
Contents

Part I Medical Approaches

Vitaly Gordin

1 A Survey of Systems Involved in Nociceptive Processing	3
Tony L. Yaksh and Ashley J. Wiese	
2 Pharmacogenomics of Pain Management	23
Piotr K. Janicki	
3 Nonsteroidal Anti-inflammatory Drugs	35
Asokumar Buvanendran	
4 The Role of Antidepressants in the Treatment of Chronic Pain	45
Beth B. Murinson	
5 Anticonvulsant Medications for Treatment of Neuropathic and “Functional” Pain	53
Bruce D. Nicholson	
6 NMDA Receptor Antagonists in the Treatment of Pain	61
Yakov Vorobeychik, Channing D. Willoughby, and Jianren Mao	
7 Role of Muscle Relaxants in the Treatment of Pain	69
Robert I. Cohen and Carol A. Warfield	
8 Topical Analgesics	79
Charles E. Argoff, Manpreet Kaur, and Kelly Donnelly	
9 Sleep Aids	89
Howard S. Smith	
10 Clinical Use of Opioids	99
Andrea Trescot	
11 Opioid Adverse Effects and Opioid-Induced Hypogonadism	111
Saloni Sharma and David M. Giampetro	
12 Acute Management of the Opioid-Dependent Patient	119
Brandi A. Bottiger, Denny Curtis Orme, and Vitaly Gordin	
13 Opioids and the Law	135
Selina Read and Jill Eckert	
14 Methadone for Chronic Pain	145
Naileshni Singh, Scott M. Fishman, and Kyle Tokarz	
15 Toxicology Screening for Opioids	151
Gary L. Horowitz	

16	Monitoring Drug Use and Abuse: The Evolution of a Paradigm	161
	Steven D. Passik and Kenneth L. Kirsh	
17	Polypharmacy and Drug Interaction	169
	Christopher A. Steel and Jill Eckert	
18	Role of Cannabinoids in Pain Management	181
	Ethan B. Russo and Andrea G. Hohmann	
19	The Future of Pain Pharmacotherapy	199
	Iwona Bonney and Daniel B. Carr	
 Part II Interventional Approaches: Anatomy and Physiology of Pain		
	Asokumar Buvanendran, Sunil J. Panchal, and Philip S. Kim	
20	Neuroanatomy and Neurophysiology of Pain	213
	Adam R. Burkey	
21	Spinal Targets for Interventional Pain Management	223
	Lawrence R. Poree and Linda L. Wolbers	
22	Functional Anatomy and Imaging of the Spine	237
	John C. Keel and Gary J. Brenner	
 Part III Interventional Approaches: Neural Blockade and Neurolysis Blocks		
	Asokumar Buvanendran, Sunil J. Panchal, and Philip S. Kim	
23	Local Anesthetics	257
	Michael S. Leong and B. Todd Sitzman	
24	Neurolytic Agents	263
	Erin F. Lawson and Mark S. Wallace	
25	Cryoanalgesia	277
	Michael S. Leong, Philip S. Kim, and Lloyd Saberski	
26	Radiofrequency: Conventional and Pulsed	285
	Maunak V. Rana	
27	Atlanto-Axial and Atlanto-Occipital Joints Injection in the Treatment of Headaches and Neck Pain	297
	Samer N. Narouze	
28	Sphenopalatine Ganglion Block	303
	Michael S. Leong, Mark P. Gjolaj, and Raymond R. Gaeta	
29	Occipital Nerve Block	309
	Garret K. Morris and Michael S. Leong	
30	Neural Blockade for Trigeminal Neuralgia	319
	Ali Mchaourab and Abdallah I. Kabbara	
31	Glossopharyngeal Nerve Block	329
	Kenneth D. Candido and George C. Chang Chien	
32	Cervical Plexus Block	339
	Gerald A. Matchett and Sean Mackey	
33	Stellate Ganglion Blockade	349
	Mehul Sekhadia, Kiran K. Chekka, and Honorio T. Benzon	

34 Epidural (Cervical, Thoracic, Lumbar, Caudal) Block/Injections.	359
Nirmala R. Abraham, Ignacio Badiola, and Thuong D. Vo	
35 Transforaminal Epidural Steroid Injections	367
Todd B. Sitzman	
36 Facet Injections and Radiofrequency Denervation	371
Sunil J. Panchal	
37 Intercostal Nerve Blocks.	381
Eduardo M. Fraifeld	
38 Intrapleural Catheters	393
Kevin E. Vorenkamp and Lynn R. Kohan	
39 Epidural Lysis of Adhesions: Percutaneous and Endoscopic Techniques	403
Timothy Y. Ko and Salim M. Hayek	
40 Thoracic and Lumbar Sympathetic Nerve Block and Neurolysis	415
Tim J. Lamer and Jason S. Eldrige	
41 Celiac Plexus, Splanchnic Nerve Block, and Neurolysis	427
Melinda M. Lawrence, Salim M. Hayek, and Joshua D. Goldner	
42 Superior Hypogastric Plexus, Ganglion Impar Blocks, and Neurolysis	435
Bryan S. Williams	
43 Peripheral Neurolysis	441
Beth Mintzer and Jagan Devarajan	
44 Central Neuraxial Neurolysis.	453
Beth Mintzer and Jagan Devarajan	
45 Provocative Discography	461
Irina Melnik, Richard Derby, and Ray M. Baker	
46 Brachial Plexus Block.	479
Chester Buckenmaier III	
47 Suprascapular Nerve Block	497
Brian Belnap and Gagan Mahajan	
48 Intradiscal Annuloplasty for the Treatment of Discogenic Pain	503
Leonardo Kapural	
49 Percutaneous Disc Decompression	513
Stanley Golovac, Salim M. Hayek, and Fnu Kailash	
50 The Racz Procedure: Lysis of Epidural Adhesions (Percutaneous Neuroplasty)	521
Gabor B. Racz, Miles R. Day, James E. Heavner, and Jeffrey P. Smith	
51 Sacroiliac Joint Injection and Radiofrequency Denervation	535
Sunil J. Panchal	
52 Vertebral Augmentation: Vertebroplasty and Kyphoplasty	543
Philip S. Kim	
53 Piriformis Injection.	555
Nathan J. Harrison and Gagan Mahajan	

54 Botulinum Toxin in the Management of Painful Conditions	563
Robert Gerwin	
55 Emerging Imaging Tools for Interventional Pain	575
Marc A. Huntoon	
Part IV Interventional Approaches: Neuromodulation	
Asokumar Buvanendran, Sunil J. Panchal, and Philip S. Kim	
56 A History of Neurostimulation.	583
Jeffrey T.B. Peterson and Timothy R. Deer	
57 Stimulation of the Peripheral Nerve and Peripheral Nerve Field	587
Jason E. Pope, Timothy R. Deer, Eric J. Grigsby, and Philip S. Kim	
58 Spinal Cord Stimulation.	601
W. Porter McRoberts, Daniel M. Doleys, and Kevin D. Cairns	
59 Brain Stimulation for Pain.	623
Konstantin V. Slavin	
60 Motor Cortex Stimulation	631
Chima O. Oluigbo, Mariel Szapiel, Alexander Taghva, and Ali R. Rezai	
61 Intrathecal Drug Delivery for Control of Pain.	637
Brian M. Bruel, Mitchell P. Engle, Richard L. Rauck, Thomas J. Weber, and Leonardo Kapural	
62 Clinical Applications of Neuromodulation: Radicular Pain and Low Back Pain.	649
Thomas L. Yearwood	
63 Clinical Applications of Neuromodulation: Neurostimulation for Complex Regional Pain Syndrome	671
Michael Stanton-Hicks	
64 Clinical Applications of Neuromodulation: Section on Angina and Peripheral Vascular Disease	681
Marte A. Martinez and Robert D. Foreman	
65 Clinical Applications of Neuromodulation: Spinal Cord Stimulation for Abdominal Pain	689
Leonardo Kapural and Marc D. Yelle	
66 Cost-Effectiveness of Interventional Techniques	697
Krishna Kumar, Syed Rizvi, Sharon Bishop, and Mariam Abbas	
67 Neurosurgical Techniques for Pain Management	711
Hendrik Klopper and Kenneth A. Follett	
68 Spinal Cord Stimulation in the Treatment of Postherpetic Neuralgia.	721
Stanley Golovac and Louis Raso	
69 Complications of Interventional Pain Management Techniques	727
Marco Araujo and Dermot More O’Ferrall	

Part V Integrative Approaches

Albert L. Ray

70 Pain as a Perceptual Experience	745
Albert L. Ray, Rhonwyn Ullmann, and Michael C. Francis	
71 Neuroplasticity, Sensitization, and Pain	759
Albert L. Ray	
72 Muscle Pain Treatment	769
Norman Marcus and Jason Ough	
73 Addictive Disorders and Pain	787
Lynn Webster and Stuart Gitlow	
74 The “Five-Minute” Mental Status Examination of Persons with Pain	795
J. David Haddox and Barry Kerner	
75 The Psychological Assessment of Patients with Chronic Pain	805
Daniel Bruns and John Mark Disorbio	
76 Psychological Therapies	827
Leanne R. Cianfrini, Cady Block, and Daniel M. Doleys	
77 Billing Psychological Services for Patients with Chronic Pain	845
Geraldyn Datz and Daniel Bruns	
78 Hypnosis and Pain Control	859
David Spiegel	
79 Acupuncture	867
Ji-Sheng Han	
80 Manual Therapies	881
John F. Barnes, Albert L. Ray, and Rhonwyn Ullmann	
81 Treatment of Chronic Painful Musculoskeletal Injuries and Diseases with Regenerative Injection Therapy (RIT): Regenerative Injection Therapy Principles and Practice	889
Felix S. Linetsky, Hakan Alfredson, David Crane, and Christopher J. Centeno	
82 Interdisciplinary Functional Restoration and Pain Programs	913
Steven D. Feinberg, Robert J. Gatchel, Steven Stanos, Rachel Feinberg, and Valerie Johnson-Montieth	
83 Pain and Spirituality	927
Allen R. Dyer and Richard L. Stieg	
84 Pain Disparity: Assessment and Traditional Medicine	935
September Williams	
85 Sleep and Chronic Pain	947
Nicole K.Y. Tang, Claire E. Goodchild, and Lynn R. Webster	
86 Empowerment: A Pain Caregiver’s Perspective	963
Julia Hallsy	

87 Patient and Caregiver's Perspective	971
Heidi J. Stokes	
88 Pain Medicine in Older Adults: How Should It Differ?	977
Debra K. Weiner, Jordan F. Karp, Cheryl D. Bernstein, and Natalia E. Morone	
89 Pain Medicine and Primary Care: The Evolution of a Population-Based Approach to Chronic Pain as a Public Health Problem	1003
Rollin M. Gallagher	
90 Pain Care Beyond the Medical Practice Office: Utilizing Patient Advocacy, Education, and Support Organizations	1011
William Rowe	
91 Neonatal Pain	1015
Celeste Johnston, Marsha Campbell-Yeo, Ananda Fernandes, and Manon Ranger	
92 Assessing Disability in the Pain Patient	1031
Steven D. Feinberg and Christopher R. Brigham	
93 The Double Effect: In Theory and in Practice	1045
Lynn R. Webster	
94 Failure to Treat Pain	1053
Kenneth L. Kirsh, Steven D. Passik, and Ben A. Rich	
Index	1059