

RIGHT COPYRIGHT

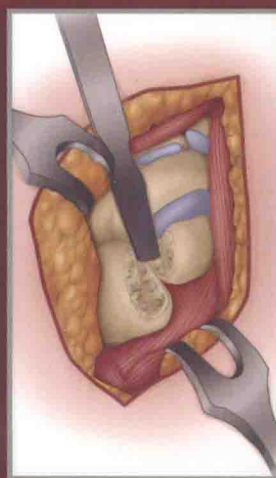
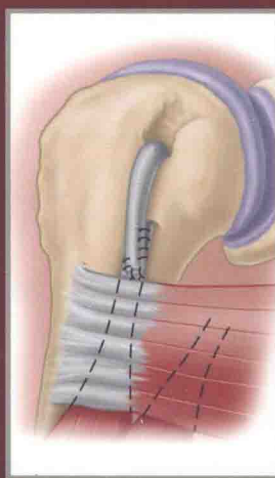
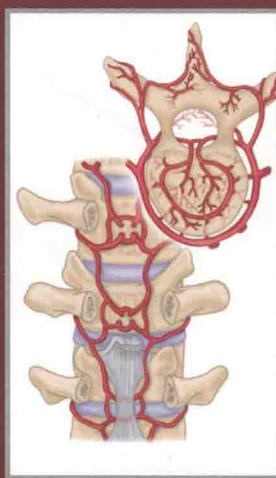
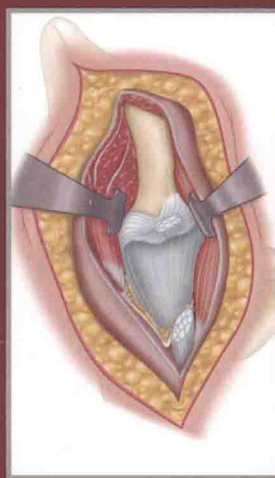
英文影印版

TWELFTH EDITION
VOLUME ONE

CAMPBELL'S OPERATIVE ORTHOPAEDICS

坎贝尔 骨科手术学

第 12 版



第 一 卷

S. Terry Canale • James H. Beaty



天津出版传媒集团

天津科技翻译出版有限公司

**CAMPBELL'S
OPERATIVE ORTHOPAEDICS**

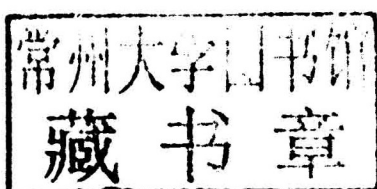
TWELFTH EDITION VOLUME I

坎贝尔


骨科手术学

第 12 版 第一卷

**S. Terry Canale
James H. Beaty**



天津出版传媒集团

 天津科技翻译出版有限公司

图书在版编目 (CIP) 数据

坎贝尔骨科手术学：英文/ (美) 卡奈尔 (Canale, S.T.), (美) 贝蒂 (Beaty, J.H.)
主编. —影印本. —天津：天津科技翻译出版有限公司, 2013.6
ISBN 978-7-5433-3246-1

I. ①坎… II. ①卡… ②贝… III. ①骨科学—外科手术—英文 IV. ①R687

中国版本图书馆CIP数据核字 (2013) 第128848号

This edition of Campbell's Operative Orthopaedics (12/E) by S. Terry Canale and James H. Beaty is published by arrangement with Elsevier.

ISBN-13:978-0-323-07243-4

ISBN-10:0-323-07243-7

Copyright © 2013 by Elsevier. All rights reserved.

Copyright © 2013 by Elsevier(Singapore) Pte Ltd. All rights reserved.

Elsevier(Singapore) Pte Ltd.

3 Killiney Road, #08-01 Winsland House I, Singapore 239519

Tel:(65)6349-0200 Fax:(65)6733-1817

First Published 2013, 2013年初版

Printed in China by Tianjin Science & Technology Translation & Publishing Co., Ltd under special arrangement with Elsevier (Singapore) Pte Ltd. This edition is authorized for sale in China only, excluding Hong Kong SAR, Macau SAR and Taiwan. Unauthorized export of this edition is a violation of the Copyright Act. Violation of this Law is subject to Civil and Criminal Penalties.

本书英文影印版由Elsevier (Singapore) Pte Ltd.授权天津科技翻译出版有限公司在中国境内 (不包括香港及澳门特别行政区和台湾地区) 独家发行。本版仅限在中国境内 (不包括香港及澳门特别行政区和台湾地区) 出版及标价销售。未经许可之出口, 视为违反著作权法, 将受法律之制裁。

授权单位: Elsevier (Singapore) Pte Ltd.

出 版 人: 刘 庆

出 版: 天津科技翻译出版有限公司

地 址: 天津市南开区白堤路244号

邮政编码: 300192

电 话: (022) 87894896

传 真: (022) 87895650

网 址: www.tsttpc.com

印 刷: 山东鸿杰印务集团有限公司

发 行: 全国新华书店

版本记录: 889×1194 16开本 278.5印张 5500千字

2013年6月第1版 2013年6月第1次印刷

定价: 1380.00元 (全四卷)

(如发现印装问题, 可与出版社调换)

IN MEMORY



ALLEN EDMONSON, MD
1927–2011



T. DAVID SISK, MD
1937–2009

Since the last edition of this text, we have lost two of our friends and mentors. Dr. Allen Edmonson and Dr. David Sisk both made huge contributions to several editions of *Campbell's Operative Orthopaedics*. In addition to his classic work on scoliosis, Dr. Edmonson served as editor of the 6th edition, and Dr. Sisk contributed the first chapters on arthroscopy to appear in this text. We are grateful for their commitment to "The Book" and the inspiration they have provided.

DEDICATION

This edition of *Campbell's Operative Orthopaedics* is dedicated to the hundreds of residents, fellows, and international visitors who have trained at "Dr. Campbell's Clinic" during its first 100 years. Their enthusiasm for learning and their commitment to our specialty have inspired the authors of all twelve editions of *Campbell's Operative Orthopaedics* to strive to produce a trusted and useful tool for continued learning, a tradition we hope continues for the next 100 years.

影 印 版 序

《坎贝尔骨科手术学》由世界级专家联袂编撰，自1939年问世以来，这部巨著伴随了一代又一代骨科医生的成长，成为全球骨科医生不可或缺的参考书，是骨科学领域最权威的著作，同样也被我国广大骨科医生奉为经典。

2013年初，Elsevier 出版公司出版了这部骨科学“圣经”的最新版本——第12版，作为一名旧版的老读者，再次切身感受到该书的严谨、科学。新版分4卷，19部分，89章。介绍了骨科手术的基本原理，详细讲述了髌、膝、踝、肩肘关节置换术，以及截肢与感染、骨肿瘤、先天性异常和发育异常、脊柱损伤、运动损伤、成人骨折与脱位、周围神经损伤、手和足踝部损伤的各种手术技术、儿童神经系统疾病及骨折与脱位。此外，还介绍了关节镜及显微外科的先进手术技术和经验。本书的特点是详细地叙述了各种手术的细节，包括手术指征、手术前后处理和并发症防治的原则、各种技巧和注意事项，还配备详细的手术图解，编排合理，非常符合临床骨科医生的学习需要。

新版《坎贝尔骨科手术学》达到了“去粗存精”、“去伪存真”之目的，删除了第11版中一些陈旧的观点和方法，吸取了近年来的最新成果，除保留作为“金标准”的经典技术之外，还介绍了大量新技术、新装备，并强调了微创骨科技术，对当前及今后一段时间的骨科临床和科研具有非常重要的指导作用。新版配图7000余幅，其中很多图片为重新绘制，直观展现骨科手术技术要点。

随着我国骨科界对外交流的日益增加，以及骨科医生英语水平的整体提高，越来越多的骨科医生希望能够尽快读到原汁原味的国外经典之作，恰逢此时，天津科技翻译出版有限公司在第12版《坎贝尔骨科手术学》刚刚推出之际，便立即引进了这部巨著的影印版本，几乎与原版同步出版，让国内读者在第一时间即能零距离地领略到这部经典原著的风采，更直接地分享这些国际骨科权威专家们对骨科手术学的真知灼见！考虑到读者的需求，出版社将影印版设计为两种形式出版。一种是如原版书，做成精装四卷的形式，另一种则按照骨科学的分支，将这套专著做成平装版，分为14个分册，可以让读者各取所需。此外，影印版均采用优质铜版纸印刷，保持了原版书的风貌，其性价比之高在近些年的影印版书中亦不多见。

最后，借此书出版之际，愿全体骨科同仁不断更新知识、锻炼技能，更好地为广大患者解除病痛，为我国的骨科事业的快速、健康发展做出更大的贡献！

中国工程院院士

CONTRIBUTORS

WILLIAM E. ALBERS, MD

Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

FREDERICK M. AZAR, MD

Professor
Director, Sports Medicine Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Chief-of-Staff, Campbell Clinic
Memphis, Tennessee

JAMES H. BEATY, MD

Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JAMES H. CALANDRUCCIO, MD

Associate Professor
Director, Hand Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

FRANCIS X. CAMILLO, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

S. TERRY CANALE, MD

Harold H. Boyd Professor and Chair
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

DAVID L. CANNON, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

KEVIN B. CLEVELAND, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

ANDREW H. CRENSHAW, JR., MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JOHN R. CROCKARELL, JR., MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

GREGORY D. DABOV, MD

Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

RAYMOND J. GARDOCKI, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JAMES L. GUYTON, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JAMES W. HARKESS, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

ROBERT K. HECK, JR., MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

SUSAN N. ISHIKAWA, MD

Assistant Professor
Co-Director, Foot and Ankle Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

MARK T. JOBE, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

DEREK M. KELLY, MD

Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

DAVID G. LAVELLE, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

SANTOS F. MARTINEZ, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

ANTHONY A. MASCIOLI, MD

Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

MARC J. MIHALKO, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

WILLIAM W. MIHALKO, MD

Professor, H.R. Hyde Chair of Excellence in
Rehabilitation Engineering
Director, Biomedical Engineering
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

ROBERT H. MILLER III, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

G. ANDREW MURPHY, MD

Assistant Professor
Co-Director, Foot and Ankle Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

ASHLEY L. PARK, MD

Clinical Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

EDWARD A. PEREZ, MD

Associate Professor
Director, Trauma Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

BARRY B. PHILLIPS, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

DAVID R. RICHARDSON, MD

Assistant Professor
Residency Program Director
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

E. GREER RICHARDSON, MD

Professor Emeritus
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

MATTHEW I. RUDLOFF, MD

Assistant Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JEFFREY R. SAWYER, MD

Associate Professor
Director, Pediatric Orthopaedic Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

THOMAS W. THROCKMORTON, MD

Associate Professor
Assistant Director, Residency Program
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

PATRICK C. TOY, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

WILLIAM C. WARNER, JR., MD

Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

JOHN C. WEINLEIN, MD

Instructor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

A. PAIGE WHITTLE, MD

Associate Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

KEITH D. WILLIAMS, MD

Associate Professor
Director, Spine Fellowship
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

DEXTER H. WITTE, MD

Clinical Assistant Professor of Radiology
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

GEORGE W. WOOD II, MD

Professor
University of Tennessee—Campbell Clinic
Department of Orthopaedic Surgery and
Biomedical Engineering
Memphis, Tennessee

PREFACE

As with every edition of this text, we have been amazed by the multitude of new techniques, new equipment, and new information generated by our orthopaedic colleagues worldwide. The emphasis on less-invasive surgical techniques for everything from hallux valgus correction to spine surgery to total joint arthroplasty has produced a variety of new approaches and new devices. The use of arthroscopy and endoscopy continues to expand its boundaries. We have attempted to include the latest orthopaedic procedures, while retaining many of the classic techniques that remain the “gold standards.”

Some of the changes in this edition that we believe will make it easier to use include the complete redrawing of the thousands of illustrations, the combining of some chapters and rearrangement of others to achieve a more logical flow of information, the addition of several new chapters, and the placement of references published before 2000 on the website only. Full access to the text and to an increased number of surgical videos is available on Expert-Consult.com, which is included with the purchase of the text. This combination of traditional and electronic formats, we believe, will make this edition of *Campbell's Operative Orthopaedics* easily accessible and useable in any situation, making it easier for orthopaedists to ensure the highest quality of patient care.

The true “heroes” of this work are our dedicated authors, who are willing to endure time away from their families and their practices to make sure that their contributions are as up-to-date and informational as possible. The revision process is lengthy and arduous, and we are truly appreciative of the time and effort expended by all of our contributors. As always, the personnel of the Campbell Foundation—Kay Daugherty,

Barry Burns, Linda Jones, and Joan Crowson—were essential in getting the ideas and information from 40 authors into a workable form. The progress of the book was marked by the proliferation of paper-stuffed file folders spread across their offices. Managing to transform all of that raw material into readable text and illustrative images is always an amazing accomplishment. Our thanks, too, to the individuals at Elsevier publishing who provided much guidance, encouragement, and assistance: Taylor Ball, Content Development Editor; Dolores Meloni, Executive Content Strategist; Mary Gatsch, Publishing Director; and John Casey, Project Manager.

We are most grateful to our families, especially our wives, Sissie Canale and Terry Beaty, who patiently endured our total immersion in the publication process.

The individuals who often are overlooked, or at least not recognized often enough, are the community of orthopaedic surgeons to whom we are indebted for their expertise and innovation that make a textbook such as ours necessary. As Dr. Campbell noted in the preface to the first edition of this text, “In some of the chapters we have drawn heavily from authoritative articles on special subjects; the author gratefully acknowledges his indebtedness for this material.” We are indeed grateful, and honored and humbled, to be the conduit of such remarkable skill and knowledge that help us to make the most current information available to our readers. We hope that this latest edition of *Campbell's Operative Orthopaedics* will prove to be a valuable tool in providing the best of care to orthopaedic patients.

S. Terry Canale, MD
James H. Beaty, MD

Campbell's Operative Orthopaedics, 12th ed.

List of Techniques

VOLUME I

Surgical Techniques and Approaches

- 1-1 Fixation of Tendon to Bone, 9
- 1-2 Tendon Fixation Into the Intramedullary Canal, 10
- 1-3 Tendon to Bone Fixation Using Locking Loop Suture, 10
- 1-4 Fixation of Tendon to Bone Using Wire Suture, 10
- 1-5 Fixation of Osseous Attachment of Tendon to Bone, 12
- 1-6 Removal of a Tibial Graft, 17
- 1-7 Removal of Fibular Grafts, 18
- 1-8 Removal of an Iliac Bone Graft, 20
- 1-9 Approach to the Interphalangeal Joints, 22
- 1-10 Medial Approach to the Great Toe Metatarsophalangeal Joint, 22
- 1-11 Dorsomedial Approach to Great Toe Metatarsophalangeal Joint, 23
- 1-12 Approach to the Lesser Toe Metatarsophalangeal Joints, 23
- 1-13 Medial Approach to the Calcaneus, 23
- 1-13 Lateral Approach to the Calcaneus, 24
- 1-15 U-Shaped Approach to the Calcaneus, 24
- 1-16 Kocher Approach (Curved L), to the Calcaneus, 25
- 1-17 Anterolateral Approach to the Calcaneus, 25
- 1-18 Anterior Approach to Expose the Ankle Joint and Both Malleoli, 27
- 1-19 Kocher Lateral Approach to the Tarsus and Ankle, 28
- 1-20 Ollier Approach to the Tarsus, 28
- 1-21 Posterolateral Approach to the Ankle (Gatellier and Chastang), 28
- 1-22 Anterolateral Approach to Lateral Dome of Talus, (Tochigi, Amendola, Muir, and Saltzman), 29
- 1-23 Posterior Approach to the Ankle, 30
- 1-24 Medial Approach to the Ankle (Koenig and Schaefer), 30
- 1-25 Medial Approach to the Posterior Lip of the Tibia (Colonna and Ralston), 31
- 1-26 Anterior Approach to the Tibia, 32
- 1-27 Medial Approach to the Tibia (Phemister), 32
- 1-28 Posterolateral Approach to the Tibia (Harmon, Modified), 32
- 1-29 Posterior Approach to the Superomedial Region of the Tibia (Banks and Laufman), 32
- 1-30 Posterolateral Approach to the Fibula (Henry), 34
- 1-31 Anteromedial Parapatellar Approach (Von Langenbeck), 35
- 1-32 Subvastus (Southern), Anteromedial Approach (Erkes, as Described by Hofmann, Plaster, and Murdock), 37
- 1-33 Anterolateral Approach to the Knee (Kocher), 37
- 1-34 Posterolateral Approach to the Knee (Henderson), 39
- 1-35 Posteromedial Approach to the Knee (Henderson), 39
- 1-36 Medial Approach to the Knee (Cave), 40
- 1-37 Medial Approach to the Knee (Hoppenfeld and DeBoer), 40
- 1-38 Transverse Approach to the Meniscus, 42
- 1-39 Lateral Approach to the Knee (Bruser), 42
- 1-40 Lateral Approach to the Knee (Brown et al.), 44
- 1-41 Lateral Approach to the Knee (Hoppenfeld and DeBoer), 45
- 1-42 Extensile Approach to the Knee (Fernandez), 46
- 1-43 Direct Posterior Approach to the Knee (Brackett and Osgood; Putti; Abbott and Carpenter), 47
- 1-44 Direct Posteromedial Approach to the Knee for Tibial Plateau Fracture (Galla and Lobenhoffer as Described by Fakler et al.), 49
- 1-45 Direct Posterolateral Approach to the Knee (Minkoff, Jaffe, and Menendez), 50
- 1-46 Anterolateral Approach to the Femur (Thompson), 51
- 1-47 Lateral Approach to the Femoral Shaft, 51
- 1-48 Posterolateral Approach to the Femoral Shaft, 53
- 1-49 Posterior Approach to the Femur, 53
- 1-50 Medial Approach to the Posterior Surface of the Femur in the Popliteal Space (Henry), 55
- 1-51 Lateral Approach to the Posterior Surface of the Femur in the Popliteal Space (Henry), 56
- 1-52 Lateral Approach to the Proximal Shaft and the Trochanteric Region, 57
- 1-53 Anterior Iliofemoral Approach to the Hip (Smith-Petersen), 58
- 1-54 Anterior Approach to the Hip Using a Transverse Incision (Somerville), 59
- 1-55 Modified Anterolateral Iliofemoral Approach to the Hip (Smith-Petersen), 60
- 1-56 Lateral Approach to the Hip (Watson-Jones), 61
- 1-57 Lateral Approach for Extensive Exposure of the Hip (Harris), 62
- 1-58 Lateral Approach to the Hip Preserving the Gluteus Medius (McFarland and Osborne), 64
- 1-59 Lateral Transgluteal Approach to the Hip (Hardinge), 64
- 1-60 Lateral Transgluteal Approach to the Hip (Hay as Described by McLauchlan), 67
- 1-61 Posterolateral Approach (Gibson), 67
- 1-62 Posterior Approach to the Hip (Osborne), 69
- 1-63 Posterior Approach to the Hip (Moore), 70
- 1-64 Medial Approach to the Hip (Ferguson; Hoppenfeld and DeBoer), 72
- 1-65 Ilioinguinal Approach to the Acetabulum (Letournel and Judet, as Described by Matta), 74
- 1-66 Iliofemoral Approach to the Acetabulum (Letournel and Judet), 75
- 1-67 Posterior Approach to the Acetabulum (Kocher-Langenbeck; Letournel and Judet), 77
- 1-68 Extensile Iliofemoral Approach (Letournel and Judet), 78
- 1-69 Extensile Iliofemoral Approach (Reinert et al.), 79
- 1-70 Triradiate Extensile Approach to the Acetabulum (Mears and Rubash), 82
- 1-71 Extensile Approach to the Acetabulum (Carnesale), 85
- 1-72 Approach to the Ilium, 86
- 1-73 Approach to the Symphysis Pubis (Pfannenstiel), 87
- 1-74 Posterior Approach to the Sacroiliac Joint, 88
- 1-75 Anterior Approach to the Sacroiliac Joint (Avila), 89
- 1-76 Approach to Both Sacroiliac Joints or Sacrum (Modified from Mears and Rubash), 89
- 1-77 Approach to the Sternoclavicular Joint, 90
- 1-78 Approach to the Acromioclavicular Joint and Coracoid Process (Roberts), 91
- 1-79 Anteromedial Approach to the Shoulder (Thompson; Henry), 91
- 1-80 Anteromedial Approach to the Shoulder (Cubbins, Callahan, and Scuderi), 92
- 1-81 Anterolateral Limited Deltoid-Splitting Approach to the Shoulder, 94
- 1-82 Extensile Anterolateral Approach to the Shoulder, 94
- 1-83 Transacromial Approach to the Shoulder (Darrach; McLaughlin), 95
- 1-84 Posterior Deltoid-Splitting Approach to the Shoulder (Wirth et al.), 95
- 1-85 Posterior Approach to the Shoulder (Modified Judet), 95
- 1-86 Simplified Posterior Approach to the Shoulder (King, as Described by Brodsky et al.), 97
- 1-87 Posterior Inverted-U Approach to the Shoulder (Abbott and Lucas), 97
- 1-88 Anterolateral Approach to the Humerus (Thompson; Henry), 101
- 1-89 Posterior Approach to the Proximal Humerus (Berger and Buckwalter), 102
- 1-90 Posterolateral Approach to the Distal Humeral Shaft (Moran), 103
- 1-91 Posterolateral Extensile (Cold), Approach to the Distal Humerus (Lewisky, Sheppard, and Ruth), 106
- 1-92 Posterolateral Approach to the Elbow (Campbell), 106
- 1-93 Extensile Posterolateral Approach to the Elbow (Wadsworth), 108
- 1-94 Posterior Approach to the Elbow by Olecranon Osteotomy (MacAusland and Müller), 108
- 1-95 Extensile Posterior Approach to the Elbow (Bryan and Morrey), 110
- 1-96 Lateral Approach to the Elbow, 110
- 1-97 Lateral J-Shaped Approach to the Elbow (Kocher), 112
- 1-98 Medial Approach with Osteotomy of the Medial Epicondyle (Molesworth; Campbell), 112
- 1-99 Medial and Lateral Approach to the Elbow, 113
- 1-100 Global Approach to the Elbow (Patterson, Bain and Mehta), 113
- 1-101 Posterolateral Approach to the Radial Head and Neck, 116

- 1-102 Approach to the Proximal and Middle Thirds of the Posterior Surface of the Radius (Thompson), 117
- 1-103 Anterolateral Approach to the Proximal Shaft and Elbow Joint (Henry), 118
- 1-104 Anterior Approach to the Distal Half of the Radius (Henry), 118
- 1-105 Approach to the Proximal Third of the Ulna and Proximal Fourth of the Radius (Boyd), 121
- 1-106 Dorsal Approach to the Wrist, 121
- 1-107 Dorsal Approach to the Wrist, 121
- 1-108 Volar Approach to the Wrist, 121
- 1-109 Lateral Approach to the Wrist, 123
- 1-110 Medial Approach to the Wrist, 124

Arthroplasty of the Hip

- 3-1 Preoperative Templating for Total Hip Arthroplasty (Capello), 182
- 3-2 Total Hip Arthroplasty Through the Posterolateral Approach with Posterior Dislocation of the Hip, 185
- 3-3 Implantation of Cementless Acetabular Component, 189
- 3-4 Implantation of Cemented Acetabular Component, 191
- 3-5 Implantation of Cementless Femoral Component, 193
- 3-6 Implantation of Cemented Femoral Component, 197
- 3-7 Transtrochanteric Approach for Revision Total Hip Arthroplasty, 266
- 3-8 Removal of Cemented Femoral Component, 267
- 3-9 Removal of a Cementless Femoral Component, 268
- 3-10 Removal of Implants with Extensive Distal Bone Ingrowth (Glassman and Engh), 269
- 3-11 Extended Trochanteric Osteotomy (Younger et al.), 270
- 3-12 Removal of a Broken Femoral Component (Collis and Dubrul), 271
- 3-13 Removal of a Broken Stem (Moreland, Marder, and Anspach), 272
- 3-14 Removal of a Broken Stem, 273
- 3-15 Removal of Femoral Cement, 273
- 3-16 Removal of Distal Cement with a High-Speed Burr (Turner et al.), 275
- 3-17 Removal of Distal Cement with a High-Speed Burr (Mallory), 276
- 3-18 Removal of a Loose All-Polyethylene Cup, 277
- 3-19 Removal of a Metal-Backed Cemented Acetabular Component, 277
- 3-20 Removal of a Cementless Acetabular Component (Mitchell), 279
- 3-21 Management of Acetabular Cavitary Deficits, 282
- 3-22 Management of Segmental Acetabular Deficit, 284
- 3-23 Management of Segmental Acetabular Deficit (Fletcher), 285
- 3-24 Management of Combined Deficits with Structural Grafting (Sporer et al.), 286
- 3-25 Management of Pelvic Discontinuity with Antiprotusio Cage (Winter et al.), 287
- 3-26 Management of Pelvic Discontinuity with Allografting and Custom Component (DeBoer et al.), 288
- 3-27 Management of Femoral Deficit with Modular Femoral Component (Cameron), 293
- 3-28 Revision with Extensively Porous-Coated Femoral Stem (Mallory and Head), 294
- 3-29 Management of Proximal Femoral Bone Loss with Distally Fixed Stem (Kwong et al.), 294
- 3-30 Management of Proximal Femoral Deficiencies with Impaction Bone Grafting and Cemented Revision Stem (Gie, Modified), 295
- 3-31 Management of Massive Deficits with Proximal Femoral Allograft-Prosthesis Composite, 297
- 3-32 Management of Massive Deficits with Modular Megaprosthesis (Klein et al.), 298

Arthrodesis of the Hip

- 5-1 Arthrodesis with Cancellous Screw Fixation (Benaroch et al.), 326
- 5-2 Arthrodesis with Cobra Plate Fixation (Murrell and Fitch), 326
- 5-3 Arthrodesis with Hip Compression Screw Fixation (Pagnano and Cabanela), 328
- 5-4 Arthrodesis in the Absence of the Femoral Head (Abbott, Fischer, and Lucas), 328
- 5-5 Arthrodesis of the Proximal Femur to the Ischium (Bosworth), 329
- 5-6 Arthrodesis with Cobra-Head Plate Fixation After Failed Total Hip Arthroplasty (Kostuik and Alexander), 330

Hip Pain in the Young Adult and Hip Preservation Surgery

- 6-1 Surgical Dislocation of the Hip (Ganz et al.), 343
- 6-2 Combined Hip Arthroscopy and Limited Open Osteochondroplasty (Clohisy and McClure), 345

- 6-3 Bernese Periacetabular Osteotomy (Matheney et al.), 352
- 6-4 Osteonecrosis of the Femoral Head: Core Decompression (Hungerford), 361
- 6-5 Osteonecrosis of the Femoral Head: Core Decompression—Percutaneous Technique (Mont et al.), 361
- 6-6 Osteonecrosis of the Femoral Head: Vascularized Fibular Grafting (Urbaniak et al.), 363

Arthroplasty of the Knee

- 7-1 Surgical Technique for Primary TKA, 399
- 7-2 Bone Preparation for Primary TKA, 402
- 7-3 PCL-Stabilized TKA of the Varus Knee, 407
- 7-4 PCL-Retaining TKA of the Varus Knee, 407
- 7-5 Valgus Deformity Correction, 408
- 7-6 Pie-Crusting Technique, 408
- 7-7 Flexion Contracture Correction, 410
- 7-8 Recurvatum Correction, 410
- 7-9 Balancing of the Posterior Cruciate Ligament, 411
- 7-10 Bone Grafting of Peripheral Tibial Defects, 412
- 7-11 Component Implantation, 415
- 7-12 Unicondylar Knee Arthroplasty, 416
- 7-13 Patellofemoral Arthroplasty, 417
- 7-14 Arthrodesis with an Intramedullary Nail for an Infected Total Knee Arthroplasty, 425

Arthrodesis of the Knee

- 8-1 Compression Arthrodesis Using External Fixation, 446
- 8-2 Arthrodesis Using Intramedullary Nail Fixation, 448
- 8-3 Knee Arthrodesis with Locked Intramedullary Nail after Failed Total Knee Arthroplasty, 449
- 8-4 Arthrodesis Using Plate Fixation, 451

Soft Tissue Procedures and Corrective Osteotomies About the Knee

- 9-1 Proximal Release of Quadriceps (Sengupta), 455
- 9-2 Proximal Release of Quadriceps (Thompson), 455
- 9-3 Drainage of Bursa, 458
- 9-4 Excision of Bursa, 458
- 9-5 Popliteal Cyst Excision (Hughston, Baker, and Mello), 460
- 9-6 Medial Gastrocnemius Bursa Excision (Meyerding and Van Demark), 461
- 9-7 Semimembranosus Bursa Excision, 462
- 9-8 Semitendinosus Tendon Transfer (Ray, Clancy, and Lemon), 463
- 9-9 Lateral Closing Wedge Osteotomy (Modified Coventry; Hofmann, Wyatt, and Beck), 473
- 9-10 Opening Wedge Hemicallosis (Turi et al.), 477
- 9-11 Closing Wedge Distal Femoral Varus Osteotomy (Coventry), 481

Total Ankle Arthroplasty

- 10-1 Total Ankle Arthroplasty, 491
- 10-2 Reconstruction of Lateral Ankle Ligaments for Chronic Instability as an Adjunct to Total Ankle Arthroplasty (Coetzee), 493

Ankle Arthrodesis

- 11-1 Opening Wedge Osteotomy of the Tibia for Varus Deformity and Medial Joint Arthrosis, 504
- 11-2 Distraction Arthroplasty of the Ankle, 507
- 11-3 Mini-Incision Technique, 511
- 11-4 Transfibular (Transmalleolar) Arthrodesis with Fibular Strut Graft, 512
- 11-5 Tibiotalocalcaneal Arthrodesis, 514
- 11-6 Technique Modifications, 516
- 11-7 Posterior Approach for Arthrodesis of Ankle and Subtalar Joints (Campbell), 519
- 11-8 Tibiocalcaneal Arthrodesis with Calandruccio II External Fixation Device, 521
- 11-9 Tibiocalcaneal Arthrodesis with a Thin-Wire External Fixation (Eylon et al.), 522
- 11-10 Tibiotalar Arthrodesis with a Sliding Bone Graft (Blair; Morris et al.), 524
- 11-11 Tibiotalar or Tibiotalocalcaneal Fusion with Structural Allograft and Internal Fixation for Salvage of Failed Total Ankle Arthroplasty (Berkowitz et al.), 524
- 11-12 Bone Graft Harvest from the Proximal Tibia (Whitehouse et al.), 527

Continued on back endsheets

Shoulder and Elbow Arthroplasty

- 12-1 Hemiarthroplasty, 540
- 12-2 Total Shoulder Arthroplasty, 546
- 12-3 Reverse Shoulder Arthroplasty, 549
- 12-4 Débridement Arthroplasty (Wada et al.), 562
- 12-5 Interposition Arthroplasty, 564
- 12-6 Radial Head Implant Arthroplasty, 568
- 12-7 Coonrad-Morrey Total Elbow Arthroplasty (Coonrad; Coonrad, Morrey, and Bryan), 571
- 12-8 Elbow Resection Arthroplasty (Campbell), 576

Arthrodesis of the Shoulder and Elbow

- 13-1 External Fixation (Charnley and Houston), 586
- 13-2 Screw Fixation (Cofield), 587
- 13-3 Plate Fixation (AO Group), 588
- 13-4 Pelvic Reconstruction Plate (Richards et al.), 589
- 13-5 Shoulder Arthrodesis after Failed Prosthetic Shoulder Arthroplasty (Scalise and Iannotti), 589
- 13-6 Elbow Arthrodesis (Staples), 593
- 13-7 Elbow Arthrodesis (Müller et al.), 593
- 13-8 Elbow Arthrodesis (Spier), 594

Amputations of the Foot

- 15-1 Terminal Syme Amputation, 615
- 15-2 Amputation at the Base of the Proximal Phalanx, 616
- 15-3 Metatarsophalangeal Joint Disarticulation, 617
- 15-4 Metatarsophalangeal Joint Disarticulation, 619
- 15-5 First or Fifth Ray Amputation (Border Ray Amputation), 619
- 15-6 Central Ray Amputation, 620
- 15-7 Transmetatarsal Amputation, 622
- 15-8 Chopart Amputation, 624
- 15-9 Syme Amputation, 627
- 15-10 Two-Stage Syme Amputation (Wyss et al.; Malone et al.; Wagner), 632
- 15-11 Boyd Amputation, 633

Amputations of the Lower Extremity

- 16-1 Transtibial Amputation, 638
- 16-2 Transtibial Amputation Using Long Posterior Skin Flap (Burgess), 640
- 16-3 Knee Disarticulation (Batch, Spittler, and McFaddin), 642
- 16-4 Knee Disarticulation (Mazet and Hennessy), 644
- 16-5 Knee Disarticulation (Kjøble), 645
- 16-6 Transfemoral (Above-Knee), Amputation of Nonischemic Limbs, 646
- 16-7 Transfemoral (Above-Knee), Amputation of Nonischemic Limbs (Gottschalk), 646
- 16-8 Transfemoral (Above-Knee), Amputation for Ischemic Limbs, 648

Amputations of the Hip and Pelvis

- 17-1 Anatomical Hip Disarticulation (Boyd), 651
- 17-2 Posterior Flap (Slocum), 653
- 17-3 Standard Hemipelvectomy, 653
- 17-4 Anterior Flap Hemipelvectomy, 655
- 17-5 Conservative Hemipelvectomy, 655

Amputations of the Upper Extremity

- 18-1 Amputation at the Wrist, 659
- 18-2 Disarticulation of the Wrist, 660
- 18-3 Distal Forearm (Distal Transradial) Amputation, 660
- 18-4 Proximal Third of Forearm (Proximal Transradial) Amputation, 662
- 18-5 Disarticulation of the Elbow, 662
- 18-6 Supracondylar Area, 663
- 18-7 Amputation Proximal to the Supracondylar Area, 664
- 18-8 Amputation Through the Surgical Neck of the Humerus, 664
- 18-9 Disarticulation of the Shoulder, 664
- 18-10 Anterior Approach (Berger), 667
- 18-11 Posterior Approach (Littlewood), 671

Amputations of the Hand

- 19-1 Kutler V-Y Triangular Advancement Flap (Kutler; Fisher), 678
- 19-2 Atasoy V-Y Triangular Advancement Flap (Atasoy et al.), 680
- 19-3 Bipedicle Dorsal Flaps, 681
- 19-4 Adipofascial Turnover Flap, 682
- 19-5 Thenar Flap, 682
- 19-6 Local Neurovascular Island Flap, 683

- 19-7 Island Pedicle Flap, 683
- 19-8 Retrograde Island Pedicle Flap, 684
- 19-9 Ulnar Hypothenar Flap, 685
- 19-10 Index Ray Amputation, 685
- 19-11 Transposing the Index Ray (Peacock), 687
- 19-12 Advancement Pedicle Flap for Thumb Injuries, 690
- 19-13 Phalangization of Fifth Metacarpal, 691
- 19-14 Krukenberg Reconstruction (Krukenberg; Swanson), 692
- 19-15 Lengthening of Metacarpal and Transfer of Local Flap (Gillies and Millard, Modified), 695
- 19-16 Osteoplastic Reconstruction and Transfer of Neurovascular Island Graft (Verdan), 696
- 19-17 Riordan Pollicization (Riordan), 696
- 19-18 Buck-Gramcko Pollicization (Buck-Gramcko), 698
- 19-19 Foucher Pollicization, 700

Osteomyelitis

- 21-1 Drainage of Acute Hematogenous Osteomyelitis, 729
- 21-2 Sequestrectomy and Curettage for Chronic Osteomyelitis, 734
- 21-3 Open Bone Grafting (Papineau et al.; Archdeacon and Messerschmitt), 735
- 21-4 Antibiotic Bead Pouch (Henry, Ostermann, and Seligson), 736
- 21-5 Intramedullary Antibiotic Cement Nail, 736
- 21-6 Split-Heel Incision (Gaenslen), 741
- 21-7 Distal Third of the Femur, 741
- 21-8 Drainage, 742
- 21-9 Resection of the Metatarsals, 743
- 21-10 Partial Calcanectomy, 743
- 21-11 Resection of the Fibula, 744
- 21-12 Resection of the Iliac Wing (Badgley), 744

Infectious Arthritis

- 22-1 Surgical Drainage of the Tarsal Joint, 753
- 22-2 Anterolateral Drainage of the Ankle, 753
- 22-3 Posterolateral Drainage of the Ankle, 753
- 22-4 Anteromedial Drainage of the Ankle, 754
- 22-5 Posteromedial Drainage of the Ankle, 754
- 22-6 Arthroscopic Drainage of the Knee, 755
- 22-7 Anterior Drainage of the Knee, 755
- 22-8 Posterolateral and Posteromedial Drainage of the Knee (Henderson), 755
- 22-9 Posteromedial Drainage of the Knee (Klein), 755
- 22-10 Posteromedial and Posterolateral Drainage of the Knee (Kelikian), 756
- 22-11 Lateral Aspiration of the Hip, 757
- 22-12 Anterior Aspiration of the Hip, 758
- 22-13 Medial Aspiration of the Hip, 758
- 22-14 Posterior Drainage of the Hip (Ober), 758
- 22-15 Anterior Drainage of the Hip, 758
- 22-16 Lateral Drainage of the Hip, 758
- 22-17 Medial Drainage of the Hip (Ludloff), 759
- 22-18 Resection of the Hip (Girdlestone), 761
- 22-19 Anterior Drainage of the Shoulder, 762
- 22-20 Posterior Drainage of the Shoulder, 763
- 22-21 Medial Drainage of the Elbow, 763
- 22-22 Lateral Drainage of the Elbow, 763
- 22-23 Posterior Drainage of the Elbow, 764
- 22-24 Lateral Drainage of the Wrist, 764
- 22-25 Medial Drainage of the Wrist, 765
- 22-26 Dorsal Drainage of the Wrist, 765
- 22-27 Osteotomy of the Ankle, 765
- 22-28 Transverse Supracondylar Osteotomy of the Femur, 765
- 22-29 V-Osteotomy of the Femur (Thompson), 766
- 22-30 Supracondylar Cuneiform Osteotomy of the Femur, 766
- 22-31 Supracondylar Controlled Rotational Osteotomy of the Femur, 766
- 22-32 Intraarticular Osteotomy, 768
- 22-33 Reconstruction after Hips Sepsis (Harmon), 769
- 22-34 Transverse Opening Wedge Osteotomy of the Hip, 770
- 22-35 Transverse Closing Wedge Osteotomy of the Hip, 771
- 22-36 Brackett Osteotomy of the Hip (Brackett), 771

Tuberculosis and Other Unusual Infections

- 23-1 Curettage for Tuberculous Lesions in the Foot, 776
- 23-2 Excision of Metatarsal, 776

- 23-3 Excision of Cuneiform Bones, 777
- 23-4 Excision of Navicular, 777
- 23-5 Excision of Cuboid, 777
- 23-6 Excision of Calcaneus, 777
- 23-7 Excision of Talus, 777
- 23-8 Partial Synovectomy and Curettage (Wilkinson), 779
- 23-9 Lesions above Acetabulum, 779
- 23-10 Lesions of the Femoral Neck, 779
- 23-11 Lesions of the Trochanteric Area (Ahern), 780
- 23-12 Excision of the Hip Joint, 780
- 23-13 Excision of Elbow Joint, 781
- 23-14 Excision of Wrist Joint, 781

General Principles of Tumors

- 24-1 Resection of the Shoulder Girdle (Marcove, Lewis, and Huvos), 809
- 24-2 Scapular Resection (Das Gupta), 816
- 24-3 Resection of the Proximal Humerus, 816
- 24-4 Resection of Proximal Humerus (Gebhardt et al.), 818
- 24-5 Intercalary Resection of the Humeral Shaft (Lewis), 818
- 24-6 Resection of the Distal Humerus, 819
- 24-7 Resection of the Proximal Radius, 821
- 24-8 Resection of the Proximal Ulna, 821
- 24-9 Resection of the Distal Radius, 821
- 24-10 Resection of the Pubis and Ischium (Radley, Liebig, and Brown), 829

- 24-11 Resection of the Acetabulum, 829
- 24-12 Resection of the Innominate Bone (Internal Hemipelvectomy), (Karakousis and Veziridis), 832
- 24-13 Resection of the Sacroiliac Joint, 832
- 24-14 Resection of the Sacrum (Stener and Gunterberg), 832
- 24-15 Resection of the Sacrum (Localio, Francis, and Rossano), 835
- 24-16 Resection of Sacrum Through Posterior Approach (MacCarty et al.), 836
- 24-17 Resection of the Proximal Femur (Lewis and Chekofsky), 836
- 24-18 Resection of Entire Femur (Lewis), 838
- 24-19 Intraarticular Resection of the Distal Femur with Endoprosthetic Reconstruction, 839
- 24-20 Resection of the Proximal Tibia (Malawer), 841
- 24-21 Resection of the Distal Femur or Proximal Tibia and Arthrodesis of the Knee (Enneking and Shirley), 842
- 24-22 Resection of the Proximal Fibula (Malawer), 848
- 24-23 Resection of the Distal Third of the Fibula, 849
- 24-24 Rotationplasty for a Lesion in the Distal Femur (Kotz and Salzer), 852
- 24-25 Rotationplasty for a Lesion of the Proximal Femur Without Involvement of the Hip Joint (Winkelmann), 853
- 24-26 Rotationplasty for a Lesion of the Proximal Femur Involving the Hip Joint (Winkelmann), 855

CONTENTS

VOLUME I

PART I **GENERAL PRINCIPLES**

- | | |
|---|------------|
| 1 Surgical Techniques and Approaches | 2 |
| Andrew H. Crenshaw, Jr. | |
| 2 Magnetic Resonance Imaging in Orthopaedics | 127 |
| Dexter H. Witte | |

PART II **RECONSTRUCTIVE PROCEDURES OF THE HIP IN ADULTS**

- | | |
|---|------------|
| 3 Arthroplasty of the Hip | 158 |
| James W. Harkess and John R. Crockarell, Jr. | |
| 4 Hip Resurfacing | 311 |
| David G. Lavelle | |
| 5 Arthrodesis of the Hip | 325 |
| William E. Albers | |
| 6 Hip Pain in the Young Adult and Hip Preservation Surgery | 333 |
| James L. Guyton | |

PART III **RECONSTRUCTIVE PROCEDURES OF THE KNEE IN ADULTS**

- | | |
|---|------------|
| 7 Arthroplasty of the Knee | 376 |
| William M. Mihalko | |
| 8 Arthrodesis of the Knee | 445 |
| William E. Albers | |
| 9 Soft Tissue Procedures and Corrective Osteotomies about the Knee | 453 |
| Andrew H. Crenshaw, Jr. | |

PART IV **RECONSTRUCTIVE PROCEDURES OF THE ANKLE IN ADULTS**

- | | |
|------------------------------------|------------|
| 10 Total Ankle Arthroplasty | 486 |
| G. Andrew Murphy | |
| 11 Ankle Arthrodesis | 503 |
| G. Andrew Murphy | |

PART V **RECONSTRUCTIVE PROCEDURES OF THE SHOULDER AND ELBOW IN ADULTS**

- | | |
|---|------------|
| 12 Shoulder and Elbow Arthroplasty | 532 |
| Thomas W. Throckmorton | |
| 13 Arthrodesis of the Shoulder and Elbow | 583 |
| Thomas W. Throckmorton | |

PART VI **AMPUTATIONS**

- | | |
|--|------------|
| 14 General Principles of Amputations | 598 |
| Patrick C. Toy | |
| 15 Amputations of the Foot | 613 |
| David R. Richardson | |
| 16 Amputations of the Lower Extremity | 637 |
| Marc J. Mihalko | |
| 17 Amputations of the Hip and Pelvis | 651 |
| Marc J. Mihalko | |
| 18 Amputations of the Upper Extremity | 659 |
| Kevin B. Cleveland | |
| 19 Amputations of the Hand | 673 |
| James H. Calandruccio | |

PART VII **INFECTIONS**

- | | |
|---|------------|
| 20 General Principles of Infection | 706 |
| Kevin B. Cleveland | |
| 21 Osteomyelitis | 725 |
| Gregory D. Dabov | |
| 22 Infectious Arthritis | 749 |
| Anthony A. Mascioli and Ashley L. Park | |
| 23 Tuberculosis and Other Unusual Infections | 773 |
| Marc J. Mihalko | |

PART VIII**TUMORS**

- 24 General Principles of Tumors** 788
Patrick C. Toy and Robert K. Heck, Jr.
- 25 Benign Bone Tumors and Nonneoplastic Conditions Simulating Bone Tumors** 859
Robert K. Heck, Jr. and Patrick C. Toy
- 26 Benign/Aggressive Tumors of Bone** 887
Robert K. Heck, Jr.
- 27 Malignant Tumors of Bone** 909
Robert K. Heck, Jr.
- 28 Soft Tissue Tumors** 947
Patrick C. Toy and Robert K. Heck, Jr.

VOLUME II**PART IX****CONGENITAL AND DEVELOPMENTAL DISORDERS**

- 29 Congenital Anomalies of the Lower Extremity** 980
Derek M. Kelly
- 30 Congenital and Developmental Anomalies of the Hip and Pelvis** 1079
Derek M. Kelly
- 31 Congenital Anomalies of the Trunk and Upper Extremity** 1119
Derek M. Kelly
- 32 Osteochondrosis or Epiphysitis and Other Miscellaneous Affections** 1133
S. Terry Canale

PART X**NERVOUS SYSTEM DISORDERS IN CHILDREN**

- 33 Cerebral Palsy** 1202
Jeffrey R. Sawyer
- 34 Paralytic Disorders** 1255
Jeffrey R. Sawyer
- 35 Neuromuscular Disorders** 1335
William C. Warner, Jr. and Jeffrey R. Sawyer

PART XI**FRACTURES AND DISLOCATIONS IN CHILDREN**

- 36 Fractures and Dislocations in Children** 1364
S. Terry Canale and James H. Beaty

PART XII**THE SPINE**

- 37 Spinal Anatomy and Surgical Approaches** 1524
George W. Wood II
- 38 Fractures, Dislocations, and Fracture-Dislocations of the Spine** 1559
Keith D. Williams
- 39 Arthrodesis of the Spine** 1629
George W. Wood II
- 40 Pediatric Cervical Spine** 1653
William C. Warner, Jr.
- 41 Scoliosis and Kyphosis** 1691
William C. Warner, Jeffery R. Sawyer, and Derek M. Kelly
- 42 Lower Back Pain and Disorders of Intervertebral Discs** 1897
Raymond J. Gardocki and Ashley L. Park
- 43 Infections of the Spine** 1965
Francis X. Camillo
- 44 Other Disorders of the Spine** 1993
Raymond J. Gardocki and Francis X. Camillo

VOLUME III**PART XIII****SPORTS MEDICINE**

- 45 Knee Injuries** 2052
Robert H. Miller III and Frederick M. Azar
- 46 Shoulder and Elbow Injuries** 2213
Robert H. Miller III, Frederick M. Azar and Thomas W. Throckmorton
- 47 Recurrent Dislocations** 2255
Barry B. Phillips
- 48 Traumatic Disorders** 2311
Frederick M. Azar