## Part 1: Fundamentals of the Spine

- 1. History of Spine Surgery
- 2. History of Spine Biomechanics
- 3. History of Spinal Instrumentation: The Modern Era
- 4. Functional Anatomy of the Spine
- 5. Biomechanical Modeling of the Spine
- 6. The Intervertebral Disc: Anatomy, Pathophysiology, and Aging
- 7. Muscles and the Spine: Dynamic Stabilization
- 8. Bone Physiology and Osteoporosis
- 9. Applied Anatomy of the Thoracolumbar Spine
- 10. Fundamentals of Spinal Alignment and Balance
- 11. Applied Anatomy of the Spinal Cord
- 12. Molecular and Anatomic Mechanisms of Nerve Root, Spinal Nerve, and Peripheral Nerve Injury
- 13. Spine Fusion: Biology and Biomechanics
- 14. Implant Attributes: Cantilever Beam Fixation
- 15. Biomechanics and Implant Materials: The Anterior Column
- 16. Biomechanics of Motion Preservation Techniques
- 17. Complications in Spine Surgery: Expected Rates and Classification

## Part 2: Pathophysiology of Spinal Disorders

- 18. Spinal Cord Dysraphism and Myelodysplasia
- 19. Congenital Spinal Deformity
- 20. Early Onset Scoliosis
- 21. Late-Onset Idiopathic Scoliosis
- 22. Scheuermann Disease
- 23. Developmental Spondylolisthesis
- 24. Craniovertebral Junction Deformities
- 25. Developmental Deformity in the Cervical Spine
- 26. Tarlov Cysts
- 27. Dural and Meningeal Pathologies
- 28. Chiari Malformations and Syringomyelia
- 29. Pathophysiology of Cervical Spondylosis, Radiculopathy, and Myelopathy
- 30. Pathophysiology of Thoracic Spondylosis, Radiculopathy, and Myelopathy

- 31. Pathophysiology of Intervertebral Disc Degeneration and Pain
- 32. Deformity in the Cervical Spine
- 33. Adult Degenerative Scoliosis
- 34. Lumbar Spondylolisthesis
- 35. Occipitocervical Injuries
- 36. Subaxial Cervical Spine Injuries
- 37. Thoracic and Lumbar Spine Injuries
- 38. Peripheral Nerve Injury
- 39. Spinal Cord Injury
- 40. Spinal Injuries in Sports
- 41. Rheumatoid Arthritis
- 42. Ankylosing Spondylitis and Related Disorders
- 43. Ossification of the Posterior Longitudinal Ligament
- 44. Primary Infections of the Spine
- 45. Secondary Infections of the Spine
- 46. Primary Tumors of the Spine
- 47. Metastatic Tumors of the Spine
- 48. Intradural Extramedullary Spine Tumors
- 49. Intramedullary Spinal Cord Lesions
- 50. Brachial Plexus Tumors Extending into the Cervicothoracic Spine
- 51. Spinal Disorders Associated with Connective Tissue Disorders
- 52. Osteoporosis, Osteomalacia, and Metabolic Bone Disease
- 53. Vascular Malformations of the Spine
- 54. Neuromuscular Disorders in the Pediatric Spine
- 55. Neurodegenerative Disorders in the Adult Spine
- 56. Postoperative Spinal Disorders Cervical
- *57. Postoperative Spinal Deformity*
- 58. Adjacent Segment Degeneration and Disease of the Cervical Spine
- 59. Adjacent Segment Degeneration and Disease of the Lumbar Spine
- 60. Proximal and Distal Junctional Kyphosis and Failure

# Part 3: Evaluation of Patients with Spinal Disorders

- 61. Physical and Neurologic Examination
- 62. Sagittal Spinal Alignment: An Evolutionary Perspective

- 63. Spinal Alignment: Significance and Preoperative Planning
- 64. Overview of Imaging Procedures Available for Spinal Diagnosis
- 65. Electrodiagnostic Studies
- 66. Differential Diagnosis of Surgical Disorders of the Spine
- 67. Patient Selection for Spine Surgery: Preoperative Optimization
- 68. Evaluation of the Aging Patient
- 69. Preoperative Evaluation of Psychosocial Aspects and Work-related Issues
- 70. Preoperative Evaluation of Patients with Tumors Affecting the Spine
- 71. Measuring Preoperative Health-Related Quality of Life: What Metrics Matter

#### Part 4: Management of Spinal Disorders

- 72. Rehabilitation, Interventions, and Medications in Management of Spinal Disorders
- 73. Spine Injections
- 74. Cognitive Behavioral Therapy and Back Pain
- 75. Regenerative Strategies and the Intervertebral Disc Degeneration
- 76. Neuromodulation and Rehabilitative Interventions for the Spine
- 77. Pain Management: Opioids and Alternatives
- 78. Fundamentals of Spine Surgery
- 79. Perioperative Management Protocols: Enhanced Recovery After Surgery (ERAS)
- 80. Surgical Incisions, Positioning, and Retraction
- 81. Intraoperative Imaging Protocols
- 82. Anesthesia for Spine Surgery and the Prevention of Complications
- 83. Intraoperative Monitoring in Routine and Complex Surgery
- 84. Blood Management and Complex Spine Surgery
- 85. Intraoperative Crisis Management in Spine Surgery: What to Do When Things Go Bad
- 86. Biologics in Spine Fusion Surgery
- 87. Osteointegration: The Bone and Implant Interface
- 88. Common Complications in Spine Surgery: Pseudarthrosis
- 89. Postoperative Medical Complications
- 90. Preventing Postoperative Infections: An Evidence-Based Approach
- 91. Neurologic Complications of Common Spine Operations

- 92. Cerebrospinal Fluid Leak: Repair and Outcomes
- 93. Arachnoiditis
- 94. Arachnoiditis and Syringomyelia
- 95. Posttraumatic and Idiopathic Syringomyelia
- 96. Vascular and Soft Tissue Complications
- 97. Postoperative Spinal Deformities
- 98. Implant Wear, Degradation, and Breakage
- 99. Spine Readmissions and Reoperations
- 100. Cervical Spine Construct Design
- 101. Occipitocervical Spine Approaches for Decompression
- 102. Occipitocervical Spine Posterior Approaches for Fusion
- 103. Endoscopic and Transnasal Approaches to the Craniocervical Junction
- 104. Cervical Spine and Cervicothoracic Junction Posterior
- 105. Posterior Cervical Decompressions: Cervical Laminectomy and Laminoforaminotomy
- 106. Cervical Laminoplasty
- 107. Dorsal Subaxial Cervical Instrumentation Techniques
- 108. Posterior Percutaneous and Minimally Invasive Approaches to

Decompression and Arthrodesis of the Cervical Spine

- 109. Cervical Spine and Cervicothoracic Junction Anterior Approach
- 110. Anterior Cervical Discectomy and Corpectomy
- 111. Management of Soft Cervical Disc Herniation: Controversies and Complication Avoidance
- 112. Anterior Sub-Axial Cervical Fixation and Fusion Techniques
- 113. Cervical Total Disc Arthroplasty
- 114. Combined Ventral-Dorsal Surgery
- 115. Thoracic and Lumbar Spine Construct Design
- 116. Posterior Approaches to the Thoracic Spine
- 117. Anterior Approaches and Lateral Approaches to the Thoracic Spine
- 118. MIS Lateral Thoracic Decompression
- 119. Thoracoscopic Corpectomy and Reconstruction
- 120. Posterolateral Thoracolumbar Fusion
- 121. Posterior Thoracic and Lumbar Universal Spinal Instrumentation

- 122. Midline Lumbar Interbody Fusion with Cortical Bone Trajectory Pedicle Screw Placement
- 123. Transforaminal Lumbar Interbody Fusion
- 124. Dorsal Semi-Rigid Stabilization
- 125. Lumbar Total Disc Arthroplasty
- 126. Minimally Invasive Spinal Decompression and Stabilization Techniques I:

Philosophy and Rationale

127. Posterior Approaches to the Lumbar Spine: Minimally Invasive

Decompression

- 128. Endoscopic Approaches to the Cervical Spine
- 129. Endoscopic Surgical Approaches to the Lumbar Spine
- 130. Posterior Approaches to the Lumbar Spine: Minimally Invasive Fusion
- 131. Anterior Lumbar Interbody Fusion
- 132. Anterior and Anterolateral Lumbar Spine Decompression and Fusion: MIS Approaches
- 133. Complex Lumbosacropelvic Fixation Techniques
- 134. Spinal Augmentation for Vertebral Compression Fractures

#### Part 5: Operative Management of Specific Disorders of the Spine

- 135. Indications for Spine Fusion for Axial Pain
- 136. Cervical Disc Herniation
- 137. Lumbar Intervertebral Disc Herniation
- 138. Thoracic Discectomy
- 139. Degenerative Spondylolisthesis
- 140. Sacroiliac Joint Pain
- 141. Surgical Principles for Spinal Deformity
- 142. An Approach for Treatment of Complex Adult Spinal Deformity
- 143. An Approach for Treatment of Complex Pediatric Spinal Deformity
- 144. Cervicothoracic Deformity: The Role of Anterior Surgery
- 145. Cervical and Cervicothoracic Deformity Correction: Posterior-based

Osteotomies

- 146. The Role of Anterior Surgery for Thoracolumbar Deformity
- 147. Anterior Column Release in Deformity
- 148. Posterior-based Management of Spinal Deformity

- 149. Minimally Invasive Approaches to Spinal Deformity
- 150. Surgical Management of High-Grade Dysplastic Spondylolisthesis
- 151. Deformity Surgery for Ankylosing Spondylitis
- 152. Failed Back Surgery Syndrome
- 153. Oncologic Approaches, and Outcomes for Primary Spine Tumors
- 154. Staging, Classification, and Oncologic Approaches for Metastatic Tumors Involving the Spine
- 155. Tumors at the Foramen Magnum and Craniocervical Junction
- 156. Cervicothoracic Junction Tumors
- 157. Thoracic and Thoracolumbar Spinal Tumors: Regional Challenges
- 158. Sacral Tumors: Regional Challenges
- 159. Radiosurgery for Spinal Tumors
- 160. The Acute Management of Traumatic Spinal Cord Injury and Polytrauma
- 161. Timing of Surgery Following Spinal Cord Injury
- 162. Medical Management of Adult and Pediatric Spinal Cord Injury
- 163. Spinal Traction
- 164. Medical Management of Fractures without Spinal Cord Injury
- 165. Anterior Surgery for Cervical Trauma
- 166. Posterior Surgery for Cervical Trauma
- 167. Surgical Approaches to Thoracolumbar Trauma
- 168. Surgical Approaches for Sacral Fractures and Sacropelvic Injuries
- 169. Rehabilitation and Recovery after Spinal Cord Injury Section 5.5: General Surgical Technique
- 170. Harvest of Autograft for Spinal Fusion
- 171. Vascularized Bone Grafts in Spine Surgery
- 172. Spinal Wound Closure

# Part 6: Evidence Development and Guidance of Informed Choice for Optimal Outcomes

- 173. Big Data in Health Care
- 174. Spine Registries
- 175. Conflicts of Interest in Spine Surgery
- 176. Art of the Clinical Trial
- 177. Meaningful Retrospective Analysis
- 178. Art and Science of Guideline Formation

- 179. Appropriate Use Criteria in Spine Surgery
- 180. Precision Medicine: Artificial Intelligence Applied to Evaluation and

Management of Spinal Disorders

- 181. Healthcare Reform and Spine Surgery
- 182. Development of New Technologies in Spine Surgery