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ROTHMAN-SIMEONE

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罗思曼-西蒙尼背柱外科学

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Rothman-Simeone The Spine

Fourth Edition • Volume II

Harry N. Herkowitz, MD Steven R. Garfin, MD Richard A. Balderston, MD Frank J. Eismont, MD Gordon R. Bell, MD Sam W. Wiesel, MD

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ROTHMAN-SIMEONE

THE SPINE Fourth Edition

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The fourth edition of The Spine is based on the principles taught to us, the Editorial Board, by Drs. Rothman and Simeone as Fellows or practice partners. These are (1) thorough knowledge of the basic science as it relates to the clinical picture, (2) understanding of the natural history of spinal disease, (3) knowledge and interpretive skills of imaging modalities and laboratory studies, (4) treatment decisions based on sound scientific principles, and (5) commitment to education and research to further the knowledge base of spinal disorders.

These principles continue to guide our daily practices and our educational responsibilities. As with the previous edition, this fourth edition remains dedicated to Drs. Rothman and Simeone, teachers and friends.

Each member of the Editorial Board has special dedications, which are listed below.

Harry N. Herkowitz, M.D.

To my wife, Jan, and my children, Seth Adam and Rachael Helene, for their love, understanding, and support. To the residents and fellows whose enthusiasm for knowledge and "all the answers" inspires me to continue academic pursuits.

Steven R. Garfin, M.D.

Susan, Jessica, and Cory. Textbooks may change by 20–30% every three to five years. My love and respect for my wonderful family, however, continues to grow regularly. They understand and accept my commitment to patients and education.

Richard A. Balderston, M.D.

To my wife Claudia, for her constant love and support, and my children Philip and Jessica, who make it all worthwhile.

Frank J. Eismont, M.D.

To my wife Emily and my children Adam, April, Allison, and Andrew, whose love and encouragement and tolerance have allowed me to avidly pursue my medical interest, and to Drs. Charles Herndon, Henry Bohlman, Fred Simeone, and Richard Rothman, who have been excellent role models for me to try to emulate regarding medical education and patient care.

Gordon R. Bell, M.D.

To my wife Kathy, for her patience and understanding.

To my children Gordie, Michael, and Megan, for making efforts such as this worthwhile.

To my parents, Gordon and Ann, for their support in making this possible.

Sam W. Wiesel, M.D.

To Vicki and Phil Bowie, who have provided unwavering support over the years.

NOTICE

Medicine is an ever-changing field. Standard safety precautions must be followed, but as new research and clinical experience broaden our knowledge, changes in treatment and drug therapy become necessary or appropriate. Readers are advised to check the product information currently provided by the manufacturer of each drug to be administered to verify the recommended dose, the method and duration of administration, and the contraindications. It is the responsibility of the treating physician, relying on experience and knowledge of the patient, to determine dosages and the best treatment for the patient. Neither the publisher nor the editor assumes any responsibility for any injury and/or damage to persons or property.

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Spinal Stenosis: Clinical Evaluation and Differential

Diagnosis

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Surgical Approaches to the Spine

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Spinal Fusion

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Anatomy of the Spinal Nerve Roots in the Lumbar and Lower Thoracic Spine; Pathophysiology of Spinal Nerve Roots as Related to Sciatica and Disc Herniation

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Biomechanical Considerations of Spinal Stability

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Alternate Forms of Disc Excision: Automated
Percutaneous Lumbar Discectomy (APLD)

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Thoracoscopy of the Spine

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Anatomy of the Spinal Nerve Roots in the Lumbar and Lower Thoracic Spine; Pathophysiology of Spinal Nerve Roots as Related to Sciatica and Disc Herniation; Spinal Stenosis: Pathophysiology

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Ossification of the Posterior Longitudinal Ligament

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Alternative Forms of Disc Excision: Minimally Invasive Spine Surgery

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Congenital Anomalies of the Spinal Cord

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Ankylosing Spondylitis: Surgical Considerations

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Surgical Management of Cervical Disc Disease

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Surgical Approaches to the Spine

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Workers' Compensation As It Affects the Spine: Management of the Workers' Compensation Patient With Low Back Pain

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Spinal Fusion

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Discitis; Complications of Spinal Surgery: Vascular Complications in Spine Surgery; Neurologic Complications in Spine Surgery

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Arteriovenous Malformations of the Spinal Cord

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Spinal Stenosis: Conservative Management of Lumbar

Spinal Stenosis

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Spinal Disorders Associated With Skeletal Dysplasias

and Metabolic Diseases

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Redo Disc Surgery—Techniques and Results

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Spinal Ortheses for Traumatic and Degenerative Disease;

Spinal Instrumentation

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Anatomy of the Spinal Nerve Roots in the Lumbar and Lower Thoracic Spine

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Chronic Pain Management: Nonsurgical Management of

Chronic Back Pain

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Interventional Neuroradiology of the Spine

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Cervical Disc Disease: Radiologic Evaluation; Spinal Stenosis: Clinical Evaluation and Differential Diagnosis

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Back Pain in Children and Adolescents; Cervical Disc Disease: Clinical Syndromes in Cervical Myelopathy

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Outcomes Research for Spinal Disorders; Tumors of the Spine

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Neuromuscular Scoliosis

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Cervical Disc Disease: Radiologic Evaluation; Spinal Stenosis: Clinical Evaluation and Differential Diagnosis

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Chronic Pain Management: Surgical Procedures for the Control of Chronic Pain

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Biomechanical Considerations of Spinal Stability

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Complications of Spinal Surgery: Postlaminectomy Kyphosis of the Cervical Spine

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The Multiply Operated Low Back: An Algorithmic Approach; Workers' Compensation As It Affects the Spine: Compensation Low Back and Neck Pain

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Electrodiagnosis: The Electrodiagnostic Examination

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Surgical Management of Cervical Disc Disease

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Complications of Spinal Surgery: Complications Associated With Posterior Spinal Instrumentation

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Laparoscopic Spinal Fusion; Discogenic Back Pain