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## **Preface**

Howard S. Smith

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## **Pathophysiology of Pain**

Todd W. Vanderah

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Processing and interpreting pain signals is a complex process entailing excitation of peripheral nerves, local interactions within the spinal dorsal horn, activation of ascending and descending circuits comprising a loop from the spinal cord to supraspinal structures, and exciting nociceptive inputs at the spinal level. The system is able to undergo neuroplastic transformations when nociceptive inputs are extended over time; such adaptations function as a pronociceptive positive feedback loop. Manipulations to disrupt any of the nodes of this pain facilitatory loop may effectively disrupt the maintenance of the sensitized pain state and diminish or abolish neuropathic pain. Understanding the ascending and descending pain facilitatory circuits may provide for design of rational therapies that do not interfere with normal sensory processing.

## **The Taxonomy of Pain**

Harold Merskey

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An ideal taxonomy should be comprehensive and its categories should be mutually exclusive. Every item should have a particular place either on its own or with other items that resemble it. This is rarely, if ever, achievable in practice in medicine. The reasons for this are explained. The taxonomy developed by the Task Force on Taxonomy of the International Association for the Study of Pain is described as well as the basis for it.

## **The Diagnostic Workup of Patients with Neuropathic Pain**

Steven H. Horowitz

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Neuropathic pain is initiated or caused by damage or dysfunction of the peripheral or central nervous systems in various disorders,

each having pain-related symptoms and signs thought secondary to common pain mechanisms. Ancillary testing may demonstrate associated nervous system abnormalities, however its specificity is inadequate at present, as it makes inferential conclusions from indirect data. Symptom assessment and physical findings remain paramount in the diagnosis of neuropathic pain.

## **Problems with Insurance-Based Research on Chronic Pain**

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Harold Merskey and Robert W. Teasell

Social factors affecting estimates of pain severity are noted, including attitudes toward pain before anesthesia, changes in attitudes afterward, and roles of physicians as examiners for military service or for compensation. Physicians identified as experts by insurance companies may see patients' injuries as causing less discomfort than do those who work for patients. An example is provided of a report funded by an insurance influence. Two examples are provided of studies in which treatment of data was insurance-friendly. We emphasize the importance of recognizing social influences on the process through which compensation is determined. These influences may be adverse to the normal evaluation of pain even when compensation is not an issue, and efforts are required to minimize potential bias.

## **Behavioral Medicine Approaches to Pain**

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Akiko Okifuji and Stacy Ackerlind

Pain is a complex, idiosyncratic experience. When pain is the primary complaint for seeking medical attention, understanding of multiple factors is essential in guiding successful treatment. Behavioral medicine, a branch of psychology, has been an integral part of interdisciplinary/multidisciplinary care of pain patients. In this article, we provide an overview of behavioral medicine approaches to pain, including assessment and commonly used therapeutic methods. Particular attention is given to cognitive-behavioral therapy and motivational enhancement therapy.

## **Physical Medicine Rehabilitation Approach to Pain**

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Steven P. Stanos, James McLean, and Lynn Rader

A physical medicine and rehabilitation approach to acute and chronic pain syndromes includes a wide spectrum of treatment focus. Management includes an assessment and treatment model based on a biopsychosocial approach. Assessment includes a focus on pain behaviors, posture, muscle imbalances, and gait impairments. Effective treatment programs rely on appropriate and realistic goal setting. Treatment options may include physical therapy, polypharmacy, cognitive behavioral therapy, and passive modalities. Treatment goals emphasize achieving analgesia, improving psychosocial functioning, and reintegration of recreational or leisure pursuits. More complicated multidimensional chronic pain

conditions may require a more collaborative continuum of multidisciplinary and interdisciplinary treatment approaches. Progress in all therapies necessitates close monitoring by the health care provider and ongoing communication between members of the treatment team.

## **Nonopioid Analgesics**

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Muhammad A. Munir, Nasr Enany, and Jun-Ming Zhang

Nonopioid analgesics represent a varied collection of analgesic agents, many of which also possess antipyretic or anti-inflammatory actions. As a group, nonopioid analgesics represent reasonable first-line analgesics for a variety of mild to moderate painful conditions and also often may be useful in conjunction with other analgesics (eg, opioids) for a myriad of severe painful conditions. Clinicians treating pain should be familiar with the actions, adverse effects, and individual agents in the group of nonopioid analgesics.

## **Adjuvant Analgesics**

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Helena Knotkova and Marco Pappagallo

Adjuvant analgesics represent a diverse group of drugs that were originally developed for a primary indication other than pain. Many of these medications are currently used to enhance analgesia under specific circumstances. The proper use of adjuvant drugs is one of the keys to success in effective pain management. Since adjuvant analgesics are typically administered to patients who take multiple medications, decisions regarding administration and dosage must be made with a clear understanding of the stage of the disease and the goals of care. The article discusses major classes of adjuvant analgesics, with the focus on the mechanism of action, clinical application, and risks and benefits associated with each particular class of adjuvants.

## **Topical Analgesics**

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Gary McCleane

Historically, analgesics were applied by the topical route of administration. With the advent of oral formulations of drugs, topical application became less popular among physicians, although patients still rated this method of drug delivery as efficacious and practical. We now appreciate that peripheral mechanisms of actions of a variety of preparations rationalizes their topical application and gives further opportunity to target peripheral receptors and neural pathways that previously required systemic administration to achieve therapeutic effect. Therefore, a peripheral effect can be generated by using locally applied drug and, consequently, systemic concentrations of that drug may not reach the level at which systemic side effects can occur.

**Complementary and Alternative Medicine for Noncancer Pain** 141  
Gira Patel, David Euler, and Joseph F. Audette

The cost of treating chronic pain is a significant and growing public health problem. National surveys indicate that many patients are paying out of pocket for untested complementary and alternative medicine (CAM) treatments for persistent pain. Little is known about appropriate care for patients with chronic pain. As a result, patients are treated symptomatically with medications that can be addictive and procedures that often are not effective. Given the growth of high quality research in CAM, utilization of a number of alternative therapies can provide a counterbalance to conventional approaches to reintroduce a model of care that is more process oriented and moves patients from passive therapies to a more active role in their self-care.

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