

151.864

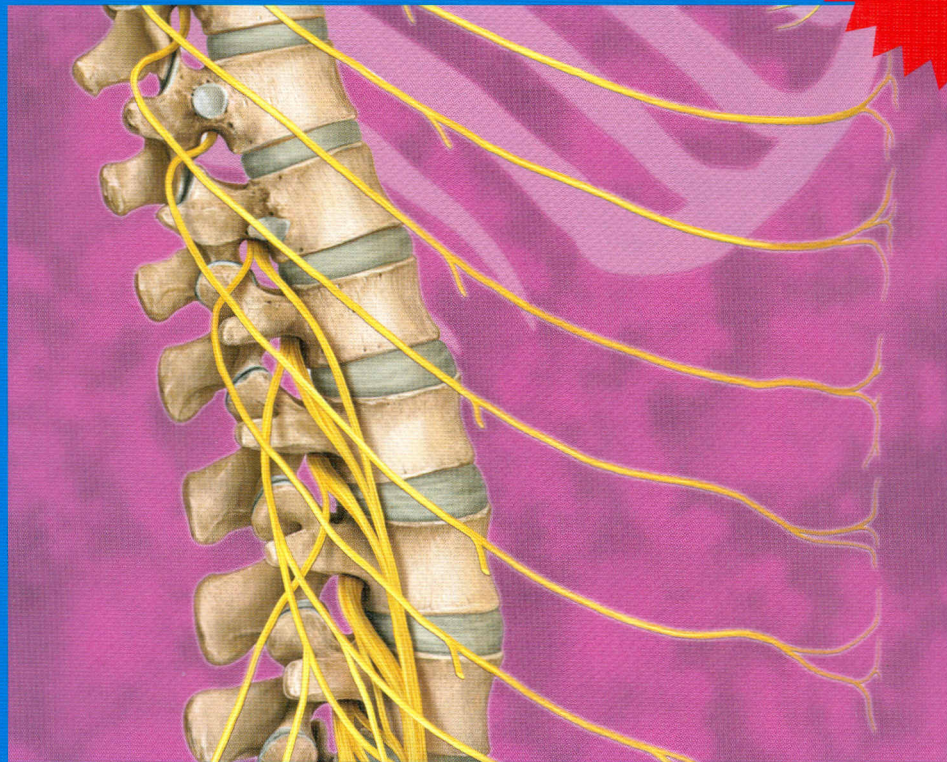
# Neurosurgical Operative Atlas

## Second Edition

### Spine and Peripheral Nerves

Christopher E. Wolfla  
Daniel K. Resnick

CME  
Credit  
Available



American  
Association of  
Neurological  
Surgeons

and the American Association of Neurosurgeons

 Thieme

# Contents

<b>Continuing Medical Education Credit Information and Objectives</b> .....	xiii
<b>Continuing Medical Education Disclosure</b> .....	xiv
<b>Series Foreword</b> <i>Robert Maciunas, M.D.</i> .....	xvii
<b>Preface</b> .....	xix
<b>Acknowledgments</b> .....	xxi
<b>Contributors</b> .....	xxiii
<b>Section I Cervical Spine</b>	
<b>A. Craniocervical Junction—Decompression</b>	
<b>Chapter 1</b> Transoral Surgery for Craniocervical Junction Abnormalities.....	3
<i>Arnold H. Menezes</i>	
<b>Chapter 2</b> High Anterior Cervical, Retropharyngeal Approach to the Ventral Craniocervical Junction and Upper Cervical Spine.....	11
<i>John R. Vender, Andy Rekito, and Dennis E. McDonnell</i>	
<b>Chapter 3</b> Transcondylar Approach to the Craniocervical Junction .....	20
<i>L. Fernando Gonzalez, Robert F. Spetzler, and Volker K. H. Sonntag</i>	
<b>Chapter 4</b> Dorsal Approach to the Craniocervical Junction.....	27
<i>Michael Y. Wang</i>	
<b>B. Craniocervical Junction—Fusion/Instrumentation</b>	
<b>Chapter 5</b> Anterior Odontoid Screw Instrumentation .....	31
<i>Ronald I. Apfelbaum</i>	
<b>Chapter 6</b> C1-2 Transarticular Screw Instrumentation .....	38
<i>Brian R. Subach and Thomas C. Schuler</i>	
<b>Chapter 7</b> C1 Lateral Mass Fixation.....	46
<i>Praveen V. Mummaneni, Valli P. Mummaneni, Regis W. Haid, and Gerald E. Rodts</i>	

<b>Chapter 8</b>	Craniocervical Instrumentation Techniques .....	52
	<i>Harel Deutsch</i>	
<b>C. Subaxial Cervical Spine—Anterior Decompression</b>		
<b>Chapter 9</b>	Anterior Cervical Discectomy and Fusion .....	56
	<i>Stephen M. Papadopoulos</i>	
<b>Chapter 10</b>	Anterior Cervical Corpectomy .....	64
	<i>John Sandin and Josh Medow</i>	
<b>D. Subaxial Cervical Spine—Anterior Fusion/Instrumentation</b>		
<b>Chapter 11</b>	Anterior Cervical Instrumentation .....	69
	<i>Stephan J. DuPlessis and R. John Hurlbert</i>	
<b>Chapter 12</b>	Cervical Disk Arthroplasty .....	77
	<i>Jeremy C. Wang and Regis W. Haid</i>	
<b>E. Subaxial Cervical Spine—Posterior Decompression</b>		
<b>Chapter 13</b>	Posterior Cervical Foraminotomy and Discectomy .....	82
	<i>Daniel K. Resnick</i>	
<b>Chapter 14</b>	Cervical Laminectomy and Fusion .....	87
	<i>Andrea F. Douglas and Anthony K. Frempong-Boadu</i>	
<b>Chapter 15</b>	Posterior Correction of Cervical Postlaminectomy Instability .....	92
	<i>Paul K. Kim and Charles L. Branch Jr.</i>	
<b>Chapter 16</b>	Expansive Open-Door Laminoplasty .....	97
	<i>Hiroshi Nakagawa, Junichi Mizuno, and Yukoh Ohara</i>	
<b>F. Subaxial Cervical Spine—Posterior Fusion/Instrumentation</b>		
<b>Chapter 17</b>	Posterior Cervical Wiring Techniques .....	102
	<i>Paul G. Matz</i>	
<b>Chapter 18</b>	Cervical Posterior Lateral Mass Fixation .....	107
	<i>Paul R. Cooper</i>	
<b>Chapter 19</b>	Cervical Pedicle Screw Fixation .....	112
	<i>Bryan B. Barnes and Joseph T. Alexander</i>	
<b>G. Cervicothoracic Junction</b>		
<b>Chapter 20</b>	“Trap Door” Exposure of the Cervicothoracic Junction .....	117
	<i>Ziya L. Gokaslan, Carlos A. Bagley, and Garrett L. Walsh</i>	
<b>Chapter 21</b>	Posterior Instrumentation Techniques for the Cervicothoracic Junction .....	124
	<i>Ross R. Moquin</i>	
<b>H. Special Topics</b>		
<b>Chapter 22</b>	Surgical Treatment of Spinal Intradural Extramedullary Tumors .....	133
	<i>Peter D. Angevine and Paul C. McCormick</i>	

**Chapter 23** Surgical Technique for Resection of Vascular Malformations within the Spinal Cord. . . . . 136  
*L. Fernando Gonzalez and Robert F. Spetzler*

**Chapter 24** Management of the Vertebral Artery During Excision of Extradural Tumors of the Cervical Spine . . . . . 145  
*Chandraneth Sen*

**Section II Thoracic Spine**

**A. Decompression**

**Chapter 25** Costotransversectomy . . . . . 151  
*Azam Ahmed and Gregory R. Trost*

**Chapter 26** Lateral Extracavitary Approach to the Thoracolumbar Spine . . . . . 156  
*Dennis Maiman*

**Chapter 27** Lateral Parascapular Approach to the Upper Thoracic Spine. . . . . 161  
*Richard G. Fessler, John K. Song, and Sean D. Christie*

**Chapter 28** Retropleural Approach to the Thoracolumbar Spine. . . . . 170  
*Peter D. Angevine and Paul C. McCormick*

**Chapter 29** Transthoracic Thoracic Discectomy . . . . . 174  
*Nicholas C. Bambakidis and Curtis A. Dickman*

**Chapter 30** Transthoracic Resection of Vertebral Body Metastasis . . . . . 181  
*Shekar N. Kurpad*

**Chapter 31** Primary Anterior Treatment of Thoracolumbar Burst Fractures . . . . . 188  
*Michael K. Rosner and Timothy R. Kuklo*

**Chapter 32** Vertebroplasty . . . . . 196  
*Eric Sauvageau, Richard D. Fessler, Giuseppe Lanzino, and Lee R. Guterman*

**B. Fusion/Instrumentation**

**Chapter 33** Sublaminar Wiring Techniques in the Thoracolumbar Spine. . . . . 202  
*William C. Welch, Peter C. Gerszten, and Richard M. Spiro*

**Chapter 34** Posterior Thoracic Instrumentation with Pedicle Screws, Hooks, Wires, and Rods . . . . . 207  
*Ondrej Choutka, Andrew W. Grande, and Charles Kuntz IV*

**Chapter 35** Anterior Thoracolumbar Instrumentation . . . . . 216  
*Kevin C. Yao, Bernard H. Guiot, and Ehud Mendel*

**C. Special Topics**

**Chapter 36** Surgical Treatment of Penetrating Wounds of the Spine. . . . . 222  
*Jeremy Amps, Michael P. Steinmetz, Ajit A. Krishnaney, and Edward C. Benzel*

**Section III Lumbosacral Spine**

**A. Decompression**

**Chapter 37** Unilateral Discectomy Through a Midline Incision. . . . . 229  
*Patrick W. Hitchon and Saul Wilson*

<b>Chapter 38</b>	Minimally Invasive Lumbar Discectomy .....	233
	<i>Nouzhan Sehati and Langston T. Holly</i>	
<b>Chapter 39</b>	Surgical Treatment of Far-Lateral Lumbar Disk Herniation .....	238
	<i>Michael W. Groff</i>	
<b>Chapter 40</b>	Surgical Treatment of Isthmic Spondylolisthesis.....	241
	<i>Robert F. Heary and Sanjeev Kumar</i>	
<b>Chapter 41</b>	Lumbar Pedicle Subtraction/Extension Osteotomy .....	247
	<i>Sumon Bhattacharjee and Christopher I. Shaffrey</i>	
<b>Chapter 42</b>	Surgical Considerations for the Management of Lumbar Degenerative Disease with Multiplanar Deformity .....	251
	<i>Stephen L. Ondra and Shaden Marzouk</i>	
<b>Chapter 43</b>	The Transparaspinal Approach to Dumbbell-Shaped Spinal Tumors.....	259
	<i>Stephen T. Onesti, Ely Ashkenazi, and W. Jost Michelsen</i>	
<b>Chapter 44</b>	Total Sacrectomy.....	266
	<i>Gary L. Gallia, Carlos A. Bagley, Timothy F. Witham, J. P. Wolinsky, and Ziya L. Gokaslan</i>	
<b>B. Fusion/Instrumentation</b>		
<b>Chapter 45</b>	Posterolateral Lumbar Spine Fusion .....	273
	<i>Eric J. Woodard</i>	
<b>Chapter 46</b>	Anterior Lumbar Interbody Fusion .....	278
	<i>Gerald E. Rodts Jr., Praveen V. Mummaneni, and Jay Miller</i>	
<b>Chapter 47</b>	Posterior Lumbar Interbody Fusion.....	282
	<i>Christopher E. Wolfla</i>	
<b>Chapter 48</b>	Transpedicular Instrumentation of the Lumbar Spine .....	286
	<i>Daniel K. Resnick</i>	
<b>Chapter 49</b>	Lumbar Disk Arthroplasty .....	290
	<i>Fred H. Geisler</i>	
<b>Chapter 50</b>	Lumbopelvic Fixation Techniques .....	297
	<i>Stephen L. Ondra and Shaden Marzouk</i>	
<b>C. Special Topics</b>		
<b>Chapter 51</b>	Lumboperitoneal Shunting .....	304
	<i>Berman Iskandar and Azam Ahmed</i>	
<b>Chapter 52</b>	Image Guidance in Minimally Invasive Spinal Surgery .....	308
	<i>Hormoz Sheikh, Kurt M. Eichholz, Sunanda Nioguy, Dino Samartzis, Ron von Jako, and Mick J. Perez-Cruet</i>	
<b>Section IV Peripheral Nerves</b>		
<b>A. Upper Extremity</b>		
<b>Chapter 53</b>	Carpal Tunnel Release .....	317
	<i>Jason H. Huang, Robert G. Whitmore, and Eric L. Zager</i>	

<b>Chapter 54</b>	Endoscopic Carpal Tunnel Release via a Biportal Approach .....	323
	<i>David F. Jimenez</i>	
<b>Chapter 55</b>	Ulnar Neurolysis for Cubital Tunnel Syndrome .....	331
	<i>Judith A. Murovic, Daniel H. Kim, David G. Kline</i>	
<b>Chapter 56</b>	Subcutaneous Transposition of the Ulnar Nerve .....	336
	<i>Jacob Schwarz and Neal J. Naff</i>	
<b>Chapter 57</b>	Submuscular Ulnar Nerve Transposition .....	340
	<i>Terence M. Myckatyn and Susan E. Mackinnon</i>	
<b>Chapter 58</b>	Surgical Treatment of Ulnar Nerve Entrapment at the Wrist .....	344
	<i>Robert J. Spinner and Allen T. Bishop</i>	
<b>Chapter 59</b>	Brachial Plexus Surgery .....	350
	<i>David G. Kline, Thomas A. Oliver, Rashid M. Janjua</i>	
<b>Chapter 60</b>	Surgical Exposure of Peripheral Nerves of the Upper Extremity—Part 1: Median Nerve ....	358
	<i>Samuel R. Borsellino, Jorge J. Lastra-Powers, Nicholas M. Boulis, and Edward C. Benzel</i>	
<b>Chapter 61</b>	Surgical Exposure of Peripheral Nerves of the Upper Extremity—Part II: Radial Nerve ....	363
	<i>Samuel R. Borsellino, Jorge J. Lastra-Powers, Nicholas M. Boulis, and Edward C. Benzel</i>	
<b>B. Lower Extremity</b>		
<b>Chapter 62</b>	Surgical Treatment of Meralgia Paresthetica .....	368
	<i>Ian F. Dunn and Marc Eichler</i>	
<b>Chapter 63</b>	Surgical Exposure of Peripheral Nerves of the Lower Extremity—Part I: Sciatic Nerve and Its Branches (Peroneal and Posterior Tibial Nerves) .....	372
	<i>Michael P. Steinmetz, Alexander Mason, Jorge J. Lastra-Powers, and Edward C. Benzel</i>	
<b>Chapter 64</b>	Surgical Exposure of Peripheral Nerves of the Lower Extremity—Part II: Femoral Nerve, Saphenous Nerve, Lateral Femoral Cutaneous Nerve, and Sural Nerve .....	378
	<i>Alexander Mason, Michael P. Steinmetz, Jorge J. Lastra-Powers, and Edward C. Benzel</i>	
<b>C. Central</b>		
<b>Chapter 65</b>	Thoracoscopic Sympathectomy .....	383
	<i>W. Putnam Wolcott, J. Patrick Johnson</i>	
<b>Chapter 66</b>	Selective Denervation for Spasmodic Torticollis .....	389
	<i>Antonio A. F. Desalles, Dennis Malkasian, and Alessandra Gorgulho</i>	
<b>Chapter 67</b>	Bridge Bypass Coaptation for Upper Trunk Cervical Nerve Root Avulsion .....	396
	<i>Gregory Murad, Shokei Yamada, and Russell R. Lonser</i>	
<b>D. General Techniques</b>		
<b>Chapter 68</b>	Surgical Techniques for Peripheral Nerve Repair .....	402
	<i>Rajiv Midha, Peter Lee, and Margot Mackay</i>	
<b>Chapter 69</b>	Harvesting Techniques of Cutaneous Nerves for Cable Graft Repair .....	409
	<i>Rajiv Midha, Cesar Serrano-Almeida, and Margot Mackay</i>	
<b>Index</b>	.....	<b>415</b>