Pain Management: Classifying, Understanding, and Treating Pain

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According to the International Association for the Study of Pain, pain is "an unpleasant sensory and emotional experience associated with actual and potential tissue damage, or described in terms of such damage, or both."[1] This definition emphasizes the subjective and psychological nature of pain and appropriately avoids making the authenticity of pain contingent on an externally verifiable stimulus. Price[2] similarly proposes that pain should be understood as a somatic perception involving a bodily sensation with qualities similar to those reported during tissue-damaging stimulation, an experienced threat associated with this sensation, and a feeling of unpleasantness or other negative emotions based on the experienced threat.

In its 2001 implementation of pain-related standards of care, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) linked pain to physical and emotional responses.[3] In justifying pain-related accreditation standards, JCAHO pointed out the connection between unrelieved pain and negative physiologic and psychological effects, generalizing these adverse outcomes from the hospitalized patient to the majority of patients in nearly all health care settings (eg, hospitals, long-term care facilities, surgical centers, mental health facilities, home health services, health system networks).

This article, the first of an occasional series of articles about pain management, discusses the classification of pain as the initial strategy for treating pain. Brief comments on the psychological aspects of pain, the general pharmacologic management of pain, and special considerations in elderly patients are presented. Fuller treatment of topics such as complex pharmacotherapy, pain syndromes, assessment methods, and nonpharmacologic approaches to pain management will be provided in future articles.

CLASSIFYING PAIN

Pain is generally classified according to its location, duration, frequency, underlying cause, and intensity. Classification of pain is thus complicated and can be a source of confusion for many clinicians. As a result, many practitioners now commonly use several different classification systems. Clear distinctions between these systems are not always possible: the more simplistic the classification of pain, the greater the number of omissions and overlaps that can occur.[4] To successfully manage pain, practitioners must be able to work with pain classifications that encompass all considerations (ie, time course, involved anatomy, intensity, type of patient, and specific pathology) and be able to switch from model to model, depending on a patient's individual circumstances.

Location of Pain

Pain is often classified by body location. Two overlapping schemes relate the pain to the specific anatomy and/or body system thought to be involved. The anatomic pain classification system identifies sites of pain as viewed from a regional perspective (eg, lower back pain, headache, pelvic pain). In contrast, the body system pain classification method focuses on classical body systems (eg, musculoskeletal, neurologic, vascular). Yet, both classification systems address only a single dimension (ie, where or why does the patient hurt) and thus may ultimately fail to adequately define the underlying neurophysiology of the problem.[5]

Duration of Pain

The duration of the pain process is the most obvious distinction that can be made when classifying pain symptoms. Conventionally, acute pain is limited to pain of less than 30 days' duration, whereas chronic pain persists for more than 6 months. Subacute pain comprises the interval from the end of the first month to the beginning of the seventh month of continued pain. Recurrent acute pain describes a pain pattern that persists over an extended period of time but occurs mainly as isolated episodes of pain. Chronic

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pain is further divided by its underlying etiology into non–cancer-related pain (often called *benign* or *nonmalignant pain*) and cancer-related pain (often called *malignant pain*).[6–8]

The primary distinction between acute and chronic pain, regardless of its etiology, is crucial. Acute pain is useful and serves a protective purpose. It warns of danger, limits use of injured or diseased body parts, and signals the departure of pathology when the limiting condition resolves. Without acute pain, it is doubtful that human survival would be possible at all.[9] Chronic pain, on the other hand, has little protective significance, persists despite normalization after injury or disease, and ultimately interferes with productive activity.

Pain after surgery (ie, postoperative pain) is a specific type of acute pain. No matter how successful or well performed, operations cause tissue trauma and release potent mediators of inflammation and pain. This type of pain is often poorly managed. Patients often receive significantly fewer opioid analgesic agents than are ordered, either because the nursing staff may be overly concerned about opioid addiction or because analgesic agents are irrationally selected by physicians, many of whom have inadequate knowledge about the pharmacology of such agents.[10] Although postoperative pain is experienced by millions of patients throughout the world, it is rarely recognized as producing harmful physiologic or psychological effects.[9]

The axiom "No one ever died from pain" is clearly incorrect, given the modern recognition that unrelieved pain increases cardiac work, increases metabolic rate, interferes with blood clotting, leads to water retention, lowers oxygen levels, impairs wound healing, alters immune function, interferes with sleep, and creates negative emotions.[11–17] Unrelieved pain can, for example, delay the return of normal gastric and bowel function in postoperative patients.[18] Recognition of the widespread inadequacy of acute pain management prompted the United States Department of Health and Human Services to publish *Acute Pain Management* as the first set of federal clinical practice recommendations.[19]

Chronic pain confuses most sufferers, because it dominates, depresses, debilitates, and ultimately lowers quality of life. If chronic pain is treated only by using acute pain models, it may become more intense, and patients may experience increased disability and suffering. Instead of comfort measures alone, chronic pain should be managed by the use of rehabilitative techniques when the pain is primarily of a noncancerous origin or by aggressive and supportive techniques when the pain is primarily caused by cancer. Chronic pain patients, unfortunately, demand more effort and resources than a single, well-meaning practitioner can usually provide. In isolation, the solo practitioner is generally unable to address the complex physical, psychosocial, and spiritual problems that chronic pain causes and so resorts to symptom management, usually by overuse of a single therapeutic approach.

Acute pain must be recognized before the pain becomes chronic. In this regard, the presence of subacute pain, which is quite similar to acute pain in its etiologic and nociceptive mechanisms,[6] may offer physicians the last opportunity for a full restoration of patients to a pain-free existence. Once the pain has been established for more than 6 months, the likelihood of complete pain relief is small (Richard Kroening, MD, PhD, oral communication). Kroening elaborates that most patients, during the first 100 days of pain, appear to respond fully to therapy and often can return to near normality. Beyond this time, however, patients generally do not feel fully restored or comfortable, even when they recover the majority of lost function. By the time pain becomes subacute, the rehabilitative approach used for chronic pain is usually more appropriate than are further acute pain management strategies.

Recurrent acute pain involves the acute flare-up of peripheral tissue pathology resulting from an underlying chronic pathologic entity. Typically, headaches, gastrointestinal motility disorders, degenerative disk and joint disease, collagen vascular disease, sickle cell disease, and similar functional processes can elicit this type of pain.[6] Unlike chronic or subacute pain, recurrent acute pain implies discrete acute episodes, which return over time. Determining the dividing line between recurrent acute pain and subacute pain is often a judgment decision by the pain practitioner. In general, daily pain for several weeks is subacute pain, but several limited pain episodes over many months or years is most likely recurrent acute pain. The recognition of recurrent acute pain enables physicians to apply a more comprehensive management approach involving patient education, contingency planning, and family involvement than ordinarily would be required by a single pain episode.

Underlying Causes of Pain

Regardless of the location, duration, frequency, and intensity of pain, every attempt must be made to determine its etiology. Ideally, treating the underlying cause of pain can enable the definitive cure of the pain syndrome. At a minimum, however, etiologic clarification will alert the clinician to whether causative or symptomatic treatment is better or, more commonly, whether a combination of both is necessary.

Pain is divided by the presumed pathophysiology into somatic, visceral, and deafferentation (also called *neuropathic*) pain. **Table 1** provides examples of each of these categories. These subgroups focus on the site of nociception or potential tissue-damaging event. Somatic pain is generally peripheral, visceral pain is usually intra-abdominal, and deafferentation pain typically involves afferent neural pathways. The pain that results from somatic processes is well localized, constant, aching, or gnawing in character. In contrast, visceral pain is poorly localized but is constant and aching in character and is referred to cutaneous sites. Deafferentation pain is characterized by tingling, sharp paroxysmal sensations or burning dysesthesia and is traditionally managed with adjuvant medications, including antidepressant and anticonvulsant drugs rather than the opioid analgesic agents used for visceral and somatic pains.[7]

Chronic non–cancer-related pain, the grist of most pain clinics, involves several different pathophysiologic problems that usually render the sufferer unable to enjoy life but do not directly threaten life. This type of pain is most often described in relationship to an anatomic site and typically engenders considerable anxiety. Myofascial pain (ie, pain arising from muscle and connective tissue) accounts for a considerable amount of chronic non–cancer-related pain; it requires specific active therapy (eg, stretching, trigger point injections) and corrective actions for pain relief.[20,21]

As with acute pain management, cancer-related pain management involves the attempted elimination (or at least severe reduction) of pain. Consequently, it focuses on the comfort of the patient and involves a strategy of palliation. Palliative care involves the liberal use of medication, often opioid analgesic agents, for maximum comfort through symptom relief, with toxicity from therapy kept at acceptable levels relative to the distress produced by the symptoms being addressed.

Temporally, chronic cancer pain may worsen over time because of disease progression and the various interventions (eg, chemotherapy, radiotherapy, surgery) used to treat the disease. The need to increase doses of opioid analgesic agents is often more related to these considerations than to the rapid development of tolerance or medication abuse, as many practitioners mistakenly believe. Of interest, chronic non–cancer-related pain may also worsen over time, resulting in significant behavioral changes (ie, pain behavior) and excessive use of analgesic medication.

Foley[22] recommended classifying cancer patients with pain into 5 groups: (1) patients with acute cancer-related pain, (2) patients with chronic cancer-related pain caused by either progression of disease or therapy, (3) patients with preexisting chronic non–cancer-related pain as well as cancer-related pain, (4) patients with a history of chemical dependency and cancer-related pain, (5) and actively dying patients who must be provided comfort measures.[8] This system of classifying pain according to the type of patient allows for a rich psychosocial approach and prospective planning for the comprehensive needs of the patient, rather than focusing too narrowly on a single dimension of the pain.

Table 1. Types of Pain

Somatic
Fracture
Incisional injury
Thermal injury
Traumatic injury
Visceral
Bowel obstruction
Constipation
Endometriosis
Metastatic organ involvement
Deafferentation
Alcoholic and nutritional neuropathy
Diabetic mononeuropathy and polyneuropathy
Pancoast's tumor (producing brachial plexopathy)
Postherpetic neuralgia

Intensity of Pain

The intensity of pain offers perhaps the least desirable system for classifying pain, because intensity varies for most patients over time and is uniquely subjective. A patient might rate the experience of pain resulting from some pathologic condition as a 10, whereas another patient with the same pathology might describe the intensity of pain only as a 5, both using a 0 to 10 scale (with 0 signifying no pain at all and 10 representing the worse pain imaginable) (**Figure 1**). Whereas non–cancer-related pain is often rated along a continuum (ie, from mild, to moderate, to severe), the words "incapacitating," "overwhelming," and "soul stealing" frequently become necessary qualifiers for cancer pain.

Rather than focus on the perceived intensity of pain, it may be more useful to look at the disruption that pain causes for patients. Pain interfering with appetite, pleasurable activities, or sleep is more a cause

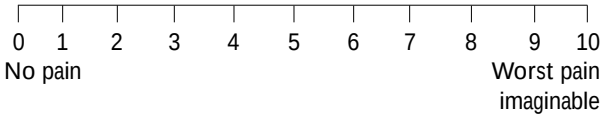

Figure 1. Illustration of a pain-rating scale for classifying the intensity of pain.

of concern than is pain leaving the patient's life otherwise intact, regardless of the reported intensity. Over time, most patients manage to adapt to their pain; they may exhibit either very little or markedly exaggerated pain behavior. Ultimately, there is no way to know how much pain another person is experiencing, and it is best to assume that pain exists whenever a patient says it does, at whatever intensity the patient says it is.[23]

PSYCHOLOGICAL ASPECTS OF PAIN

Coexisting psychiatric disorders are not rare when pain is severe.[24] Moreover, mental health consultants are frequently asked to evaluate patients for suspected "psychogenic pain." According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*,[25] this type of pain is classified as pain disorder. Pain disorder is characterized by pain in one or more anatomic sites that is the predominant focus of the patient's clinical presentation and is of sufficient severity to warrant clinical attention. The pain causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. Psychological factors are judged to have an important role in the onset, severity, exacerbation, or maintenance of the pain. The symptom or deficit is not intentionally produced or feigned, and the pain is not better accounted for by a mood, anxiety, or psychotic disorder and does not meet clinical criteria for dyspareunia.[25] Pain disorder involves further coding according to subtypes associated with psychological factors (acute or chronic), a general medical condition (not considered a mental disorder), or both psychological factors and a general medical condition (acute or chronic).

Although there is little doubt that a relationship between pain and certain mental disorders exists, the exact nature of the relationship is less than clear.[26] It must again be emphasized that all pain is real to the patient, and little is accomplished by challenging its validity. Because pain is experienced in the mind and requires the interpretation of bodily sensations, there is a psychological overlay with most pain experiences. It is unrealistic to try to partition pain into real and psychological types, especially when the distinction is too often based on the treating practitioner's inability to identify objective pathology. To understand fully the relationship between nociception and the psychological effects of acute and chronic pain, the practitioner must recognize emotional distress as a cause of pain (in addition to nociception) and understand that psychological mechanisms do intensify pain perception.[27] An emotional reaction to pain does not mean that the pain is caused only by an emotional problem.[28]

Psychosomatic pain has, unfortunately, become synonymous with imagined pain, but this pain may be as severe and distressing as somatogenic pain.[27] Although the threshold of pain (ie, the point at which pain is first noted) is fairly constant from person to person, the tolerance level (ie, how much pain a person can endure) is highly variable.[29] Factors such as depression, anxiety, and motivation significantly influence the tolerance for pain and may determine the amount of suffering experienced and the pain behavior exhibited. Secondary gain, or the practical advantage resulting from the symptom of pain, is not the same as malingering or factitious disorder and does not signify that pain is purely psychological in origin.[30]

The use of placebo medication or therapy to determine the reality of pain is a highly questionable practice, not to mention a potentially very costly one.[31] Because the ability to respond positively to a placebo depends on the belief system of the patient, nothing about the reality of the pain will be learned from the use of sham therapies. The only accurate conclusion about a person who responds positively to a placebo is that he or she desires pain relief and trusts someone or something to help him.[32] Interestingly, placebos are more often given to problematic or uncooperative patients than to cooperative patients who might be most likely to respond to them (personal observation).

TREATING PAIN

Overview

No single therapeutic approach manages all types of pain for all types of patients under all clinical circumstances. The various available options must be considered every time a physician attempts to control pain. Of course, the management of pain is never the sole responsibility or domain of a single discipline or specialty. Working together, cross-disciplinary approaches often provide the best clinical outcomes. Future articles in *Hospital Physician* will examine in greater depth the pharmacologic and nonpharmacologic treatment options for pain management. This brief overview serves to introduce the key concepts of pain management, primarily from a pharmacologic perspective. At the same time, one

must never underestimate the analgesic effectiveness of kind words, a gentle touch, or just being present. Being there, being available, and being able to use different treatment approaches affords patients the greatest relief from pain and suffering.

In the past, much distinction was made between the treatment of acute and chronic pain, especially between the treatment of cancer-related and non–cancer-related pain. Today, these distinctions are less clear, and more commonality exists between the various types of pain and the pharmacologic agents used to treat them. To control acute pain, anti-inflammatory drugs and opioid analgesic agents (**Table 2**) have traditionally been used.

Anti-inflammatory Drugs

For relieving any underlying inflammatory process, anti-inflammatory agents are likely to be very useful, whether they are nonsteroidal or steroidal in their composition. The use of these medications helps control the toxic chemical events leading to the sensitization of the peripheral nervous system and the further experience of pain in response to injury. Which anti-inflammatory drug is used is less important than is the fact that some agent is administered for relief of pain. Although the toxicity profiles for nonsteroidal anti-inflammatory agents vary, the ability of these agents to relieve inflammation and pain is clear. When inflammation plays a role in the development and experience of pain, then relieving the inflammation will very likely improve the pain.

Opioid Analgesic Agents

Opioid analgesic agents also can be used in the setting of acute pain; their benefits generally outweigh their few significant risks (eg, sedation, constipation, nausea, vomiting, itching, respiratory depression).[33] Providing opioid analgesic agents has become the standard of care for postoperative pain management. The optimal analgesic dose varies widely among patients, especially among age groups. There is enormous variability in the dose of opioids required to provide pain relief, even among opioid-naive patients with identical surgical lesions. This great variability underscores the need to write analgesic orders that include provisions for supplementary doses and to use intravenous boluses and infusions to provide rapid relief of severe pain.[33]

An oral route of administration is generally preferred for most patients with pain, whether acute or chronic. However, when patients cannot tolerate orally administered analgesics or when the onset of pain is so rapid that it must be treated rapidly, alternative routes (eg, rectal, buccal, sublingual, intravenous, subcutaneous, intraspinal, epidural) should be considered. The potential of the sublingual route has been successfully exploited by fentanyl and buprenorphine products but is not as well established for morphine. Moreover, the latter drug has relatively poor buccal absorption; lipophilic medications are better absorbed buccally.

Today, there is considerable interest in semisynthetic opioid agents, which avoid the known toxicity associated with meperidine and morphine. Higher doses of meperidine have caused confusion, delirium, hallucinations, and seizures because of the accumulation of the metabolite normeperidine, and patients with compromised renal function are particularly at risk for having central nervous system toxicity. Administration of naloxone does not reverse and may even exacerbate this hyperexcitability. For these reasons, meperidine should not be used as therapy for acute pain in patients who have renal or central nervous system disease and should not be given to those without such diseases for more than 48 hours or at doses greater than 600 mg/24 hours; the drug should not be prescribed for chronic pain.[33]

The traditional "gold standard" of pure single-entity opioid agents used for the management of chronic pain has generally been morphine. However, the accumulation of the morphine metabolites morphine-3-glucuronide and morphine-6-glucuronide can cause significant problems with long-term and high-dose oral morphine therapy.[34] As an alternative to morphine, oxycodone, with or without acetaminophen or aspirin, has proven to be an excellent orally administered analgesic agent. Physicians must always carefully consider the risks associated with using fixed-combination products containing a specific amount of acetaminophen (or ibuprofen) and a fixed amount of analgesic agents (ie, hydrocodone or oxycodone) over time, in light of potential hepatic and renal toxicity. Many fixed-combination opioid/acetaminophen medications contain 500 mg of acetaminophen per tablet, so patients taking 2 tablets every 4 hours are actually ingesting 6 grams of acetaminophen daily. Use of controlled-release single-entity oxycodone only, either initially or after converting from another combination opioid-containing product, allows for the continued use of the same opioid analgesic agent, from mild, through moderate, to severe pain.[35]

When medications cannot be administered orally because of swallowing difficulties, intolerance of previous analgesic agents, or unacceptable adverse effects, consideration may be given to the use of transdermal fentanyl as an alternative to starting parenteral or rectal opioids, as long as pain is stabilized and dose titration is

Table 2. Commonly Used Analgesics and Adjuvants

Generic Names	Suggested Starting Dosage*	Dosing Interval
Nonsteroidal anti-inflammatory drugs		
Acetaminophen	650 mg PO	q 4–6 h
Aspirin	650 mg PO	q 4–6 h
Ibuprofen	400–600 mg PO	q 6 h
Ketorolac	30 mg IV	q 6 h
Naproxen	250 mg PO	q 12 h
Anticonvulsant agents		
Carbamazepine	200 mg PO	q 12 h
Clonazepam	0.5 mg PO	q 8–12 h
Gabapentin	100 mg PO	q 8 h
Phenytoin	300 mg PO	Once daily at bedtime
Valproic acid	250 mg PO	q 12 h
Antidepressant agents		
Amitriptyline	10–25 mg PO	Once daily at bedtime
Desipramine	10–25 mg PO	Once daily in the morning
Imipramine	10–25 mg PO	Once daily at bedtime
Nortriptyline	10–25 mg PO	Once daily at bedtime
Paroxetine	20 mg PO	Once daily in the morning
Local anesthetic (and antiarrhythmic) agent		
Mexiletine	150 mg PO	q 8 h
Single-entity opioid analgesic agents		
Fentanyl	25 µg/h (patch)	q 3 d
Hydrocodone	20 mg PO	q 4 h
Hydromorphone	8 mg PO *or* 1.5–2 mg IV	q 4 h
Meperidine	75 mg IV	q 3 h
Morphine	10 mg IV *or* 30 mg PO	q 4 h
Oxycodone	15–20 mg PO	q 4 h

IV = intravenously; PO = orally; q = every.

*There is considerable interpatient variability when making equianalgesic conversions between agents in the same group. It is therefore advisable to convert patients to only 50% to 75% of the equianalgesic dosages. Maximum daily doses must be identified before starting treatment and should be adjusted downward for elderly, fragile, or significantly ill patients, especially those with underlying hepatic or renal dysfunction.

not needed.[36] Although fentanyl is readily absorbed through the skin, there are a few caveats to recall when selecting this "pain patch." Notably, the transdermal delivery system only works when the patch is firmly attached to the patient. No special skin preparation other than clipping the hair and placing the patch over a nondependent, fleshy area is required; "defatting" the skin with any solvents to improve the adhesiveness of the patch should be avoided, because such a step can decrease the effectiveness of the patch. Additionally, if the patient is extremely cachectic, absorption may become erratic. Temperature and reservoir concentration drive the fentanyl into the body; when the temperature is not normal, delivery is altered. During episodes of fever (eg, temperatures of 38.9°C–40°C [102°F–104°F]), during exertion in sunny and warm environments, and during exposure to external heat-producing sources (eg, heating pads, heated water beds, electric blankets, car seats in the summer), the dose delivered may exceed the dose

printed on the patch and lead to dangerous increases in serum fentanyl levels.[37] Because there is a significant lag in absorption of fentanyl through the skin, it usually takes 12 to 16 hours to see a substantial therapeutic effect and at least 48 hours to achieve steady-state blood concentrations.[38] The American Pain Society guidelines therefore recommend that patients be titrated to pain relief first with short-acting opioid agents and then switched to transdermal fentanyl.[33]

SPECIAL CONSIDERATIONS IN THE ELDERLY

There are many myths and misconceptions about pain and its management involving elderly patients. Many practitioners incorrectly assume that pain is a natural outcome of growing old. Others believe that pain perception or sensitivity decreases with age. The idea that elderly persons not reporting pain do not have pain or that elderly persons who are able to sleep do not have pain condemns many to needless suffering. Compared to younger persons, elderly persons are at greater risk for many painful conditions. Whereas the emotional suffering related to pain may be less in older persons, there is no evidence that the perception of pain diminishes with age. More importantly, older persons commonly underreport pain and often believe that it is unacceptable to show pain behavior. Opioid analgesic agents may be used safely with older people, but starting dosages may need to be adjusted because of an increased sensitivity to them. Although some older persons may be cognitively impaired, they are still able to perceive pain, so their reports of unrelieved pain must be taken seriously.[39]

Pain assessment is often more complex with elderly persons, especially when they are cognitively impaired, than with younger patients. Nevertheless, self-reports about pain are still valid and must be obtained, even from cognitively impaired patients. Practitioners must consider the likelihood of some underreporting of pain when working with cognitively impaired elderly patients; most of these patients are still able to use pain-rating scales, despite their cognitive disabilities. When patients are extremely cognitively impaired, behavioral indicators such as moaning, groaning, grimacing, protecting involved areas, and assuming certain positions or postures may prove as useful as formal pain-rating scales for determining the presence or absence of pain.[39] Altered physiologic markers (eg, tachycardia, tachypnea, hypertension) in a fearful, frightened, difficult to console cognitively impaired patient should suggest the occurrence of acute pain. Practitioners caring for elderly patients must remember that chronic pain may not lead to the same physiologic changes and behaviors, so they must be especially vigilant to detect pain.

CONCLUSION

A perceptual phenomenon such as pain is not accessible to objective validation. The subjective experience of pain is universal and among the most common reasons that patients seek clinicians' help. An extensive armamentarium of medical, surgical, psychological, social, and rehabilitative interventions is available to address pain. In order to intervene effectively, however, clinicians must have a conceptual frame of reference. A biopsychosocial model recognizing the biologic/physiologic, psychological/behavioral, and environmental influences is likely the best conceptualization and the only one able to explain all patients and their pain.[40]

Pain means suffering. It has plagued humanity for as long as humans have existed. To attempt to remedy this suffering and relieve pain, accurate assessment and diagnosis must occur. Although many pain syndromes still do not have specific therapies, the classification of pain into certain categories can enable the design of treatment approaches to benefit most patients. Over time, help for the others may also be possible.

Too few physicians actually learned how to manage pain in training. Instead, there were "one size fits all" strategies for pain management. Tradition recommended administering 1 to 2 acetaminophen or hydrocodone tablets (eg, extra-strength Tylenol, Darvocet, Lortab, Vicodin) by mouth every 4 to 6 hours as needed for mild to moderate pain and then jumping to meperidine (Demerol) 50 to 75 mg intramuscularly every 4 hours. At no time did most physicians realize that pain—and its ultimate management—was the most unique of all experiences for patients. Only now are the complexities and abilities of the mind and nervous system being called on to relieve pain. **HP**

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