlas of Anatomy. 11th ed.
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- ## CHAPTER 5
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Fig. 5.5B Grant's Atlas of Anatomy. 9th ed.
Fig. 5.11 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.13 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.16 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.17A & B Grant's Atlas of Anatomy. 11th ed.
Fig. 5.18A Grant's Atlas of Anatomy. 12th ed. Fig. 5.4A & B, p. 357.
Fig. 5.18(insert) Grant's Atlas of Anatomy. 12th ed. Fig. 5.4, p. 357.
Fig. 5.19B Grant's Atlas of Anatomy. 11th ed.
Fig. 5.20 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.21A Grant's Atlas of Anatomy. 12th ed. Table 5.2F, p. 377.
Fig. 5.21B–D, E, & H Grant's Atlas of Anatomy. 11th ed.
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Fig. 5.28A Grant's Atlas of Anatomy. 12th ed. Fig. 5.16A, p. 371.
Fig. 5.28B Grant's Atlas of Anatomy. 12th ed. Fig. 5.16C, p. 371.
Fig. 5.33 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.34A & B Basic Clinical Massage Therapy: Integrating Anatomy and Treatment.
Fig. 5.34C–J Grant's Atlas of Anatomy. 11th ed.
Fig. 5.35 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.36A Grant's Atlas of Anatomy. 11th ed.
Fig. 5.38A Basic Clinical Massage Therapy: Integrating Anatomy and Treatment.
Fig. 5.40A Basic Clinical Massage Therapy: Integrating Anatomy and Treatment.
Fig. 5.40B & C Modified from Grant's Atlas of Anatomy. 11th ed.
Fig. 5.40D Grant's Atlas of Anatomy. 12th ed. Fig. 5.41B.
Fig. 5.40E Grant's Atlas of Anatomy. 12th ed. Fig. 5.42B.
Fig. 5.40F Clay JH, Pounds DM: Basic Clinical Massage Therapy: Integrating Anatomy and Treatment. 2nd ed. Baltimore: Lippincott Williams & Wilkins, 2008. Fig. 9-12, p. 342.
Fig. 5.40G Grant's Atlas of Anatomy. 11th ed.
Fig. 5.40H Basic Clinical Massage Therapy, 2nd. Fig. 9-14, p. 344.
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Fig. 5.42(left) Basic Clinical Massage Therapy
Fig. 5.42(right) Melloni's Illustrated Review of Human Anatomy. P. 173.
Fig. 5.43B Grant's Atlas of Anatomy. 9th ed.
Fig. 5.44 Modified from Grant's Atlas of Anatomy. 12th ed. Fig. 3-39A, p. 242.
Fig. 5.45A Modified from Essential Clinical Anatomy. 3rd ed. Fig. 5.17B, p. 348.
Fig. 5.49A & B Grant's Atlas of Anatomy. 11th ed.
Fig. 5.50 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.51 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.52 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.53A–C Grant's Atlas of Anatomy. 11th ed.
Fig. 5.54A & B Grant's Atlas of Anatomy. 11th ed.
Fig. 5.55A & B(inset) Grant's Atlas of Anatomy. 11th ed.
Fig. 5.55C–F Basic Clinical Massage Therapy.
Fig. 5.56 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.58 Basic Clinical Massage Therapy
Fig. 5.60A–E Grant's Atlas of Anatomy. 11th ed.
Fig. 5.60F–K Basic Clinical Massage Therapy.
Fig. 5.61 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.63 Grant's Atlas of Anatomy. 11th ed.
Fig. 5.67B Grant's Atlas of Anatomy. 12th ed.
Fig. 5.67C Grant's Atlas of Anatomy. 11th ed. Fig. 5.66, p. 443.
Fig. 5.68A, C, & H Basic Clinical Massage Therapy
Fig. 5.68B, D–G, & J Grant's Atlas of Anatomy. 11th ed.
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- Fig. 5.85B** Atlas of Radiologic Anatomy. 6th English ed.
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- Fig. 5.90A** Grant's Atlas of Anatomy. 12th ed. Figs 5.46B and 5.44.
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- Fig. 5.92B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 5.93B & D** *Modified from* Student Atlas of Anatomy
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- Fig. 5.96A** Grant's Atlas of Anatomy. 11th ed.
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- Fig. 6.37** Grant's Atlas of Anatomy. 11th ed.; Grant's Atlas of Anatomy. 12th ed. Fig. 6.20B, p. 502
- Fig. 6.38B** Grant's Atlas of Anatomy. 10th ed.
- Fig. 6.39C** *Courtesy of* D. Armstrong, University of Toronto, Canada.
- Fig. 6.40** Grant's Atlas of Anatomy. 12th ed. Fig. 6.18, p. 500.
- Fig. 6.41** Grant's Atlas of Anatomy. 12th ed. Fig. 6.19, p. 501.
- Fig. 6.43** Grant's Atlas of Anatomy. 10th ed.
- Fig. 6.44C** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.45** Grant's Atlas of Anatomy. 12th ed. Fig. 8.5F, p. 757.
- Fig. 6.46A–C** Grant's Atlas of Anatomy. 10th ed.
- Fig. 6.46D** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.47A** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.47B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.48** Grant's Atlas of Anatomy. 12th ed. Fig. 6.26, p. 510.
- Fig. 6.49A** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.49B–D, F, & G** Basic Clinical Massage Therapy. 2nd ed. Figs. 5.1, 5.12, 5.3, 5.6, and 5.10, pgs. 193, 201, 195, 197, and 199.
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- Fig. 6.56B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.56C** Grant's Atlas of Anatomy. 12th ed. Fig. 6.57B, p. 554.
- Fig. 6.56E** *Modified from* Grant's Atlas of Anatomy. 12th ed. Fig. 6.58B, p. 555.
- Fig. 6.57** *Modified from* Anderson JE: Grant's Atlas of Anatomy. 7th ed. Baltimore: Williams & Wilkins, 1978.
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- Fig. 6.60A** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.60B & C** Basic Clinical Massage Therapy, 2nd ed. Fig. 5.5, p. 186.
- Fig. 6.61A & B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.62** *Modified from* Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.63A–C** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.66** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.67** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.74B** Grant's Atlas of Anatomy. 12th ed. Fig. 6.06C, p. 568.
- Fig. 6.75** *Modified from* Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.77A & B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.78(top left & right)** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.81D** Grant's Atlas of Anatomy. 12th ed. Fig. 6.68A, p. 568.
- Fig. 6.82** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.83** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.84A** Grant's Atlas of Anatomy. 12th ed. Fig. 6.61, p. 559.
- Fig. 6.84B** Grant's Atlas of Anatomy. 9th ed.
- Fig. 6.89** Grant's Atlas of Anatomy. 12th ed. Fig. 6.62, p. 560.
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- Fig. 6.96** Grant's Atlas of Anatomy. 9th ed.
- Fig. 6.97B & D** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.98B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 6.103** *Modified from* Anatomy as the Basis of Clinical Medicine. 3rd ed.
- Fig. 6.104** Grant's Atlas of Anatomy. 11th ed.

CHAPTER 6

- Fig. 6.3A & B** Grant's Atlas of Anatomy. 10th ed.
- Fig. 6.3D & E** Grant's Atlas of Anatomy. 12th ed. Fig. 6.02D & E.
- Fig. 6.5** *Based on* Grant's Atlas of Anatomy. 12th ed. Fig. 6.02F.

Fig. 6.106B Grant's Atlas of Anatomy. 11th ed.
Fig. 6.107B & C Grant's Atlas of Anatomy. 11th ed.
Fig. 6.108 Grant's Atlas of Anatomy. 11th ed.
Fig. 6.109B Grant's Method of Anatomy: A Clinical Problem-Solving Approach. 11th ed.
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Fig. B6.26 Grant's Atlas of Anatomy. 10th ed.
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Fig. B6.31 www.xray200.co.uk.
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Fig. B6.33 John Sleezer/MCT/Landov.
Fig. B6.37A Basic Clinical Massage Therapy: Integrating Anatomy and Treatment, 2nd ed. Fig. 5-35.
Fig. B6.37C MCT/Landov.
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CHAPTER 7

Fig. 7.1A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.2A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.2B *Courtesy of* Arthur F. Dalley Ph.D.
Fig. 7.2C *Courtesy of* Arthur F. Dalley Ph.D.
Fig. 7.3 Grant's Atlas of Anatomy. 12th ed. Fig. 7.2B, p. 611.
Fig. 7.4A Grant's Atlas of Anatomy. 12th ed. Fig. 7.3B, p. 613.
Fig. 7.7A Grant's Atlas of Anatomy. 12th ed. Fig. 7.4A, p. 614–615.
Fig. 7.8A Grant's Atlas of Anatomy. 12th ed. Fig. 7.4B, p. 614.
Fig. 7.9A Grant's Atlas of Anatomy. 12th ed. Fig. 7.5B, p. 617.
Fig. 7.9B Grant's Atlas of Anatomy. 11th ed.
Fig. 7.10A–C Grant's Atlas of Anatomy. 12th ed. Fig. 7.10A–C, p. 64.
Fig. 7.11(top) Grant's Atlas of Anatomy. 12th ed. Fig. 7.6, p. 619.
Fig. 7.11(bottom) Grant's Atlas of Anatomy. 12th ed. Fig. 7.5, p. 617.
Fig. 7.12A Grant's Atlas of Anatomy. 12th ed. Fig. 7.6B, p. 619.
Fig. 7.16 LWW Atlas of Anatomy. Pl. 7-29, p. 324, 382, and 314.
Fig. 7.18 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.21 Grant's Atlas of Anatomy. 10th ed.
Fig. 7.23A & B Grant's Atlas of Anatomy. 11th ed.
Fig. 7.23C Grant's Atlas of Anatomy. 12th ed. Fig. 7.13, p. 627.
Fig. 7.28D Grant's Atlas of Anatomy. 11th ed.
Fig. 7.29A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.30 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.31C Grant's Atlas of Anatomy. 11th ed.
Fig. 7.32 Grant's Atlas of Anatomy. 10th ed.
Fig. 7.33 Grant's Atlas of Anatomy. 9th ed.
Fig. 7.35 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.41A & B Grant's Atlas of Anatomy. 11th ed.
Fig. 7.42 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.44A Anatomy as the Basis of Clinical Medicine. 3rd ed.
Fig. 7.44B Grant's Atlas of Anatomy. 11th ed. Fig. 7.36A, p. 640.
Fig. 7.45A Grant's Atlas of Anatomy. 12th ed. Fig. 7.35A, p. 655.
Fig. 7.45B *Modified from* Grant's Atlas of Anatomy. 10th ed.
Fig. 7.45C Grant's Atlas of Anatomy. 12th ed. Fig. 7.35C, p. 655.
Fig. 7.46A LWW Atlas of Anatomy. Pl. 7-58B, p. 353.
Fig. 7.46B Grant's Atlas of Anatomy. 11th ed.
Fig. 7.47A LWW Atlas of Anatomy. Pl. 7-57C, p. 352.
Fig. 7.47B Grant's Atlas of Anatomy. 12th ed. Fig. 7.32A, p. 651.
Fig. 7.51A Melloni's Illustrated Review of Human Anatomy: By Structures—Arteries, Bones, Muscles, Nerves, Veins, p. 149.
Fig. 7.51B Human Anatomy. 4th ed. Fig. 15.18, p. 419.
Fig. 7.52 Welch Allyn, Inc., Skaneateles Falls, NY.
Fig. 7.53 Human Anatomy. 4th ed. Fig. 15.17.
Fig. 7.54B Melloni's Illustrated Review of Human Anatomy. P. 141.
Fig. 7.54C Melloni's Illustrated Review of Human Anatomy. P. 143.
Fig. 7.56A–D *Modified from* Girard, Louis: Anatomy of the Human Eye. II. The Extra-ocular Muscles. Teaching Films, Inc. Houston, TX.
Fig. 7.57 Melloni's Illustrated Review of Human Anatomy. P. 189.
Fig. 7.60 Grant's Atlas of Anatomy. 10th ed.
Fig. 7.61 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.63 Essential Clinical Anatomy. 3rd ed. Fig. 7.21, p. 539.
Fig. 7.66 Grant's Atlas of Anatomy. 12th ed. P. 835.
Fig. 7.67 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.68 *Modified from* Grant's Atlas of Anatomy. 9th ed.
Fig. 7.69A Grant's Atlas of Anatomy. 12th ed. Fig. 7.46A.
Fig. 7.69B Grant's Atlas of Anatomy. 12th ed. Fig. 7.46C (left).
Fig. 7.69C & D Grant's Atlas of Anatomy. 12th ed. Fig. 7.4B & 7.46C, (middle).
Fig. 7.70A Grant's Atlas of Anatomy. 12th ed. Fig. 7.41B (detail).
Fig. 7.70B *Modified from* Grant's Atlas of Anatomy. 11th ed.
Fig. 7.70C Grant's Atlas of Anatomy. 12th ed. Fig. 7.45A.
Fig. 7.71 *Modified from* Paff, GH: Anatomy of the Head & Neck. Philadelphia: WB Saunders Co., 1973. Fig. 122-3, p. 62-63.
Fig. 7.72 Basic Clinical Massage Therapy: Integrating Anatomy and Treatment, 2nd ed. Figs. 3.15, 3.16, and 3.19, p. 82, 84, and 86.
Fig. 7.74 Grant's Atlas of Anatomy. 10th ed.
Fig. 7.79 Grant's Atlas of Anatomy. 12th ed. Fig. 7.79, p. 687.
Fig. 7.80C Grant's Atlas of Anatomy. 11th ed.
Fig. 7.82B *Courtesy of* M. J. Phatoah, University of Toronto, Canada.
Fig. 7.84 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.87A Grant's Atlas of Anatomy. 12th ed. Fig. 7.52C, p. 683.
Fig. 7.87B Grant's Atlas of Anatomy. 12th ed. Fig. 7.52D, p. 683.
Fig. 7.88 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.91 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.92 Grant's Atlas of Anatomy. 12th ed. Fig. 7.50B, p. 680.
Fig. 7.95 *Modified from* Thibodeau GA, Patton KT: Anatomy and Physiology. 4th ed. St. Louis: Mosby, 1999.
Fig. 7.96A Grant's Atlas of Anatomy. 9th ed.
Fig. 7.96B Grant's Atlas of Anatomy. 12th ed. Fig. 7.51A, p. 681.
Fig. 7.97A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.98 *Modified from* Anatomy of the Head & Neck. Figs. 238–240, p. 142–143.
Fig. 7.100B & C *Modified from* Hall-Craggs ECB: Anatomy as the Basis of Clinical Medicine. 2nd ed. Baltimore: Williams & Wilkins, 1990. Fig. 9-100, p. 536.
Fig. 7.101A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.101B Grant's Atlas of Anatomy. 12th ed. Fig. 7.57C, p. 690.
Fig. 7.102 Essential Clinical Anatomy. 3rd ed. Fig. 7.39A, p. 565.
Fig. 7.103A Grant's Atlas of Anatomy. 10th ed.
Fig. 7.103B Grant's Atlas of Anatomy. 11th ed.
Fig. 7.104A Grant's Atlas of Anatomy. 12th ed. Fig. 7.64A, p. 697.
Fig. 7.104B *Courtesy of* E. Becker, University of Toronto, Canada.
Fig. 7.105 Essential Clinical Anatomy. 3rd ed. Fig. 7.39B, p. 565.
Fig. 7.106 Grant's Atlas of Anatomy. 11th ed. Table 9.7.
Fig. 7.107A Grant's Atlas of Anatomy. 11th ed.
Fig. 7.107B Grant's Atlas of Anatomy. 12th ed. Fig. 7.65C, p. 698.
Fig. 7.108B Grant's Atlas of Anatomy. 10th ed.
Fig. 7.108C Grant's Atlas of Anatomy. 11th ed.
Fig. 7.109O Welch Allyn, Inc., Skaneateles Falls, NY.
Fig. 7.111A Grant's Atlas of Anatomy. 10th ed.
Fig. 7.112 LWW Atlas of Anatomy. Pl. 7-66B & C.
Fig. 7.114 Grant's Atlas of Anatomy. 11th ed.
Fig. 7.116 *Modified from* Grant's Atlas of Anatomy. 11th ed.
Fig. 7.117A Grant's Atlas of Anatomy. 10th ed.
Fig. 7.117B Grant's Atlas of Anatomy. 11th ed.

- Fig. 7.119** Grant's Atlas of Anatomy. 12th ed. Fig. 7.78A, p. 715.
- Fig. 7.120** Seeley RR, Stephens TR, and Tate P: Anatomy & Physiology. 6th ed. New York: McGraw-Hill 2003. Fig. 15.28, p. 532.
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- Fig. 8.14A** Grant's Atlas of Anatomy. 12th ed. Fig. 8.9A, p. 762.
- Fig. 8.14B** Grant's Atlas of Anatomy. 11th ed.
- Fig. 8.15** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.16** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.24B** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.25B** Grant's Atlas of Anatomy. 12th ed. Fig. 8.9A, p. 762.
- Fig. 8.26D & E** Grant's Atlas of Anatomy. 9th ed.
- Fig. 8.27** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.28** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.30A** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.32A & B** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.32C** *Based on* Pocket Atlas of Human Anatomy. 5th ed. P. 169, Fig. C, p. 169.
- Fig. 8.32D & E** Grant's Atlas of Anatomy. 11th ed.
- Fig. 8.33** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.34** Grant's Atlas of Anatomy. 11th ed.
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- Fig. 8.35D & E** Grant's Atlas of Anatomy. 11th ed.
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- Fig. 8.41A** Grant's Atlas of Anatomy. 11th ed.
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- Fig. 8.47** Grant's Atlas of Anatomy. 9th ed.
- Fig. 8.51** Grant's Atlas of Anatomy. 11th ed.
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CHAPTER 8

- Fig. 8.2A** Grant's Atlas of Anatomy. 11th ed.
- Fig. 8.2B** Grant's Atlas of Anatomy. 11th ed. Fig. 4-6, p. 279.
- Fig. 8.4A** Grant's Atlas of Anatomy. 12th ed. Fig. 8.1A, p. 749.
- Fig. 8.5** Grant's Atlas of Anatomy. 11th ed.
- Fig. 8.8** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.9** Grant's Atlas of Anatomy. 10th ed.
- Fig. 8.10** Grant's Atlas of Anatomy. 12th ed. Fig. 8.5, p. 757.
- Fig. 8.11** Grant's Atlas of Anatomy. 11th ed.
- Fig. 8.12** Grant's Atlas of Anatomy. 12th ed. Fig. 8.2A, p. 748.
- Fig. 8.13B** Grant's Atlas of Anatomy. 12th ed. Fig. 8.9B.

CHAPTER 9

- Fig. 9.2** Grant's Atlas of Anatomy. 10th ed.
- Fig. 9.3** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.4** Grant's Atlas of Anatomy. 12th ed. Fig. 9.3A.
- Fig. 9.8** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.9** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.10** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.12** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.13** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.16** Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.17** *Modified from* Grant's Atlas of Anatomy. 11th ed.
- Fig. 9.18** Grant's Atlas of Anatomy. 11th ed.
- Fig. B9.1** Grant's Atlas of Anatomy. 11th ed.

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