

Contents

Foreword	xvi
Preface	xvii
Acknowledgments	xviii
Contributors	xix
First Edition Contributors	xxvi
1. Roadmap to Neurosurgery Residency	1
<i>Chris Z. Wei, David T. Fernandes Cabral, Andrew D. Legarreta, and Robert M. Friedlander</i>	
1.1 Introduction	1
1.2 Applications	1
1.3 Profiles	9
References	14
2. History of Neurological Surgery	15
<i>Edward G. Andrews, Madeleine C. Smith, and Gail Rosseau</i>	
2.1 Introduction	15
2.2 The Pre-Cushing Era.	15
2.3 The Cushing Era.	17
2.4 Spinal Neurosurgery	18
2.5 Women in Neurosurgery	19
2.6 Instrumentation	21
2.7 Global Neurosurgery	23
References	24
3. Neurological Examination	27
<i>Prateek Agarwal and Daniel Y. Zhang</i>	
3.1 Introduction	27
3.2 Mental Status	27
3.3 Cranial Nerves	29
3.4 Motor Examination	32
3.5 Reflex Examination	35
3.6 Sensory Examination	36
3.7 Gait and Coordination ...	37
3.8 Special Tests	38

3.9	Neurological Exam in the ICU	40	3.10	Top Hits	41
4.	Neuroanatomy				44
	<i>David T. Fernandes Cabral, Joao T. Alves Belo, and Juan C. Fernandez-Miranda</i>				
4.1	Introduction	44	4.6	Spinal Cord	61
4.2	Bones of the Skull	44	4.7	Vertebral Column	63
4.3	Cerebrum	47	4.8	Vascular Anatomy	71
4.4	Brainstem	55	4.9	Top Hits	79
4.5	Cisterns	61		References	83
5.	Neuroradiology for the Neurosurgeon				84
	<i>David R. Hansberry, Kofi-Buaku Atsina, Mougnyan Cox, and Adam E. Flanders</i>				
5.1	Introduction	84	5.4	Clinical Scenarios	88
5.2	Computed Tomography	84	5.5	Top Hits	98
5.3	Magnetic Resonance	86		References	99
6.	Bedside Procedures				101
	<i>Redi Rahmani, Gabrielle Santangelo, Rohin Singh, Muhammad I. Jalal, and G. Edward Vates</i>				
6.1	Introduction	101	6.5	Postprocedure Care	114
6.2	Indications	101	6.6	Top Hits	116
6.3	Procedure Preparation	106		References	117
6.4	Procedure	112			
7.	Operating Room				122
	<i>Ali A. Alattar, Hanna Algattas, Kristopher Kimmell, and G. Edward Vates</i>				
7.1	Introduction	122	7.2	Operating Room	122

7.3	Cranial Positioning	122	7.8	Positioning-Related Complications	137
7.4	Cranial Approaches	123	7.9	Pediatric	138
7.5	Cerebral Relaxation	131	7.10	Functional	139
7.6	Spinal Positioning	131	7.11	Top Hits	140
7.7	Spinal Approaches	132		References	148
8.	Neurocritical Care	150			
	<i>Xiaoran Zhang, Stephen C. Frederico, and Lori Shutter</i>				
8.1	Introduction	150	8.6	Hematology and Coagulation	157
8.2	Respiratory Physiology	150	8.7	Critical Illness Weakness	158
8.3	Shock	152	8.8	Top Hits	159
8.4	Fluid and Electrolytes	153		References	160
8.5	Cerebral Metabolism and Perfusion	154			
9.	Traumatic Brain Injury	162			
	<i>Christine Y. Mau and Shelly D. Timmons</i>				
9.1	Introduction	162	9.5	TBI Management	172
9.2	Assessment	162	9.6	Skull Fractures	175
9.3	Classifications of Traumatic Brain Injury	166	9.7	Penetrating Trauma	177
9.4	Neuromonitoring	171	9.8	Top Hits	179
				References	180
10.	Spinal Trauma	185			
	<i>Katherine E. Wagner, James H. Mooney, Corinna Zygourakis, and Jamie Ullman</i>				
10.1	Introduction	185	10.2	Examination	185

10.3	Intubation	186	10.11	Cervical Spine Trauma.	191
10.4	Imaging	186	10.12	Cervical Spine Injuries.	191
10.5	Cervical Collars	187	10.13	Thoracic Injuries	199
10.6	Shock and Secondary Injury.	187	10.14	Thoracolumbar Spine Injuries.	199
10.7	Steroids	187	10.15	Compression Fractures	200
10.8	Immobilization Devices.	187	10.16	Sacral Fractures	201
10.9	Spinal Cord Syndromes.	188	10.17	Top Hits	202
10.10	The Spinal Column Model	190		References	203
11.	Spine	205			
	<i>Vijay Letchuman, Raghav Gupta, Praveen V. Mummaneni, and Robert F. Heary</i>				
11.1	Introduction	205	11.8	Spinal Deformity.	217
11.2	Cervical Spine Degenerative Disease.	205	11.9	Inflammatory Spondyloarthropathies	221
11.3	Degenerative Cervical Myelopathy	205	11.10	Spinal Infections	222
11.4	Thoracic Spine Degenerative Disease.	211	11.11	Cauda Equina Syndrome.	223
11.5	Lumbar Back Pain	212	11.12	Other Spinal Syndromes	224
11.6	Spinal Neoplasms	213	11.13	Top Hits	224
11.7	Spinal Vascular Disorders	216		References	225

12.	Pain	228			
	<i>James H. Mooney and Charles Munyon</i>				
12.1	Introduction	228	12.5	Craniofacial Pain Syndromes	232
12.2	Pain Pathway Anatomy	228	12.6	Procedures for Pain	240
12.3	Gate Control Theory	230	12.7	Top Hits	244
12.4	Major Types of Pain	230		References	246
13.	Cerebrovascular	249			
	<i>Kamil W. Nowicki, Aditya M. Mittal, and Brian L. Hoh</i>				
13.1	General	249	13.3	Open Vascular Techniques	274
13.2	Endovascular Techniques	271	13.4	Top Hits	284
				References	286
14.	Neurosurgical Oncology	292			
	<i>Erin N. Walker, Christian M. Kaculini, Sabrina A. Nusraty, Maxwell T. Laws, Leonel E. Ampie, Kevin Thomas Breen, Masahiro Oishi, Eric C. Burton, Huma E. Chaudhry, and Desmond A. Brown</i>				
14.1	Introduction	292	14.7	Tumors of Cranial and Paraspinal Nerves	308
14.2	Lymphomas and Hematopoietic Tumors . . .	292	14.8	Sellar Tumors	310
14.3	Mesenchymal Tumors . . .	294	14.9	Cysts and Tumor-Like Lesions	311
14.4	Neuroepithelial Brain Tumors	299	14.10	Top Hits	313
14.5	Pineal Region Tumors . . .	305		References	315
14.6	Embryonal and PNETs	306			

15.	Pediatric Neurosurgery	319			
	<i>Kerrin Sunshine, Arpan Ranjan Chakraborty, and Krystal L. Tomei</i>				
15.1	Examination	319	15.4	Pediatric Trauma	335
15.2	Developmental Anomalies	323	15.5	Top Hits	337
15.3	Pediatric Tumors	335		References	338
16.	Movement Disorders and Epilepsy	343			
	<i>Pablo A. Valdes, Melissa M.J. Chua, and Garth Rees Cosgrove</i>				
16.1	Introduction	343	16.3	Top Hits	363
16.2	Epilepsy	351		References	365
17.	Peripheral Nerve Surgery	369			
	<i>Andrés A. Maldonado, Alexander Y. Shin, and Robert J. Spinner</i>				
17.1	Introduction	369	17.6	Neuropathic Pain	383
17.2	Approach	369	17.7	Tumors	383
17.3	Entrapments	370	17.8	Conclusions	388
17.4	Inflammation	374	17.9	Top Hits	388
17.5	Injuries	376		References	390
18.	Stereotactic Radiosurgery	391			
	<i>Justiss A. Kallos, Costas Hadjipanayis, Ajay Niranjan, and L. Dade Lunsford</i>				
18.1	Introduction	391	18.6	Indications	393
18.2	Radiation Background	391	18.7	Vascular Indications	394
18.3	Main SRS Modalities	392	18.8	Primary Malignant Brain Tumors	396
18.4	Dosing and Tolerance	393	18.9	Primary Benign Brain Tumors	396
18.5	Adverse Reactions	393	18.10	Pain	399

18.11	Functional Disorders	399	18.16	Clinical Outcomes	404
18.12	Pediatric Indications	400	18.17	Future Directions	405
18.13	Pediatric Tumors	401	18.18	Top Hits	406
18.14	Treatment Procedure	402		References	406
18.15	Procedural Considerations	403			
19.	Neurological Infectious Diseases				413
	<i>Edwin Chen and Nupur Gupta</i>				
19.1	Introduction	413	19.6	Skull and Vertebral Osteomyelitis	419
19.2	Microbiological Diagnosis	413	19.7	Shunt Infections	420
19.3	Meningitis	414	19.8	Select Diseases with CNS Involvement	421
19.4	Brain Abscess	415	19.9	Top Hits	426
19.5	Spinal Epidural Abscess	417		References	432
20.	Interdisciplinary Care				434
	<i>Logan Pyle, Joshua A. Smith, and Jeffrey J. Esper</i>				
20.1	Neurology	434	20.4	Neurotology	453
20.2	Neuroanesthesia	444	20.5	Top Hits	456
20.3	Neuro-ophthalmology	448		References	458
21.	Socioeconomics in Neurosurgery				460
	<i>Deborah L. Benzil</i>				
21.1	Training	460	21.4	Personal Finance	465
21.2	Patient Care	461	21.5	Job Satisfaction	466
21.3	Medical Economics	462		References	467

22.	Advice from the Masters	468		
	<i>Michael D. White, Nallammai Muthiah, and Laura Snyder</i>			
22.1	Introduction	468	22.6	Select Peer-Reviewed Journals 482
22.2	The Masters	468	22.7	Leadership 484
22.3	Additional Reading	473	22.8	Board Review 485
22.4	National Conferences	477		References 486
22.5	Grants and Awards	480		
23.	Rapid Review	487		
	<i>Raj Swaroop Lavadi, Rohit Prem Kumar, Ajay Chatrath, Galal A. Elsayed, and Michael M. McDowell</i>			
23.1	Neurological Examination	487	23.11	Cerebrovascular 510
23.2	Neuroanatomy	488	23.12	Neurosurgical Oncology 514
23.3	Neuroradiology for the Neurosurgeon.	492	23.13	Pediatric Neurosurgery. 516
23.4	Bedside Procedures.	495	23.14	Movement Disorders and Epilepsy 520
23.5	Operating Room	497	23.15	Peripheral Nerve Surgery 522
23.6	Neurocritical Care	499	23.16	Stereotactic Radiosurgery 523
23.7	Traumatic Brain Injury.	501	23.17	Neurological Infectious Diseases 526
23.8	Spinal Trauma.	504	23.18	Interdisciplinary Care 528
23.9	Spine	506		
23.10	Pain	509		
24.	Holding the Pager	531		
	<i>Lola B. Chambless</i>			
24.1	Response	531	24.3	What Is Urgent? 531
24.2	Check the Box.	531	24.4	Load the Boat 532

24.5	Handoffs	532	24.13	Neurosurgical Oncology	538
24.6	Unwind	532	24.14	Pediatric Neurosurgery . . .	538
24.7	Neuroradiology for the Neurosurgeon	533	24.15	Movement Disorders and Epilepsy	540
24.8	Neurocritical Care	533	24.16	Peripheral Nerve Surgery	541
24.9	Traumatic Brain Injury . . .	534	24.17	Neurological Infectious Diseases	542
24.10	Spinal Trauma	535	24.18	Interdisciplinary Care	543
24.11	Spine	536		References	544
24.12	Pain	537			
	Index				545