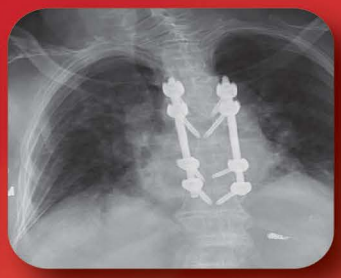
hers.com, for detailed information on anesthesia books, visit our website www.jaypeebrothers.com, for detailed information on anesthesia books






Ramamurthy's Decision Making in PAIN MANAGEMENT

An Algorithmic Approach

Editors
Ameet Nagpal
Miles Day
Maxim S Eckmann
Brian T Boies
Larry C Driver

Foreword
Kenneth D Candido

3rd Edition

JAYPEE

CONTENTS

SECTION 1 Evaluation

Maxim S Eckmann

1.	**Initial Management of Acute Pain** *Wallisch BJ, Bowman MC*	3
2.	**Evaluation of the Chronic Pain Patient** *Guthmiller KB, Bryant CE, Fehl JE*	5
3.	**Evaluation of the Pediatric Pain Patient** *Mina MM, Mina M*	8
4.	**Evaluation of the Geriatric Pain Patient** *Boies BT, Horrocks A*	10
5.	**Evaluation and Preparation for Regional Anesthesia** *Wallisch BJ, Rios N*	12
6.	**Evaluation and Preparation for Chronic Pain Procedure** *Nagpal A, Fehl JE*	15
7.	**Psychological Evaluation** *McGeary CA*	18
8.	**Post-Traumatic Stress Disorder** *Sanford AE, McGeary CA*	20
9.	**Assessment of Substance Abuse Potential** *McGeary DD, Eckmann MS*	23
10.	**Substance Abuse and Chronic Pain** *McGeary DD*	25
11.	**Sleep Disturbances and Chronic Pain** *Keizer BM, Lai TT*	27
12.	**Mood Disorders and Chronic Pain** *McGeary DD*	30
13.	**Obesity and Chronic Pain** *Fehl JE, Nouri G*	32
14.	**Disability and Dysfunction** *McGeary DD, Eckmann MS*	34
15.	**Pain Measurement** *McGeary CA*	36
16.	**Provocation Discography** *Feldman AT, Goff BJ*	38
17.	**Imaging Studies** *Huynh L, Levin JE, Kennedy DJ*	40
18.	**Electromyography and Nerve Conduction Studies (Upper/Lower)** *Nagpal A, Benfield JA*	42
19.	**Small Fiber Neuropathy** *Bhavaraju-Sanka R*	44

20. Differential Epidural/Spinal Blockade 48
Boies BT

21. Diagnostic Neural Blocks 51
Patel S, Roe TC

SECTION 2 Acute Pain

Maxim S Eckmann

22. Patient-Controlled Analgesia 57
Hilliard PE, Chen J

23. Epidural Analgesia 60
Rana MV, Kusper TM

24. Acute Herpes Zoster 63
Guthmiller KB, Thorsted RS

25. Acute Upper Extremity Pain 65
Patel S, Soliman S

26. Acute Lower Extremity Pain 69
Mitchell B, William JG

27. Acute Thoracic Pain 73
Walker TV, Day M

28. Acute Vertebral Pain 76
Moore CC, Anitescu M

29. Acute Abdominal Pain 79
Prust SM, Wallisch BJ

30. Acute Pancreatic Pain 82
McKenny J, Wallisch BJ

31. Obstetric Pain 84
King AL, Liles DR

SECTION 3 Chronic Pain Syndromes

Brian T Boies

32. Myofascial Pain 89
Nagpal A, Bickelhaupt B

33. Fibromyalgia 92
Bautista A, Chang Chien GC, Candido KD

34. Postherpetic Neuralgia 94
Benedetti EM, Singh TSS

35. Complex Regional Pain Syndrome 96
Slogic KM, Guthmiller KB

36. Painful Diabetic Peripheral Neuropathy 100
Yazdani S, Day M

37. Neuropathic Pain 102
Eckmann MS

38. Central Pain Syndrome 106
Arora SS, Galang E, Chang Chien GC

39. **Phantom Pain** 108
Salas MM, Goff BJ

40. **Spinal Cord Injury-Related Pain** 111
Averna J, Chang Chien GC, Saulino M

41. **Spasticity** 115
Verduzco-Gutierrez M, Nguyen C, Mas MF

42. **Rheumatoid Arthritis** 118
Eckmann MS

43. **Osteoarthritis** 120
Eckmann MS

44. **Back Pain in Pregnancy** 122
Rosen M

45. **Discogenic Back Pain** 124
Chang Chien GC, Odonkor CA, Candido KD

46. **Nonsomatic Pain** 127
McGeary DD, McGeary CA

47. **HIV–AIDS** 129
Joves BC, Pangarkar SS

48. **Sickle Cell Disease** 131
Vu AH, Pangarkar SS

49. **Chronic Abdominal Pain** 133
Lai TT, Durning SJ, Boies BT

50. **Male Pelvic Pain** 137
Mirchandani AA, Hwang S, Bonder JH

51. **Pelvic Pain in Women** 139
Nagpal A, Hwang S, Bonder JH, Mirchandani AA

SECTION 4 **Cancer Pain**
Brian T Boies

52. **Patient Education** 145
Driver LC, Chai T

53. **Medical Management** 147
Driver LC, Kim PY

54. **Metastatic Disease** 150
Driver LC, Banik R

55. **Neurolytic Blocks** 153
Driver LC, Patel MY

56. **Palliative Care** 156
Driver LC

SECTION 5 **Head and Neck Pain**
Ameet Nagpal

57. **Approach to the Patient with Headache** 161
Swearingen AB, DiTommaso C

58. **Vascular Headache or Migraine Headache and Cluster Headache Disorders** 164
DiTommaso C, Das R

59. **Trigeminal Neuralgia** 166
Boies BT, Thome CM

60. **Temporomandibular Disorders** 168
Talib HS, Phull RD

61. **Orofacial Pain** 170
Talib HS, Phull RD

62. **Migraine Headache Disorder** 172
Das R, DiTommaso C

63. **Approach to the Patient with Neck Pain** 174
Lautenschlager K

64. **Cervical Facet Joint Pain** 176
Kroski WJ, Lautenschlager K

65. **Cervical Radiculopathies** 178
Hommer DH, Goff BJ

SECTION 6 **Thoracic Pain**
Larry C Driver

66. **Chronic Chest Wall Pain** 183
Eckmann MS

67. **Postmastectomy Pain** 186
Patel S, Soliman S

68. **Chronic Vertebral Pain** 188
Ovsiowitz R, Pangarkar SS

69. **Rib Pain** 190
Nick CT, Lautenschlager K

SECTION 7 **Low Back Pain**
Ameet Nagpal

70. **Acute Low Back Pain** 195
McKenny J, Wallisch BJ

71. **Chronic Low Back Pain** 197
Jones JR, Day M

72. **Lumbosacral Radiculopathy** 200
Haque AR, Pino CA

73. **Spinal Stenosis** 202
Wirthlin JD, Lai TT, Jorgensen AY

74. **Ankylosing Spondylitis** 205
Jorgensen AY, Lai TT, Galang E, Arora SS, Chang Chien GC

75. **Failed Back Surgery Syndrome** 208
Levin D, Anitescu M

76. **Lumbar Facet Joint Pain** 212
Benedetti EM, Garg S

77. **Sacroiliac Joint Pain** 214
Kroski WJ, Hommer DH

SECTION 8 **Upper Extremity Pain**
Miles Day

78. **Shoulder Pain** 219
Nagpal A, Wells KS

79. **Approach to Elbow Pain** 221
Meizinger CM, Fredericson M, Kennedy DJ

80. **Wrist and Hand Pain** 224
Patel S, Soliman S

81. **Entrapment Syndromes: Upper Extremities** 226
Bhavaraju-Sanka R

82. **Bursitis: Upper Extremity** 231
Bouffard KJ, Marshall B

83. **Tendinopathy: Upper Extremities** 233
Bouffard KJ, Caldwell M

SECTION 9 **Lower Extremity Pain**
Miles Day

84. **Hip Pain** 239
Tenforde AS, Kennedy DJ

85. **Knee Pain** 241
Patel S, Horrocks A

86. **Foot and Ankle Pain** 244
Tenforde AS, Kennedy DJ

87. **Piriformis Syndrome** 246
Nagpal A, Prust SM

88. **Vascular Claudication** 248
Khakpour H

89. **Entrapment Neuropathies: Lower Extremity** 250
Bhavaraju-Sanka R

90. **Tendinopathy: Lower Extremities** 254
Bouffard KJ, Caldwell M

91. **Bursitis: Lower Extremity** 256
Bouffard KJ, Marshall B

SECTION 10 Pediatric Pain

Miles Day

92. **Management of Painful Procedures in Pediatric Patients** 261
Mina MM

93. **Chronic Benign Pain in Children** 263
Mina MM

94. **Cancer-Related Pain in Children** 265
Driver LC, Spain TL, McAnally AA

95. **Complex Regional Pain Syndrome in Children** 268
Mina MM

SECTION 11 Pharmacology

Ameet Nagpal

96. **Local Anesthetic Choice and Toxicity** 273
Wolf J, Rubens A, Pino CA

97. **Nonsteroidal Anti-Inflammatory Drugs** 278
Patel AB, Day M

98. **Corticosteroids** 281
von Kriegenbergh KM, Day M

99. **Antidepressants** 283
Day M, McClure BS

100. **Anticonvulsants** 286
Davies E, Souza S

101. **Antispasmodics and Antispasticity Pharmacology** 289
Verduzco-Gutierrez M, Dragojlovic N

102. **Interventional Spasticity Management with Botulinum Toxin** 292
Mimbella PC, Verduzco-Gutierrez M

103. **Cannabis** 295
Pangarkar SS, Leung E

104. **N-Methyl-D-Aspartate Antagonists** 298
Mitchell B, Garza R III

105. **Neurolytic Blocks** 300
Lopez EM, Davies E

106. **Topical Agents** 303
Davies E, Salas MM

107. **Regenerative Medicine** 305
McCallin JP, Salas MM

SECTION 12 Opioid Pharmacology

Larry C Driver

108. **Opioids** 311
Rana MV, Kusper TM

109. **Opioid Toxicology** 314
Kusper TM, Rana MV
110. **Opioid Withdrawal** 318
Rana MV, Kusper TM
111. **Opioid-Induced Hyperalgesia** 321
Rana MV, Kusper TM
112. **Risk Evaluation and Mitigation Strategies for Opioids** 324
Rana MV, Kusper TM
113. **Weaning** 327
Kusper TM, Rana MV

SECTION 13 **Noninterventional Therapeutic Modalities**
Miles Day

114. **Physical Therapy** 333
Thakur S, DiTommaso C
115. **Occupational Therapy** 336
Thakur S, DiTommaso C
116. **Transcutaneous Electrical Nerve Stimulation** 338
Issa MA, DiTommaso C
117. **Vocational Rehabilitation** 341
McCallin JP, Kum-Nji G
118. **Acupuncture** 343
Zhang K, Ramamurthy S
119. **Hypnosis, Biofeedback, and Meditation** 345
Zhang K, Ramamurthy S
120. **Cognitive Behavioral Techniques for Pain Management** 348
McGeary CA
121. **Psychological Interventions** 350
McGeary CA
122. **Prosthetic Support: Management of Amputee-Related Pain** 352
Benfield JA, Bushman TJ, Mugleston BJ

SECTION 14 **Interventional Therapeutic Modalities**
Larry C Driver

123. **Epidurals** 357
Adams CW, Day M
124. **Subarachnoid Block** 359
Kraus GP, Lai TT
125. **Peripheral Nerve Blocks** 362
Boies BT, Thome CM
126. **Sympathetic Blocks** 364
Lai TT, Lopez EM
127. **Cranial Nerve Blocks** 367
Eckmann MS, Ramamurthy S

128. Intravenous Regional Analgesia **370**
Naylor KJ, Anitescu M

129. Intravenous Infusion Therapy in Chronic Pain States **373**
Sudhakaran S, Anitescu M

130. Continuous Neural Block **375**
Mitchell B, William JG

131. Intra-Articular Steroid Injections **378**
Bartlett JJ, Goff BJ

132. Epidural Steroid Injections **381**
Graff V, Pino CA

133. Medial Branch Blocks **383**
Benedetti EM, Ellis SE

134. Intradiscal Therapies **386**
Benedetti EM, Feldman AT, Singh TSS

135. Vertebral Augmentation **388**
Warner C, Beall DP

136. Radiofrequency Ablation **391**
Eckmann MS

137. Pulsed Radiofrequency Neuromodulation **393**
Eckmann MS

138. Intrathecal Therapy **396**
Jones DT, Eckmann MS

139. Spinal Cord Stimulation **399**
Pang EK, Pangarkar SS

140. Peripheral Nerve Stimulation **402**
Jung Jae, Zall Mona, Curry Jason

141. Neurosurgical Procedures for Pain **405**
Bartanusz V

SECTION 15 **Other Topics**

Brian T Boies

142. Pain Management Ethics **411**
Driver LC

143. Imaging Use During Interventional Procedures **414**
Levin JE, Huynh L, Kennedy DJ

144. Radiographic Contrast Media **417**
Eckmann MS

145. Controversial Therapies **419**
Nagpal A, Eckmann MS, Ramamurthy S

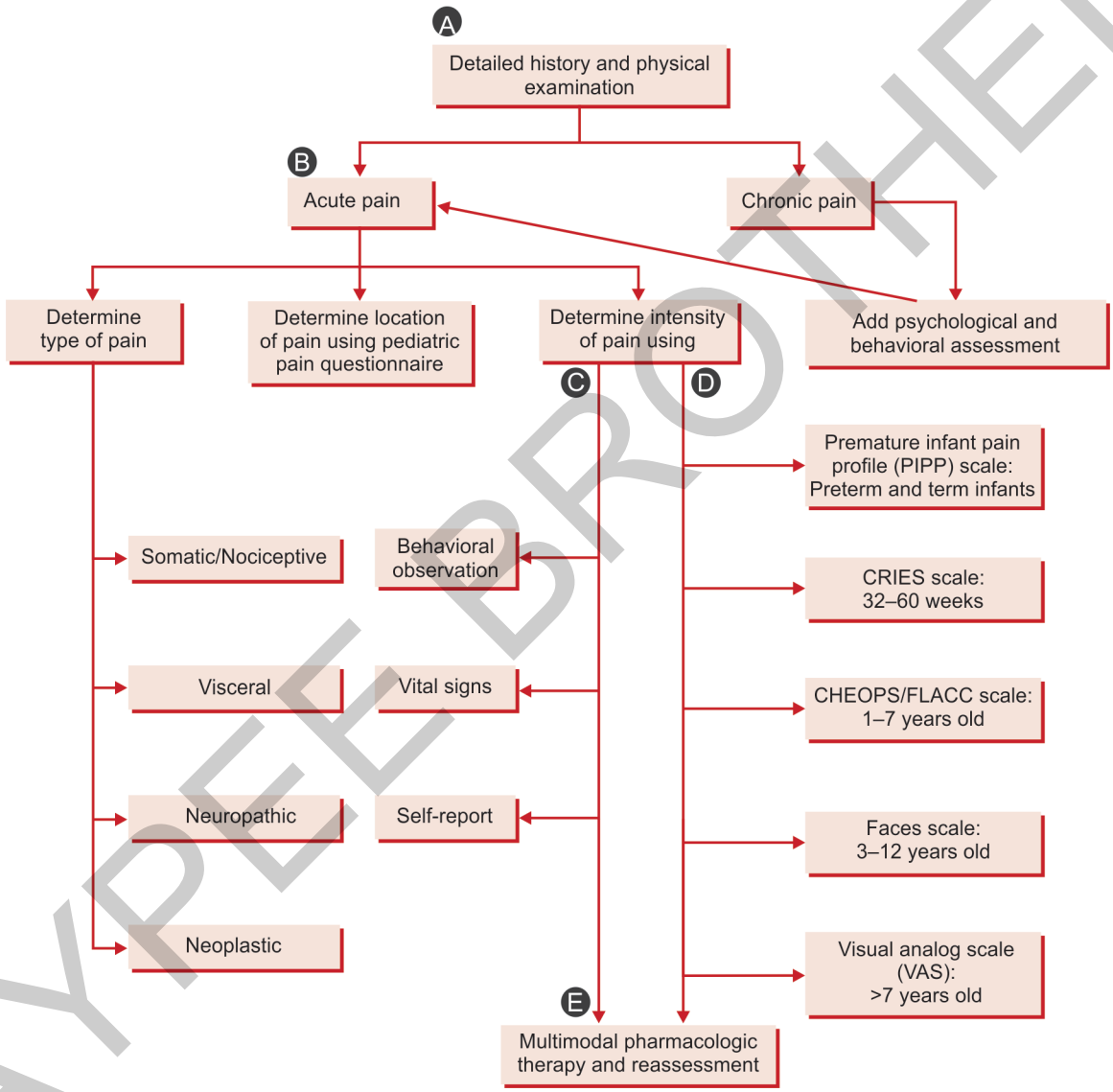
Index *421*

CHAPTER

3

Evaluation of Pediatric Pain Patient

Mina MM, Mina M



JAYPEE BROTHERS

Evaluating pediatric pain is much more difficult to assess than that of an adult, leading to untreated or undertreated pain with negative effects on quality of life. This results in social, economic and emotional consequences for both the child and the parents. Pain can involve both peripheral and central pathways accompanied by emotional factors and could be (1) somatic, (2) visceral, (3) neuropathic, or (4) neoplastic. Pain perception starts around the third trimester with different perception related to the maturity of the central nervous system. Hence, exposure to pain in early stages of life could be detrimental, leading to changes in the social and emotional aspects.

A Clear documentation on the assessment of pain and the methodology used should be taken into consideration, along with cognitive abilities and psychosocial aspects of these children. Different methods are used with no gold standard. Evaluation of pain in children should be done routinely using appropriate pain assessment tools mostly done by the nursing staff in a hospital setting (who are usually first to address pain) followed by parents,

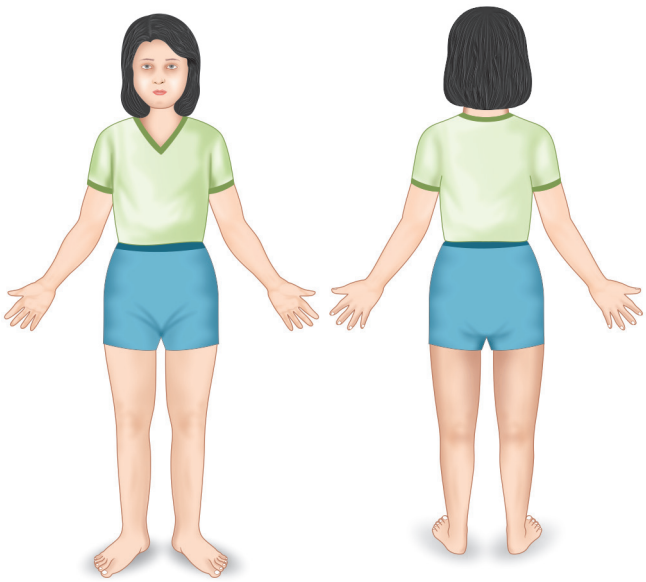


Fig. 1: Pediatric pain questionnaire

and then physicians. Adequate education on assessment tools, documentation of methods used, treatment options given, threshold of pain level to therapy given, and response to treatment and side effects should be documented with clear communications between all medical staff.

B Acute pain, including postprocedural and postoperative, should be assessed using appropriate tools routinely. However, chronic pediatric pain (with or without acute pain), mostly seen as outpatient, has a different scope of assessment. Identifying the location and type of the pain helps to determine etiology using a pediatric pain questionnaire **(Fig. 1)**, where the child can color the area of the body involved.

C There are three principal methods of assessing pain *intensity* in children:

1. *Behavioral/Observation*: The child is observed for a few minutes and a number is chosen that matches their behavior observing body language, facial expressions, and sleep-wake patterns, but needs additional sources, such as feedback from parents or caregivers to exclude other forms of stress such as hunger or anxiety.
2. *Biological measures*: Relies on vitals.
3. *Self-report*: Child can adequately express their pain which is the gold standard.

D For children who are unable to self-report, Behavioral and Biological scales can be used in conjunction with combined scales, like the Objective Pain Scale and the Comfort Scale used to assess procedural and post-operative pain.

1. *For preterm and term infants*: Premature infant pain profile (PIPP) is composed of seven indicators: gestational age, behavioral state before painful stimulus, change in heart rate during painful stimulus, change in oxygen saturations during painful stimulus, brow bulge during painful stimulus, eye squeeze during painful stimulus, and nasolabial furrow during painful stimulus.

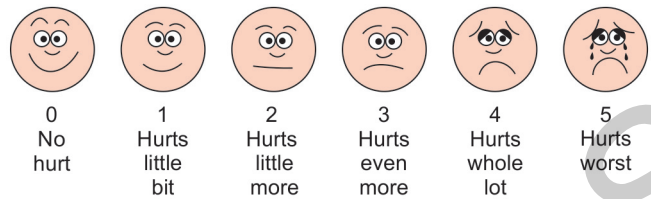


Fig. 2: Faces scale

2. *From 32 weeks to 60 weeks*: CRIES scale is an acronym for crying, requires oxygen, increased vital signs, expression, and sleep.
3. *From 2 months to 7 years*: FLACC scale is an acronym for face, legs, activity, cry, and consolability.
4. *From 1 year to 7 years*: The Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) contains six parameters including cry, facial, verbal, torso, touch, and legs.
5. *From 3 years to 18 years of ages*:
   - *Simple descriptive scale*: Uses descriptive words to describe the intensity of the pain
   - *Numeric scale*: Uses a straight line from 0 to 10, with 0 being no pain and 10 being the worst pain, and the patients choose the number that best fits the intensity of their pain
   - *Faces scale* ***(Fig. 2)***: Six faces with varying expressions ranging from happy to crying
   - *Poker chip scales*, where the child's pain is represented in the amount of poker chips used.
6. *Cognitively impaired children*: Noncommunicating child pain checklist—postoperative version is recommended.

E *Multimodal Therapy:* Once pain is assessed, the 2012 WHO guidelines recommend a two-step approach, where step one is mild pain treated with acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs) followed by step two for moderate to severe pain requiring adding an opioid such as codeine or morphine. Adjuvant medications can be added at any step such as anticonvulsants. Pain should be assessed before, during, and after treatment using the same scale, so that there is a baseline threshold and a way to make sure the treatment is working. There should be guidelines set-up in the hospital for the nurses to be aware of what treatment should be administered depending on the level of pain the patient is in.

ACKNOWLEDGMENTS

For their great efforts in collecting and reviewing the research and data: Eman Mina, Eirene Rophael, Marina Mina, Cyril Mina.

SUGGESTED READING

Chiaretti A, Pierri F, Valentini P, et al. Current practice and recent advances in pediatric pain management. Eur Rev Med Pharmacol Sci. 2013;17 (Suppl 1):112-26.

Mazur A, Winnicki IR, Szczepański T. Pain management in children. Ann Agric Environ Med. 2013;Special Issue 1:28-34.

Wong D, Baker C. Pain in children: comparison of assessment scales. Pediatric Nursing. 1988;14(1):9-17.

JAYPEE BROTHERS

for detailed information on anesthesia books, visit our website **www.jaypeebrothers.com,** for detailed information on anesthesia books, visit our w

Ramamurthy's

Decision Making in Pain Management

An Algorithmic Approach

This is the only pain management textbook which is concise enough to assist the reader in making a clinical decision during a patient visit. The book is not designed to be a definitive textbook of the Pain Medicine/Management field–rather, it is designed to assist the reader in day-to-day, real life practice! As such, much of the content of the book is evidence-based, and much of it is based on the anecdotal experience of the authors, most of whom practice in academic settings.

Each chapter contains 1–2 pages of text and a clear and algorithmic approach to the particular topic. The chapters explore cutting-edge treatment options, such as regenerative medicine, the use of infusion therapy (i.e. ketamine), and advanced neuromodulatory technologies. An entire section of the book is devoted to opioids and management of opioid therapy, an extremely important topic in today's society.

Ramamurthy's Decision Making in Pain Management (3rd edn) is beneficial for all physicians and physician extenders who treat patients with any chronic pain conditions. It is useful for pain medicine practitioners, physical medicine and rehabilitation physicians, anesthesiologists, and primary care physicians, as well as physician assistants and nurse practitioners.



Ameet Nagpal MD MS MEd is the Medical Director of UT Health San Antonio's Pain Medicine Clinic, San Antonio, TX, USA. He is also a Clinical Assistant Professor in the Department of Anesthesiology at UT Health San Antonio. Dr Nagpal is a board certified physician in Physical Medicine and Rehabilitation and Pain Medicine. He has a Masters in Science in Biophysics from Georgetown University and a Masters in Education in Health Care Curriculum and Instruction from the University of Houston. His areas of ongoing research include conjoint couples therapy for chronic pain and novel radiofrequency ablation procedures for sacroiliac complex pain, and his primary clinical interest is in chronic pelvic pain.



Miles Day MD DABA FIPP DABIPP is the Medical Director of the Pain Center at Grace Clinic and is the Pain Medicine Fellowship Program Director at Texas Tech University Health Sciences Center, Lubbock, TX, USA. Dr Day is a Traweek-Racz Endowed Professor in Pain Research at Texas Tech's Department in Anesthesiology. He is also a Diplomate of the American Board of Anesthesiology (ABA) with subspecialty certification in Pain Medicine. Dr Day is the author of numerous articles and book chapters in well-known publications, and he has a special interest in the interventional treatment of chronic facial pain.



Maxim S Eckmann MD is the Director of Anesthesiology Pain Medicine and the Program Director of the Pain Medicine Fellowship at UT Health San Antonio, San Antonio, TX, USA. He is also an Associate Professor in Anesthesiology and Pain Medicine at UT Health San Antonio. Dr Eckmann serves his specialty as a working member of the American Board of Anesthesiology (ABA), American Society of Anesthesiology (ASA), American Society of Regional Anesthesia and Pain Medicine (ASRA), and the Texas Pain Society (TPS). He is clinically active in perioperative, acute and chronic pain management including advanced interventional pain medicine.



Brian T Boies MD is a Clinical Assistant Professor in the Department of Anesthesiology at UT Health San Antonio, San Antonio, TX, USA. He is board certified in both Pain Medicine and Anesthesiology by the American Board of Anesthesiology (ABA). He has a passion for teaching and is actively involved in the Anesthesiology residency and Pain Medicine fellowship at his institution. Dr Boies has had formal training in evidence-based medicine and is a strong advocate for its use in pain management.



Larry C Driver MD is a Professor in the Department of Pain Medicine, Division of Anesthesiology and Critical Care at The University of Texas MD Anderson Cancer Center, Houston, TX, USA. He is also board certified in Anesthesiology, Pain Medicine, and Palliative Medicine. His clinical and academic practice focuses on patients with advanced cancer and the ethical issues surrounding their care.

Available at all medical bookstores
or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

Shelving Recommendations
PAIN MANAGEMENT, PAIN MEDICINE
ANESTHESIOLOGY
PHYSICAL MEDICINE & REHABILITATION

ISBN 978-93-86261-45-8