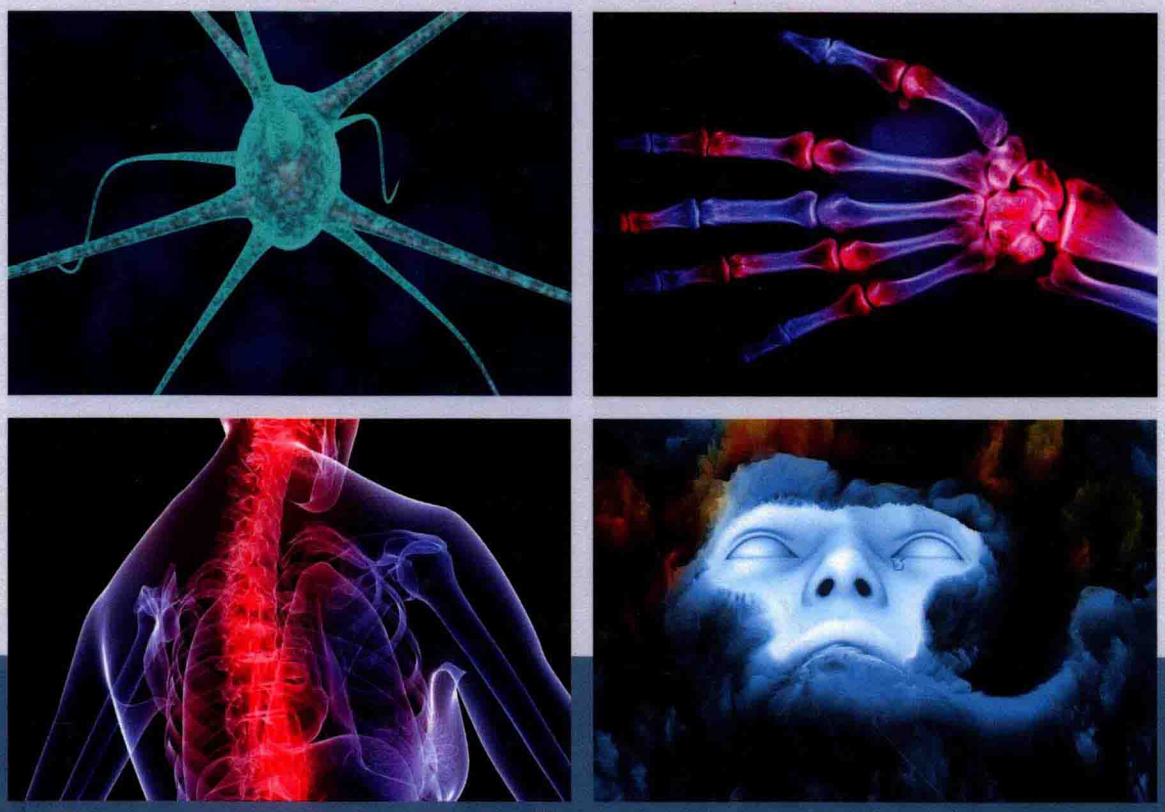
PAIN MEDICINE

An Interdisciplinary Case-Based Approach



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AN INTERDISCIPLINARY CASE-BASED APPROACH

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To our families
To our patients
To the healthcare workers, students, residents, and fellows in-training in Pain Medicine
In Memory of Howard Smith

Salim Hayek
Binit Shah
Mehul Desai
Thomas Chelimsky

To my mentor, Salim Hayek, who has guided, encouraged, and supported me in every step of my career. I owe my successes to you.To my wife, Rupa, who has sacrificed so that I might succeed, challenged me that I might be a better man, and loved me that I might live.

—BJS

To my fellow co-editors, who provided me this opportunity and inspired me with their Herculean efforts. To Sophia and Milan, you motivate me every day to make you both as proud of me as I am of you.

—MJD

To my colleagues who wrote this book, and all who have inspired and taught me every day in each conversation about a suffering person we treat together, to my wife Gisela and two children Miriam and Hannah who are so patient with me, and to God, the greatest teacher and pain fighter of all.

—TCC

IN MEMORIAM

It would have been very unusual for Howard S. Smith not to complete a project. Howard was the consummate academician, having completed three different residencies, authored more than 100 articles and book chapters, and edited more than 10 books, including this one. He could not have accomplished these things without having perseverance and being meticulous. Yet, it would be easy for someone to not know these things about Howard. He was sincere, humble, and down-to-earth, qualities that unfortunately are somewhat unusual among super-achievers, which is a term that personifies Howard Smith.

It is somewhat ironic that what we may remember most about Howard is not his plethora of accomplishments, but rather his empathy, compassion, and infectious laugh that made everyone around him smile. His presence at conferences meant not only that there would be astute observations on the latest trends in pain medicine, but that there would also be someone who would listen intently to all sides of a debate, show compassion to minority viewpoints, and mediate seemingly irreconcilable differences of opinion.

Howard's departure came as a shock to his many friends, his family, and the medical community, all of whom had come to love and admire him. He was chosen as an editor for this book because of his incomparable work ethic, intellect, reliability, and dedication. Although we are saddened that he will not see this textbook come to fruition, we take some consolation in the fact that this book represents the ideals that Howard emulated in his life: an evidence-based compendium of the principles and practice of pain medicine.

We hereby dedicate this book to the memory of Howard Smith, whose keen insight and gentle demeanor touched everyone he met.

Salim M. Hayek
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Thomas C. Chelimsky
Steven Cohen

FOREWORD

John Bonica (February 16, 1917–August 15, 1994) was an anesthesiologist and is recognized as the founding father of pain management, a field that has now evolved into the well-recognized medical specialty called Pain Medicine. After completing residency in 1944, Bonica joined the Unites States Army and was appointed Chief of Anesthesiology at Madigan Army Medical Center in Fort Lewis, Washington. For the next three years, he gained firsthand experience while treating painful injuries in World War II veterans. As an anesthesiologist, Bonica found that the tools at his disposal, opioid analgesics and peripheral nerve blocks using local anesthetics, were just a small part of what was needed to adequately diagnose and treat patients with complex, chronic painful disorders. He went on to pioneer the concept of bringing multiple medical specialists together to evaluate patients and construct a comprehensive treatment plan for each patient. Thus, the multidisciplinary approach to pain management was born. The original approach was to have each patient evaluated by a number of different specialists, usually an anesthesiologist or other physician would act as the team leader, often a surgical specialist would be involved, and the team always had a psychiatrist or psychologist and a physical therapist. Programs emerged around the world, many of which were based at rehabilitation facilities and they admitted patients for treatment during lengthy inpatient hospitalizations. Research about the effectiveness of this comprehensive approach emerged, demonstrating sustainable improvements in pain and function: Yes, the multidisciplinary rehabilitation approach really works. But there was a problem. Getting so many specialists together and coordinating care in this comprehensive fashion takes a lot of time and requires many different specialists, so it is expensive. Insurance providers began to deny coverage for comprehensive pain care and the approach fell out of favor in the 1980s.

Even as the cumbersome multidisciplinary programs like the one that John Bonica built during his long academic career at the University of Washington were in decline, modern training in the area of pain management began to emerge. The interest of anesthesiologists in pain management emerged largely from the use of analgesics and regional anesthesia to control pain in the immediate postoperative period. It was clear that many patients did gain some relief from chronic pain conditions when specific neural structures were blocked. Specific treatments emerged from this paradigm, most notably epidural injection of corticosteroids for lumbar radicular pain. Formal accredited training programs for physicians seeking to subspecialize in pain management began in the United States in 1993. This fellowship training added a single year to anesthesiology training and was often technically focused on interventional. While there was some lip service given to the overall multidisciplinary treatment of pain, many early pain specialists entered practice offering largely technical services (they were known as "block docs"). The true benefit of multidisciplinary pain care was lost.

By the late 1990s, it was clear that physicians from disciplines other than anesthesiology also wanted access to subspecialty training in pain management, which by that time had adopted the broader name of Pain Medicine. It was not until 2007 that the requirements for training programs were finally changed to ensure that all pain specialists would gain exposure to disciplines beyond anesthesiology during their subspecialty training. They would be required to have some minimal exposure to psychiatry, physical medicine and rehabilitation, and neurology. The excessive focus on interventions has gradually subsided and a new and refreshing recognition has taken hold: that each patient with chronic pain may well benefit from a broad range of treatment options that include rehabilitation, psychology, and involvement of other disciplines in coordinated plans of care. The term "multidisciplinary" has been gradually overtaken by the term "interdisciplinary" in recent years, and this is fitting. Instead of calling on experts from multiple disciplines to work together to formulate a treatment plan, modern pain training and pain care are more often organized so that a pain specialist actually delivers care across traditional boundaries. The anesthesiologist must gain sufficient skills in neurology to care for patients with headaches and the neurologist must gain sufficient skills in performing neural blockade to provide the treatments pain patients will need.

So, it is inspiring to see a book appear that embraces the interdisciplinary approach and presents in-depth discussions of common and unusual chronic pain conditions in a case-based fashion that emphasizes interdisciplinary pain care. Drs. Hayek, Shah, Desai, and Chelimsky have created just such a text in *Pain Medicine: An Interdisciplinary Case-based Approach.* Each chapter is built around a well-described patient with the disorder that is being discussed in that chapter. The cases are detailed and realistic. Each case is followed by a number of questions that the authors then address in detail. The questions posed are the very ones a pain specialist

will have to master in order to effectively care for patients with that specific painful disorder. Every chapter crosses more than one discipline and discusses the broad array of treatment techniques that can be brought to bear on that specific painful condition. This novel approach is a powerful way for practitioners to acquire state-of-the-art information about the causes, evaluation, and treatment of pain. This interdisciplinary, case-based approach will allow pain practitioners, new and experienced alike, to bring the very best care to their patients suffering with pain.

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December 2014

PREFACE

Although it is no secret that chronic pain is a major healthcare problem of epidemic proportions, its management is far from perfect. In the United States, chronic pain has an estimated prevalence of greater that 30% and is one of the main reasons for seeking medical care. The direct and indirect economic costs of chronic pain are astronomical. Chronic pain is challenging not only because of complex pathophysiological processes but also because it affects all facets of life: physical, emotional, psychological, economic, and social. Hence, many experts consider chronic pain not a mere symptom but a disease entity in itself. This constellation poses particular challenges in the management of chronic pain and requires integration of multiple, and often simultaneous, approaches to optimize patient outcomes.

Interdisciplinary clinical medicine involves bringing together the input of multiple healthcare specialists of different backgrounds in the care of complex patients. Patients benefit from the contribution of experts from different clinical backgrounds who address their problems in an integrated and concurrent fashion. The resultant comprehensive patient care may be more successful at managing and solving patient problems that are beyond the proficiency and training of a single provider. The benefits, however, are not limited to the patients. Clinicians learn from the cross-pollination of knowledge and exchange of clinical experiences and skills.

This concept has been embraced in medical education, and particularly in pain medicine. Indeed, the Accreditation Council for Graduate Medical Education (ACGME) has mandated multidisciplinary training of fellows in accredited programs in pain medicine since 2007. Greater exposure of trainees to the disciplines of neurology, physical medicine and rehabilitation, and psychiatry/psychology, in addition to anesthesiology is now routine. Innovation in educational experience is highly encouraged, including training in cancer pain, palliative care, and pediatric pain. Specific training requirements are also delineated for the interventional track trainees.

Interdisciplinary medicine, although ideal, may be difficult to practice. Team members must learn to appreciate the differing perspectives and accede to work with each other. In addition, interdisciplinary practice has been criticized as inefficient. Nonetheless, it carries a very high and perhaps underestimated value, both from the perspective of physician education and job satisfaction and the perspective of patient outcomes and quality of care.

This textbook embraces the spirit and implementation of interdisciplinary pain medicine practice. Common chronic pain conditions are tackled in-depth using a vignette-based approach and contributions from multiple authors from different disciplines in each chapter. Although neither interdisciplinary practice nor interdisciplinary book writing are easy feats, the editors believe they are worth the effort. We believe the readers and students of pain medicine will agree.

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OTHER DISORDERS

SECTION I

NEUROPATHIC PAIN

1.

SMALL FIBER NEUROPATHY

Kamal Chemali, Salim Hayek, and Thomas C. Chelimsky

CASE PRESENTATION

A 48-year-old man presents to the clinic because of a burning sensation in both toes that started 3 months ago and has progressed to involve the entire foot up to the ankle. He denies any past medical history but has gained 25 lbs in the past year due to overeating and inactivity.

On examination, motor strength is normal. He has a mild sensory gradient to pinprick and temperature in stocking distribution to the ankles, bilaterally and symmetrically. Vibration and joint position sense are intact. Reflexes are graded at 2+ NINDS (classification of the National Institute of Neurological Disorders and Stroke) at the knees and 1+ NINDS at the ankles. His gait is normal, and the Romberg test is negative.

QUESTIONS

1. What is the definition and pathophysiology of small fiber neuropathy (SFN)?
2. How does one evaluate the patient with autonomic SFN?
3. What are the differential diagnosis and the testing recommendations for SFN?
4. How does one manage SFN?
   a. Pain management
   b. Practical checklist for management of orthostasis

WHAT IS THE DEFINITION AND PATHOPHYSIOLOGY OF SFN?

It is not uncommon in chronic pain or neurologic practices to encounter cases of peripheral polyneuropathy (PN) that affect small fibers mediating autonomic and pain functions. Actually, it is thought that most patients with a PN have some degree of small fiber impairment[1] that often goes underrecognized. Autonomic dysfunction most often accompanies a PN involving the unmyelinated small C and Aδ fibers. We refer to this component as *small fiber neuropathy* (SFN). SFN presents with two basic types of complaints: those involving primarily autonomic nerves, with complaints of loss of function (also referred to as *negative* symptoms) such as numbness, orthostatic hypotension (OH), or bowel and bladder dysfunction, and those involving primarily pain nerves, with gain of function (also referred to as *positive* symptoms) complaints such as burning pain, tightness, paresthesiaes, and the like. Many SFNs present with both types of complaints. This case-based review will revisit the most common forms of SFN, emphasizing their manifestations, evaluation, and management.

This presentation is a classic example of a peripheral neuropathy affecting nerve fibers mediating perception of pain and temperature more than other sensory modalities. Small, unmyelinated C fibers and thinly myelinated Aδ fibers subserve two major categories of signals: (1) *afferent* signals, including somatic and visceral pain, visceral state (e.g., baroreceptor, chemoreceptor, etc.), and temperature; and (2) *efferent autonomic* signals, including sympathetic and parasympathetic nerves to all organs and their vascular beds and enteric nerves in the gut. In particular, these fibers innervate the skin epidermis, the subcutaneous vascular bed, and the sweat glands in the dermis. Exaggerated and ectopic discharges of epidermal C fibers (somatic C fibers) result from an insult to the axon, resulting in a painful burning or tingling sensation. These are termed "positive" neuropathic symptoms because they result from pathologic *hyperactivity* of the nerve cell. As the disease underlying the C fiber attack progresses, the C fibers degenerate and "negative" symptoms, such as loss of pin or temperature sensation, will appear, resulting from pathologic *hypoactivity*. Clinically, positive and negative symptoms differ in that positive symptoms draw attention to themselves, whereas negative symptoms only manifest once a person realizes he or she cannot perform a specific function. Involvement of the C fibers to the subcutaneous vascular bed will produce vasomotor changes, warmth, redness or paleness, and possibly edema. Involvement of sweat gland C fibers (sudomotor fibers) may result in abnormal sweat output, such as hyper- or hypohidrosis. In approaching SFN clinically, a first step is to determine if both afferent (sensory) and efferent