# HANDBOOK OF SPINE SURGERY

# 脊柱外科手册

——从入门到精通

## 第二版

[美] Ali A. Baaj

[美] Praveen V. Mummaneni

主编 [美] Juan S. Uribe

[美] Alexander R. Vaccaro

[美] Mark S. Greenberg

主译 董 健 姜晓幸

山东科学技术出版社 www.lkj.com.cn

## HANDBOOK OF SPINE SURGERY

# 脊柱外科手册

——从入门到精通

第二版

[美] Ali A. Baaj

[美] Praveen V. Mummaneni

主编 [美] Juan S. Uribe

[美] Alexander R. Vaccaro

[美] Mark S. Greenberg

主译 董 健 姜晓幸

#### 图书在版编目 (CIP) 数据

脊柱外科手册:第二版/(美)阿里 A. 巴杰(Ali A. Baaj)等主编;董健,姜晓幸主译.一济南:山东科学技术出版社,2018.1

ISBN 978-7-5331-9060-6

I.①脊··· Ⅱ.①阿···②董···③姜··· Ⅲ.①脊柱病-外科 手术-手册 IV.① R681.5-62

中国版本图书馆 CIP 数据核字 (2017) 第 199557 号

Copyright © 2016 of the original English language edition by Thieme Medical Publishers, Inc., New York, USA.

Original title: Handbook of Spine Surgery, 2/e

by Ali A. Baaj / Praveen V. Mummaneni / Juan S. Uribe / Alexander R. Vaccaro / Mark S. Greenberg

Simplified Chinese translation edition @ 2017 by Shandong Science and Technology Press Co., Ltd.

版权登记号 图字15-2017-84

## 脊柱外科手册

(第二版)

主编 [美] Ali A. Baaj 等主译 董健善縣幸

主管单位: 山东出版传媒股份有限公司

出 版 者: 山东科学技术出版社

地址:济南市玉函路16号

邮编: 250002 电话: (0531)82098088

网址: www.lkj.com.cn

电子邮件: sdkj@sdpress.com.cn

发 行 者: 山东科学技术出版社

地址:济南市玉函路16号

邮编: 250002 电话: (0531)82098071

印刷者:山东新华印刷厂潍坊厂

地址:潍坊市潍州路753号

邮编: 261008 电话: (0536)2116806

开本: 850 mm×1168 mm 1/32

印张: 19.5 字数: 420 千

版次: 2018年1月第1版 2018年1月第1次印刷

ISBN 978-7-5331-9060-6

定价: 98.00 元

## 主 编

#### Ali A. Baaj, MD

Assistant Professor
Department of Neurological Surgery
Weill Cornell Medical College
Adult and Pediatric Spine Surgery
New York Presbyterian Hospital
New York, New York

#### Praveen V. Mummaneni, MD

Professor and Vice-Chairman
Department of Neurosurgery
University of California-San Francisco
Co-Director, UCSF Spine Center
San Francisco, California

#### Juan S. Uribe, MD

Associate Professor Director, Spine Section Department of Neurosurgery University of South Florida Tampa, Florida

## 编者

#### Salman Abbasifard, MD

Surgery Department Neurosurgery Division University of Arizona Medical Health Center Tucson, Arizona

# Muhammad M. Abd-El-Barr, MD, PhD

Department of Surgery Brigham and Women' S Hospital Boston, Massachusetts

# Alexander R. Vaccaro, MD, PhD, MBA

Richard H. Rothman Professor and Chairman
Department of Orthopaedic Surgery
Professor of Neurosurgery
Co-Chief of Spine Surgery
Sidney Kimmel Medical Center at Thomas
Jefferson University

Co-Director, Delaware Valley Spinal Cord Injury Center President, Rothman Institute

President, Rothman Institute Philadelphia, Pennsylvania

### Mark S. Greenberg, MD

Associate Professor Department of Neurosurgery and Brain Repair University of South Florida Tampa, Florida

#### Amir A. Ahmadian, MD

Neurosurgeon Department of Neurosurgery University of South Florida Tampa, Florida

#### Junyoung Ahn, BS

Departments of Surgery, Orthopedic Surgery, and Biological Psychology University of Texas Southwest Dallas, Texas

#### Puya Alikhani, MD

Department of Neurosurgery University of South Florida

Tampa, Florida

#### Jahangir Asghar, MD

Nicklaus Children's Hospital

Pediatric Orthopedic Spine Surgeon

Miami, Florida

#### Ali A. Baai, MD

Assistant Professor

Department of Neurological Surgery

Weill Cornell Medical College

Adult and Pediatric Spine Surgery

New York Presbyterian Hospital New York New York

#### Colin R. Bamford, MD

Associate Professor

Department of Neurology

population of fredroing)

University of Arizona

Tucson, Arizona

#### Kelley Banagan, MD

Department of Orthopaedics

Assistant Professor

.

University of Maryland Medical Center

Baltimore, Maryland

#### Rahul Basho, MD

Director of Spine Surgery Hannibal Regional Hospital

Midwest Orthopedic Specialists

mawest Ormopeate Specialists

Hannibal, Missouri

#### Christopher M. Bono, MD

Chief, Orthopaedic Spine Service

Department of Orthopaedic Surgery

Brigham and Women's Hospital Boston, Massachusetts

Clinton J. Burkett, MD

Neurosurgeon

Neurological Surgery Associates

Fort Lauderdale, Florida

Zorica Buser, PhD

Senior Research Associate

Department of Orthopaedic Surgery

Keck School of Medicine University of Southern California

University of Southern Camornia

Los Angeles, California

#### Ali Bydon, MD

Associate Professor of Neurosurgery

The Johns Hopkins University

Baltimore, Maryland

#### Mohamad Bydon, MD

Assistant Professor of Neurologic Surgery

Department of Orthopedic Surgery and Health

Sciences Research

Mayo Clinic

Rochester, Minnesota

#### Steven W. Chang, MD

Attending Physician

Barrow Neurological Institute

Barrow Neurosurgical Associates

Phoenix, Arizona

#### Jens R. Chapman, MD

Complex Spine Surgery

Swedish Neuroscience Institute

Seattle, Washington

此为试读,需要完整PDF请访问: www.ertongboo

#### Todd M. Chapman Jr., MD

Department of Orthopaedic Surgery Washington University St. Louis, Missouri

#### Matthew Chin, MD

Department of Orthopaedic Surgery Drexel University College of Medicine Philadelphia, Pennsylvania

#### Dean Chou, MD

Professor
Department of Neurosurgery
University of California-San Francisco Spine
Center
San Francisco, California

#### José A. Corredor, MD

Weill Cornell Brain and Spine Center Department of Neurological Surgery Weill Cornell Medical College New York-Presbyterian Hospital New York, New York Cirujano de Columnae Bogotfá, Colombia

#### Hormuzdiyar H. Dasenbrock, MD

Department of Neurosurgery Brigham and Women's Hospital Boston, Massachusetts

#### Sanjay S. Dhall, MD

Associate Professor
Department of Neurological Surgery
University of California-San Francisco
Director
Spinal Neurotrauma Program
San Francisco General Hospital
San Francisco, California

#### Jonathan G. Eastman, MD

Assistant Professor Department of Orthpaedic Surgery

Division of Traumatology

University of California-Davis Health System Sacramento, California

#### Benjamin D. Elder, MD, PhD

Department of Neurosurgery

The Johns Hopkins University School of Medicine

Baltimore, Maryland

#### Marco Ferrone, MD

Instructor of Orthopaedic Surgery
Department of Orthopaedic Oncology
Brigham and Women's Hospital / Dana Farber
Cancer Institute
Boston, Massachusetts

#### Andreas K. Filis, MD

Department of Orthopedics and Oncological Sciences

University of South Florida College of Medicine

Tampa, Florida

#### Kevin T. Foley, MD, FACS, FAANS

Professor of Neurological Surgery, Orthopaedic Surgery, and Biomedical Engineering University of Tennessee Health Science Center Chairman, Semmes-Murphey Clinic Memphis, Tennessee

#### Jared Fridley, MD

Department of Neurosurgery Baylor College of Medicine Houston, Texas

#### Steven R. Garfin, MD

Distinguished Professor and Chair Department of Orthopaedic Surgery University of California-San Diego

University of California-San Diego

San Diego, California

#### Rafael De la Garza-Ramos, MD

Department of Neurosurgery The Johns Hopkins University Baltimore, Maryland

# Peter Carlos Gerszten, MD, MPH, FACS

Peter E. Sheptak Professor and Vice-Chairman
Departments of Neurological Surgery and
Radiation Oncology

University of Pittsburgh Medical Center

Pittsburgh, Pennsylvania

#### George M. Ghobrial, MD

Department of Neurological Surgery Thomas Jefferson University Philadelphia, Pennsylvania

#### Ziya L. Gokaslan, MD, FAANS, FACS

Gus Stoll, MD Professor and Chair

Department of Neurosurgery

The Warren Alpert Medical School of Brown University

Neurosurgeon-in-Chief

Rhode Island Hospital and The Miriam
Hospital

Clinical Director, Norman Prince

Neurosciences Institute

President, Brown Neurosurgery Foundation

Rhode Island Hospital

Department of Neurosurgery

Norman Prince Neurosciences Institute

Providence, Rhode Island

#### C. Rory Goodwin, MD, PhD

Department of Neurosurgery The Johns Hopkins University Baltimore, Maryland

#### Mark S. Greenberg, MD

Associate Professor
Department of Neurosurgery and Brain Repair
University of South Florida

Tampa, Florida

#### Michael W. Groff, MD

Director of Spinal Neurosurgery
Department of Neurosurgery

Brigham and Women's Hospital

Boston, Massachusetts

#### Mari L. Groves, MD

Department of Neurosurgery

The Johns Hopkins Hospital Baltimore, Maryland

#### Colin B. Harris, MD

Attending Spine Surgeon

Syracuse Orthopedic Specialists

Crouse Hospital and St. Joseph's Hospital

Health Care Center

Syracuse, New York

#### James S. Harrop, MD, FACS

Professor

Departments of Neurological and Orthopedic Surgery

Director, Division of Spine and Peripheral Nerve Surgery

Neurosurgery Director of Delaware Valley SCI

Center

Thomas Jefferson University

Philadelphia, Pennsylvania

#### Roger Härtl, MD

Professor of Neurological Surgery
Director of Spinal Surgery
Co-Director, Spine Center
Weill Cornell Brain and Spine Center
New York, New York

#### Jonathan Hobbs, MD

Department of Neurosurgery University of Chicago Chicago, Illinois

#### Holli A. Horak, MD

Associate Professor Department of Neurology University of Arizona Tucson, Arizona

#### Phillip Horne, MD, PhD

Assistant Professor of Surgery
Department of Orthopaedic Surgery
Duke Orthopaedics of Raleigh
Duke Raleigh Hospital
Raleigh, North Carolina

#### Patrick C. Hsieh, MD, MSc

Associate Professor

Director of Minimally Invasive Spine Program and Spinal Oncology

Department of Neurosurgery

USC Spine Center

University of Southern California Keck School of Medicine

Los Angeles, California

#### Steven W. Hwang, MD

Chief

Division of Pediatric Neurosurgery

Department of Neurosurgery

Tufts Medical Center and Floating Hospital for

Children

Boston, Massachusetts

#### Keith Jackson, MD

Staff Surgeon

Department of Orthopaedics and Rehabilitation

Womack Army Medical Center

Fort Bragg, North Carolina

#### George I. Jallo, MD

Professor of Neurosurgery, Pediatrics, and Oncology

Director

Institute Brain Protection Services

All Children's Hospital-Johns Hopkins Medicine

St. Petersburg, Florida

#### Whitney S. James, MD, MHS

Department of Neurosurgery
University of Arizona Medical Center

Offiversity of Afrizona Wedlear Center

Tucson, Arizona

#### Andrew Jea, MD

Associate Professor

Department of Neurosurgery

Baylor College of Medicine

Houston, Texas

# Andrei Fernandes Joaquim, MD, PhD

Neurosurgeon

Department of Neurology

State University of Campinas

Campinas-SP, Brazil

#### U. Kumar Kakarla

Attending Physician

Barrow Neurological Institute

Barrow Neurosurgical Associates

Phoenix, Arizona

#### Ricky Kalra, MD

Department of Neurosurgery

University of Utah

Salt Lake City, Utah

#### Adam S. Kanter, MD

Chief

Division of Spine Surgery

Associate Professor

Department of Neurological Surgery

University of Pitttsburgh

Pittsburgh, Pennsylvania

#### Amrit Khalsa, RN, IBCLC

Consultant

Labor of Love Lactation Services

Meta Midwifery in the Bay Area

Oakland, California

#### Paul D. Kiely, MCh, FRCh

Integrated Spine Research Department

Hospital for Special Surgery

New York, New York

#### Eric O. Klineberg, MD, MS

Associate Professor

Department of Orthopaedic Surgery

University of California-Davis Health System

Spine Center

Sacramento, California

#### Thomas Kosztowski, MD

Department of Neurosurgery

The Johns Hopkins Hospital

Baltimore, Maryland

#### Frank La Marca, MD

Clinical Associate Professor

Department of Neurosurgery

University of Michigan

Ann Arbor, Michigan

#### Tien V. Le, MD

Neurological Surgeon

Tampa Bay Neurosurgery and Spine Specialists

Tampa, Florida

#### Joon Y. Lee, MD

Associate Professor

Director of Clinical Research

Department of Orthopaedic Surgery

University of Pittsburgh Medical Center

Pittsburgh, Pennsylvania

#### Lawrence G. Lenke, MD

Professor and Chief of Spinal Surgery

Department of Orthopaedic Surgery

Columbia University College of Physicians and

Surgeons

Surgeon-in-Chief

The Spine Hospital at New York- Presbyterian/

Allen Hospital

New York, New York

#### Allan D. Levi, MD, PhD, FACS

Professor and Chairman

Department of Neurological Surgery

University of Miami

Miami, Florida

#### William D. Long III, MD

Private Practice
Premier Orthopaedics
Bergen County, New Jersey

#### Daniel C. Lu, MD, PhD

Associate Professor
Department of Neurosurgery
Spinal Cord Rehabilitation Center
Ronald Reagan UCLA Medical Center
UCLA Medical Center
Director, Neuroplasticity
Comprehensive Spine Center
Santa Monica, California

#### Steven C. Ludwig, MD

Chief of Spine Surgery
Director of Spine Fellowship
Head of the Division of Spine Surgery
University of Maryland
Department of Orthopaedics
Baltimore, Maryland

#### Glen R. Manzano, MD

Assistant Professor of Clinical Neurosurgery
Department of Neurological Surgery
University of Miami Health System
University of Miami Hospital
Miami, Florida

#### Hazem A. Mashaly, MD

Department of Neurosurgery Ain Shams University Cairo, Egypt

#### Dustin H. Massel, BS

Research Coordinator
Department of Orthopaedic Surgery
Rush University Medical Center
Chicago, Illinois

#### Benjamin C. Mayo, BA

Research Coordinator
Department of Orthopaedic Surgery
Rush University Medical Center
Chicago, Illinois

#### Justin W. Miller, MD

Orthopaedic Spine Surgeon Indiana Spine Group Carmel, Indiana

#### David Minges, MD

Orthopaedic Spine Surgeon Advanced Bone and Joint St. Peters, Missouri

#### Alim P. Mitha, MD

Cerebrovascular/Endovascular/Skull Base Neurosurgeon Department of Clinical Neurosciences Foothills Medical Centre University of Calgary Calgary, Alberta, Canada

#### Krishna D. Modi, BS

Research Assistant
Department of Orthopaedic Surgery Rush
University Medical Center
Midwest Orthopaedics at Rush
Chicago, Illinois

#### Camilo Molina, MD

Department of Neurosurgery The Johns Hopkins University Baltimore, Maryland

#### Eric Momin, MD

Department of Neurosurgery Baylor College of Medicine Houston, Texas

#### Edward A. Monaco III, MD, PhD

Assistant Professor

Department of Neurological Surgery

University of Pittsburgh Medical Center

Pittsburgh, Pennsylvania

#### Praveen V. Mummaneni, MD

Professor and Vice-Chairman

Department of Neurosurgery

University of California-San Francisco

Co-Director, UCSF Spine Center

San Francisco, California

#### Gisela Murray, MD

Neurosurgeon

## San Juan, Puerto Rico

Rod J. Oskouian Jr., MD Chief of Spine Division

Department of Neurological Surgery

popularion of free orogical pargery

Swedish Neuroscience Institute

Seattle, Washington

#### Sheri Palejwala, MD

Department of Neurosurgery

University of Arizona

Tucson, Arizona

#### Ioannis Papanastassiou, MD, PhD

Orthopedic Department

General Oncological Hospital Kifisias 'Agioi

Anargyroi'

Athens, Greece

#### Paul Park, MD

Associate Professor

Department of Neurosurgery

University of Michigan

Ann Arbor, Michigan

#### Amit R. Patel, MD

Orthopaedic Spine Surgeon

Orthopaedic and Spine Specialists

York, Pennsylvania

#### Kamakshi Patel, MD, MPH

Assistant Professor of Neurology

University of Texas Medical Branch Galveston, Texas

ourreston, reads

#### Frank M. Phillips, MD

Professor

Department of Orthopaedic Surgery

Spine Fellowship Co-Director

Rush University Medical Center

Chicago, Illinois

#### Kornelis Poelstra, MD, PhD

Chairman

Department of Surgery

Sacred Heart Hospital on the Emerald Coast

President, The Spine Institute on the Emerald

Coast

Miramar Beach, Florida

#### Ravi K. Ponnappan, MD

Clinical Associate Professor

Department of Orthopaedic Surgery

Drexel University College of Medicine

Philadelphia, Pennsylvania

#### Steven M.Presciutti, MD

Midwest Orthopaedics at Rush

Rush University

Chicago, Illinois

#### Martin Quirno, MD

Midwest Orthopaedics at Rush

Rush University

Chicago, Illinois

此为试读,需要完整PDF请访问: www.ertongboo

#### Ravi Ramachandran, MD

Spine Surgeon

Sacramento, California

#### Wyatt L. Ramey, MD

Division of Neurosurgery Department of Surgery University of Arizona

Tucson, Arizona

#### Edwin Ramos, MD

Assistant Professor

Department of Neurosurgery

University of Chicago

Chicago, Illinois

#### William J. Readdy, BS

Robert Wood Johnson Medical School New Brunswick, New Jersey

#### Jay Rhee, MD

Director of Spine Surgery Department of Neurosurgery Holy Cross Health System Silver Spring, Maryland

#### Marie Roguski, MD, MPH

Department of Neurosurgery Tufts Medical Center Boston, Massachusetts

#### F. Andrew Rowan, MD, MS

Department of Orthopedics University of Arizona

Tucson, Arizona

#### Rajiv Saigal, MD, PhD

Department of Orthopedic Surgery Scripps Health, San Diego Spine Foundation San Diego, California

#### Andrew A. Sama, MD

Associate Professor

Department of Orthopaedic Spine Surgery
Hospital for Special Surgery Weill Cornell

School of Medicine

NewYork, NewYork

#### Amer F. Samdani, MD

Chief of Surgery

Shriners Hospitals for Children-Philadelphia

Philadelphia, Pennyslvania

#### Rick C. Sasso, MD

Professor

Chief of Spine Surgery

Department of Orthopaedic Surgery

Indiana University School of Medicine

Indiana Spine Group

Indianapolis, Indianapolis

# Meic H. Schmidt, MD, MBA, FAANS, FACS

Professor of Neurosurgery and Orthopaedics

Ronald I. Apfelbaum Endowed Chair for Spine Surgery

Vice Chair for Clinical Affairs

Department of Neurosurgery

Chief Value officer, University Hospital, Neurosurgery Service

Neurosurgery Service

Program Director, Neurosurgery Spine Fellowship

1 Chowship

Director, Spinal Oncology Service, Huntsman

Cancer Institute

Clinical Neurosciences Center

University of Utah

Salt Lake City, Utah

#### Gregory D. Schroeder, MD

Department of Orthopaedic Surgery

Rothman Institute at Thomas Jefferson

University

Philadelphia, Pennsylvania

#### Daniel M. Sciubba, MD

Associate Professor of Neurosurgery,

Oncology, and Orthopaedic Surgery

Department of Neurosurgery

The Johns Hopkins University

Baltimore, Maryland

#### Shyam M. Shridharani, MD

Assistant Professor

Department of Orthopaedic Surgery

The University of Arizona

Tucson, Arizona

#### Harry L. Shufflebarger, MD

Chief

Division of Spinal Surgery

Department of Orthopedic Surgery

Nicklaus Children's Hospital

Miami, Florida

#### Krzysztof Siemionow, MD

Chief of Spine Surgery

Assistant Professor of Orthopaedics and

Neurosurgery

University of Illinois-Chicago

Chicago, Illinois

# Harminder Singh, MD, FACS, FAANS

Assistant Professor

Department of Neurosurgery

Stanford University School of Medicine

Stanford, California

#### Kern Singh, MD

Associate Professor

Department of Orthopaedic Surgery

Rush University Medical Center

Chicago, Illinois

#### Jesse Skoch, MD

Department of Surgery

Division of Neurosurgery

Banner University Medical Center

Tucson, Arizona

#### Jessica Sosio, BS

Department of Biology

Florida State University

Tallahassee, Florida

#### Eric Sribnick, MD, PhD

Assistant Professor

Department of Neurosurgery

The Ohio State University

Columbus, Ohio

#### Zachary J. Tempel, MD

Department of Neurological Surgery

University of Pittsburgh Medical Center

Pittsburgh, Pennsylvania

#### Khoi D. Than, MD

Assistant Professor

Department of Neurological Surgery

Oregon Health & Science University

Portland, Oregon

#### Jason O. Toy, MD

Department of Orthopaedics and Rehabilitation

Yale University School of Medicine

New Haven, Connecticut

#### Alexander Tuchman, MD

Department of Neurological Surgery Keck School of Medicine University of Southern California Los Angeles, California

#### Juan S. Uribe, MD

Associate Professor Director, Spine Section Department of Neurosurgery University of South Florida Tampa, Florida

#### Timothy D. Uschold, MD

Neurological and Spine Surgeon Southern Oregon Neurosurgical and Spine Associates Medford, Oregon

# Alexander R. Vaccaro, MD, PhD, MBA

Richard H. Rothman Professor and Chairman
Department of Orthopaedic Surgery
Professor of Neurosurgery
Co-Chief of Spine Surgery
Sidney Kimmel Medical Center at Thomas
Jefferson University
Co-Director, Delaware Valley Spinal Cord
Injury Center
President, Rothman Institute

#### Juan M. Valdivia, MD, FAANS

NeurOsurgeon Bay Care Medical Group Tampa, Florida

Philadelphia, Pennsylvania

#### Fernando L. Vale, MD

Professor and Vice-Chairman

Department of Neurosurgery and Brain Repair

University of South Florida

Tampa, Florida

#### Arya Giri Varthi, MD

Department of Orthopaedic Surgery and Rehabilitation Yale New Haven Hospital

#### Viren S. Vasudeva, MD

New Haven, Connecticut

Department of Neurosurgery Brigham and Women's Hospital Harvard Medical School Boston, Massachusetts

#### Andrey Alex Volkov, DO

Department of Neurooncology Moffitt Cancer Center Tampa, Florida

Chief of Neurosurgery

Tampa, Florida

#### Frank D. Vrionis, MD, PhD

H. Lee Moffitt Cancer Center
Professor of Neurosurgery
Department of Orthopedics and Oncological
Sciences
University of South Florida College of
Medicine

#### Jeffrey C. Wang, MD

Chief, Orthopaedic Spine Service

Co-Director, University of Southern California

Spine Center

Professor of Orthopaedic Surgery and

Neurosurgery

USC Spine Center

Los Angeles, California

#### Michael Y. Wang, MD, FACS

Professor

Departments of Neurological Surgery and

Rehab Medicine

University of Miami Miller School of Medicine

Miami, Florida

#### Peter G. Whang, MD, FACS

Associate Professor, Spine Service

Department of Orthopaedics and Rehabilitation

Yale University School of Medicine

New Haven, Connecticut

#### Timothy F. Witham, MD, FACS

Associate Professor of Neurosurgery and

Orthopaedic Surgery

Director, The Johns Hopkins Bayview Spine

Program

Director, The Johns Hopkins Neurosurgery

Spinal Fusion Laboratory

Co-Program Director, Johns Hopkins

Neurosurgery Residency

Baltimore, Maryland

#### Jean-Paul Wolinsky, MD

Associate Professor of Neurosurgery and

Oncology

Department of Neurosurgery

The Johns Hopkins University

Baltimore, Maryland

#### Jau-Ching Wu, MD, PhD

Consultant, Assistant Professor

Department of Neurosurgery

Neurological Institute

Taipei Veterans General Hospital

School of Medicine National Yang-Ming

University

Taipei City, Taiwan

#### Anthony T. Yeung, MD

Orthopedic Spine Surgeon

Desert Institute for Spine Care

Phoenix, Arizona

#### Christopher Yeung, MD

President

Desert Institute for Spine Care

Phoenix, Arizona

#### Hasan A. Zaidi, MD

Barrow Neurological Institute

Barrow Neurosurgical Associates

Phoenix, Arizona

#### Vinko Zlomislic, MD

Assistant Clinical Professor

Department of Orthopaedic Surgery

University of California-San Diego

San Diego, California

#### Benjamin M. Zussman, MD

Department of Neurosurgery

University of Pittsburgh Medical Center

Pittsburgh, Pennsylvania

主 译: 董 健 姜晓幸

主译助理:李娟

译 者: (以姓氏笔画排序)

马易群 王会仁 车 武 冯振洲 李熙雷 张 键 陈子贤 林 红 周 健 周晓岗 孟德华 姜允琦 费琴明 顾宇彤 曹 露 曹渊武 蒋 淳

感谢我的父母 Abdulwahab 和 Hana, 感谢我的妻子 Gabriela, 感谢我脊柱外科的导师们,特别是 Juan Uribe 和 Ziya Gokaslan 以及令我们有动力编写此书的住院和专科医生们。

## A A B

感谢 Valli、Nikhita、Nkihil 和 Neel 的支持,感谢那些我有幸指导和帮助过的住院和专科医生们。

#### P V M

我要把此书献给我刚出生的孩子 Christian John Vaccaro,以及我美丽的妻子 Lauren。妻子的爱与照顾让我们的家充满了欢乐。

ARV

献给我的家人。

## M S G

献给我的妻子 Catalina, 我的儿子 Sebastian, 我的女儿 Camila, 我的父母 Carlos Santiago 和 Maria Cecilia, 我的岳父母 Ivan 和 Maria Cecilia, 感谢他们无条件的爱和支持。

J S U

此为试读,需要完整PDF请访问: www.ertongboo