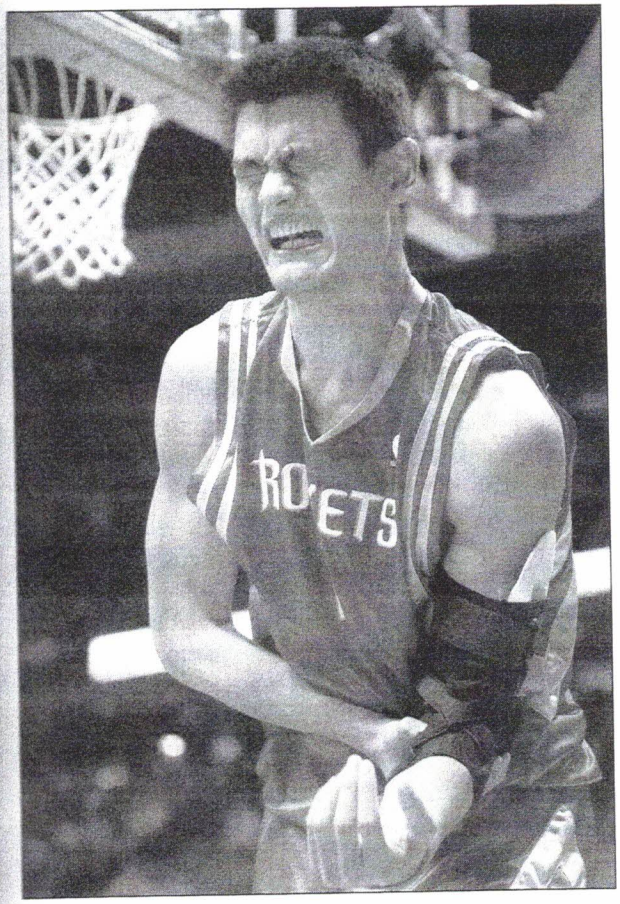
Taylor Reading

Class 5

Pain

CHAPTER 10

The Management of Pain and Discomfort

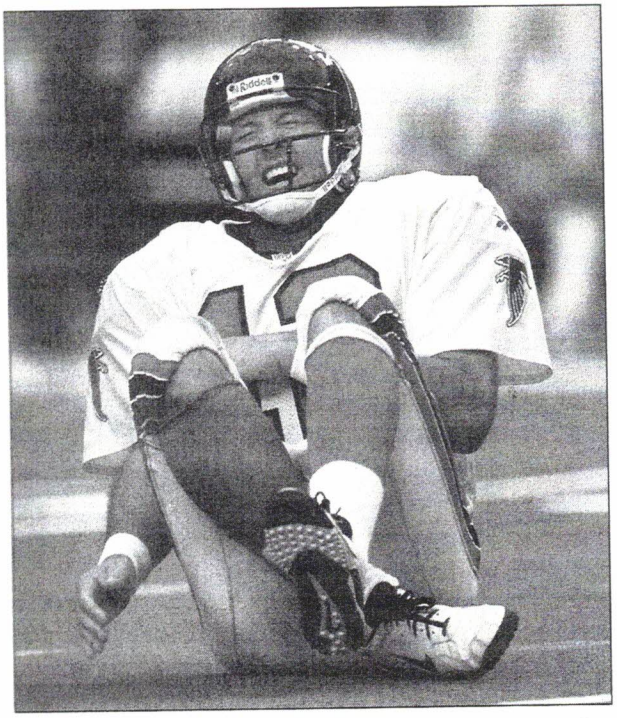


CHAPTER OUTLINE

Jesse woke up to the sun streaming in through the windows of his new home. It was his first apartment, and with a sigh of contentment, he reveled in the experience of finally being on his own. Yesterday had been a busy day. He and several of his friends had moved all the stuff he had accumulated from college up two flights of narrow stairs to his small but cozy new place. It had been a lot of work, but it had been fun. They'd had a few beers and some pizza afterward, and everyone went home tired and sore but contented.

As Jesse rolled over to admire his apartment, he experienced a sharp pain. Muttering a curse, he realized that his back had gone out on him. It must have been from carrying all those boxes. Slowly and carefully, he eased himself into first a sitting and then a standing position. He was definitely stiff, probably having aggravated injuries he had acquired during years of football. It was not the first time he had had this experience, and he knew that taking over-the-counter painkillers and moving around would help him feel better as long as he did not exert himself too much that day.

Jesse is fortunate because he is young and his pain is only short term in response to the exertion of carrying boxes and using muscles not accustomed to regular use. For many people, though, the kind of experience that Jesse has is a chronic one—that is, long term, painful, and difficult to treat. In fact, chronic back pain is one of the most common causes of disability in this country, and large numbers of middle-aged and older Americans deal with back pain on a daily or intermittent basis. Even his short-term experience led Jesse to realize that he had to moderate his physical activity the following day.



Pain is a valuable cue that tissue damage has occurred and activities must be curtailed.

Chronic pain lasting at least 6 months or longer affects 30–50 million people in the United States. Costs in disability and lost productivity add up to more than $100 billion annually (Lozito, 2004). Indeed, pain typically leads people to change their activity level and other aspects of their behavior. As this chapter explains, such pain behaviors are an important component of the pain experience. Jesse was annoyed with himself for not taking basic precautions in lifting and carrying that might have spared him this agony. For people who experience chronic pain, the emotional reactions are more likely to be anxiety and depression, and emotional reactions to pain are also integral to the pain experience.

THE SIGNIFICANCE OF PAIN

On the surface, the significance of pain would seem to be obvious. Pain hurts, and it can be so insistent that it overwhelms other, basic needs. But the significance of pain goes far beyond the disruption it produces. Although we normally think of pain as an unusual occurrence, we actually live with minor pains all the time. These pains are critical for survival because they provide low-level feedback about the functioning of our bodily systems, feedback that we then use, often unconsciously, as a basis for making minor adjustments, such as shifting our posture, rolling over while asleep, or crossing and uncrossing our legs.

Pain also has important medical consequences. It is the symptom most likely to lead an individual to seek treatment (see Chapter 8). It can exacerbate illnesses and hamper recovery from medical procedures (McGuire et al., 2006). Unfortunately, though, the relationship between pain and the severity of an underlying problem can be weak. For example, a cancerous lump rarely produces pain, at least in its early stages, yet it is of great medical importance.

Pain is also medically significant because it can be a source of misunderstanding between a patient and the medical provider. From the patient's standpoint, pain may be the problem. To the provider, in contrast, pain is a by-product of a disorder. In fact, pain is often considered by practitioners to be so unimportant that many medical schools have little systematic coverage of pain management in their curriculum. One student, reporting on his medical school experience, stated that pain had

been mentioned exactly four times in the entire 4-year curriculum, and only one lecture had even a portion of its content devoted to pain management. Until recently, pain management was considered to be somewhat incidental to the management of illness, and for some groups, such as very young infants, pain was thought not to be experienced at all, a misperception that often led to painful interventions without anesthesia (Slater et al., 2006).

Although the practitioner focuses attention on symptoms, which, from a medical standpoint, may be more meaningful, the patient may feel that an important problem is not getting sufficient attention. As we saw in Chapter 9, patients may choose not to comply with their physician's recommendations if they feel they have been misdiagnosed or if their chief symptoms have been ignored.

Pain has psychological as well as medical significance (Keefe et al., 2002). For example, both depression and anxiety worsen the experience of pain (Vowles, Zvolensky, Gross, & Sperry, 2004). When patients are asked what they fear most about illness and its treatment, the common response is pain. The dread of not being able to reduce one's own suffering arouses more anxiety than the prospect of surgery, the loss of a limb, or even death. In fact, inadequate relief from pain is the most common reason for patients' requests for euthanasia or assisted suicide (Cherny, 1996).

No introduction to pain would be complete without a consideration of its prevalence and cost. Seventy to 85% of people in the United States suffer from back pain at some time in their life, 40 million people suffer from daily arthritis pain, 45 million have chronic headaches, and the majority of patients in intermediate or advanced stages of cancer suffer moderate to severe pain (New York Presbyterian Hospital, 2007). At least $532 million is spent every year on over-the-counter drugs (ABC News, 2004). The worldwide pain management prescription drug market totaled approximately $24 billion in 2002, reaching $29 billion in 2007 (Global Information Inc., 2007). The pain business is big business, reflecting the suffering, both chronic and temporary, that millions of people experience.

THE ELUSIVE NATURE OF PAIN

Pain has been one of the more mysterious and elusive aspects of illness and its treatment. It is fundamentally a psychological experience, and the degree to which it is felt and how incapacitating it is depend in large part on how it is interpreted. Howard Beecher (1959), a physician, was one of the first to recognize this. During World War II, Beecher served in the medical corps, where he observed many wartime injuries. In treating the soldiers, he noticed a curious fact: Only one quarter of them requested

At least $532 million is spent annually in the United States on over-the-counter remedies to reduce the temporary pain of minor disorders.

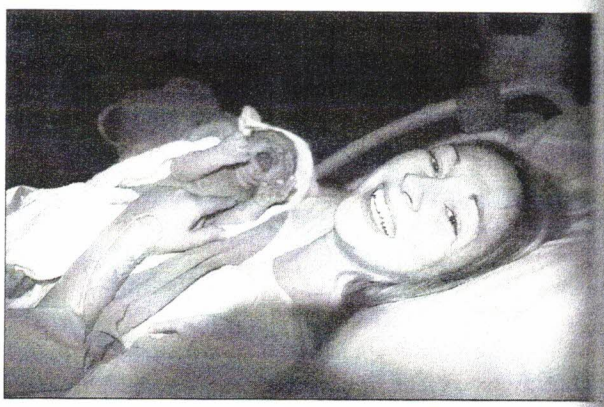
BOX

A Cross-Cultural Perspective on Pain: The Childbirth Experience

Although babies are born in every society, the childbirth experience varies dramatically from culture to culture, and so does the experience of pain associated with it. Among Mexican women, for example, the word for labor (*dolor*) means sorrow or pain, and the expectation of giving birth can produce a great deal of fear. This fear and the anticipation of pain can lead to a more painful experience with more complications than is true for women who do not bring these fears and expectations to the birthing experience (Scrimshaw, Engle, & Zambrana, 1983).

In stark contrast is the culture of Yap in the South Pacific, where childbirth is treated as an everyday occurrence. Women in Yap perform their normal activities until they begin labor, at which time they retire to a childbirth hut to give birth with the aid of perhaps one or two other women. Following the birth, there is a brief period of rest, after which the woman resumes her activities. Problematic labors and complications during pregnancy are reported to be low (Kroeber, 1948).

There is no simple and direct relationship between expectations about pain and the childbirth experience, but expectations do play an important role in how labor is experienced. Cultural lore and customs are a significant source of these expectations.



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morphine (a widely used painkiller) for what were often severe and very likely painful wounds. When Beecher returned to his Boston civilian practice, he often treated patients who sustained comparable injuries from surgery. However, in contrast to the soldiers, 80% of the civilians appeared to be in substantial pain and demanded painkillers. To make sense of this apparent discrepancy, Beecher concluded that the meaning attached to pain substantially determines how it is experienced. For the soldier, an injury meant that he was alive and was likely to be sent home. For the civilian, the injury represented an unwelcome interruption of valued activities.

Pain is also heavily influenced by the context in which it is experienced. Sports lore is full of accounts of athletes who have injured themselves on the playing field but stayed in the game, apparently oblivious to their pain. Such action may occur because sympathetic arousal, as it occurs in response to vigorous sports, seems to diminish pain sensitivity (Fillingham & Maixner, 1996; Zillman, de Wied, King-Jablonski, & Jenzowsky, 1996). In contrast, stress and psychological distress may aggravate the experience of pain (Porter et al., 1998). In addition, shut-ins who have little to occupy their time other than minding their aches and pains may feel each one acutely (Pennebaker, 1983).

Pain has a substantial cultural component. Although there are no ethnic or racial differences in the ability to discriminate painful stimuli, members from some cultures report pain sooner and react more intensely to it than individuals from other cultures (Hernandez & Sachs-Ericsson, 2006). These cultural variations may derive both from differences in norms regarding the expression of pain and in some cases from different pain mechanisms (Mechlin, Maixner, Light, Fisher, & Girdler, 2005; Sheffield, Biles, Orom, Maixner, & Sheps, 2000). An example of these kinds of cultural differences appears in Box 10.1. There are also gender differences in the experience of pain as well, with women typically showing greater sensitivity to pain (Lowery, Fillingim, & Wright, 2003).

Measuring Pain

One barrier to the treatment of pain is the difficulty people have in describing it objectively. If you have a lump, you can point to it; if a bone is broken, it can be seen in an X-ray. But pain does not have these objective referents.

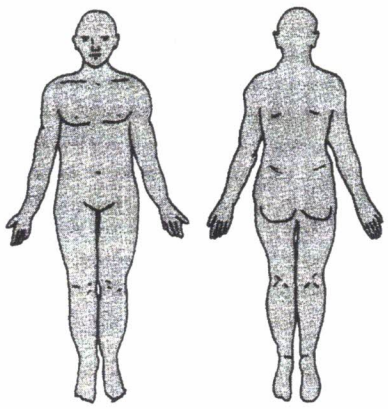
Verbal Reports One solution to measuring pain is to draw on the large, informal vocabulary that people use for describing pain. Medical practitioners usually use this source of information in trying to understand patients' complaints. A throbbing pain, for example, has different implications than does a shooting pain or a constant, dull ache.

Other researchers have developed pain questionnaires (Osman, Breitenstein, Barroos, Gutierrez, & Kopper, 2002) (Figure 10.1). Such measures typically

FIGURE 10.1 | The McGill Pain Questionnaire

Patient's name _____ Date _____ Time _____ A.M./P.M.

1 Flickering	**11** Tiring	Brief	Rhythmic	Continuous
Quivering	Exhausting	Momentary	Periodic	Steady
Pulsing	**12** Sickening	Transient	Intermittent	Constant
Throbbing	Suffocating			
Beating	**13** Fearful			
Pounding	Frightful			
2 Jumping	Terrifying			
Flashing	**14** Punishing			
Shooting	Grueling			
3 Pricking	Cruel			
Boring	Vicious			
Drilling	Killing			
Stabbing	**15** Wretched			
Lancinating	Blinding			
4 Sharp	**16** Annoying			
Cutting	Troublesome			
Lacerating	Miserable			
5 Pinching	Intense			
Pressing	Unbearable			
Gnawing	**17** Spreading			
Cramping	Radiating			
Crushing	Penetrating			
6 Tugging	Piercing			
Pulling	**18** Tight			
Wrenching	Numb			
7 Hot	Drawing			
Burning	Squeezing			
Scalding	Tearing			
Searing	**19** Cool			
8 Tingling	Cold			
Itchy	Freezing			
Smarting	**20** Nagging			
Stinging	Nauseating			
9 Dull	Agonizing			
Sore	Dreadful			
Hurting	Torturing			
Aching	PPI			
Heavy	**0** No pain			
10 Tender	**1** Mild			
Taut	**2** Discomforting			
Rasping	**3** Distressing			
Splitting	**4** Horrible			
	5 Excruciating			



E = External
I = Internal

Comments:

provide indications of the nature of pain, such as whether it is throbbing or shooting, as well as its intensity (Dar, Leventhal, & Leventhal, 1993; Fernandez & Turk, 1992). Measures have also been developed to address the psychosocial components of pain, such as the fear it causes or the degree to which it has been catastrophized, that is, has been exaggerated and become a dramatic part of life (Osman et al., 2000). Combinations of measures like these can help those who treat patients with pain to get a full picture of all the dimensions of the patient's pain.

Pain Behavior

Other measures of pain have focused on **pain behaviors**—behaviors that arise as manifestations of chronic pain, such as distortions in posture or gait, facial and audible expressions of distress, and avoidance of activity (Turk, Wack, & Kerns, 1995). Analyses of pain behaviors provide a basis for assessing how pain has disrupted the life of particular patients or groups of patients, distinguishing, for example, between how people manage low back pain versus chronic headaches.

Because pain behavior is observable and measurable, the focus on pain behaviors has helped define the characteristics of different kinds of pain syndromes. Pain is now viewed as a complex biopsychosocial event involving psychological, behavioral, and physiological components.

The Physiology of Pain

The view of pain as having psychological, behavioral, and sensory components is useful for making sense of the manifold pathways and receptors involved in the pain experience.

Overview

The experience of pain is a protective mechanism to bring into consciousness the awareness of tissue damage. At the time of the pain experience, however, it is unlikely to feel very protective. Unlike other bodily sensations, the experience of pain is accompanied by motivational and behavioral responses, such as withdrawal, and intense emotional reactions, such as crying or fear. These experiences are an integral part of the pain experience and thus become important in its diagnosis and treatment.

Scientists have distinguished among three kinds of pain perception. The first is mechanical **nociception**—pain perception—that results from mechanical damage to the tissues of the body. The second is thermal damage, or the experience of pain due to temperature exposure. The third is referred to as polymodal nociception, a general category referring to pain that triggers chemical reactions from tissue damage.

Nociceptors in the peripheral nerves first sense injury and, in response, release chemical messengers which are conducted to the spinal cord, where they are passed directly to the reticular formation and thalamus and into the cerebral cortex. These regions of the brain, in turn, identify the site of the injury and send messages back down the spinal column, which lead to muscle contractions, which can help block the pain and change in other bodily functions, such as breathing.

Two major types of peripheral nerve fibers are involved in nociception. A-delta fibers are small, myelinated fibers that transmit sharp pain. They respond especially to mechanical or thermal pain, transmitting sharp, brief pains rapidly. C-fibers are unmyelinated nerve fibers, involved in polymodal pain, that transmit dull, aching pain. (Myelination increases the speed of transmission, so sudden, intense pain is more rapidly conducted to the cerebral cortex than is the slower, dull, aching pain of the C-fibers.)

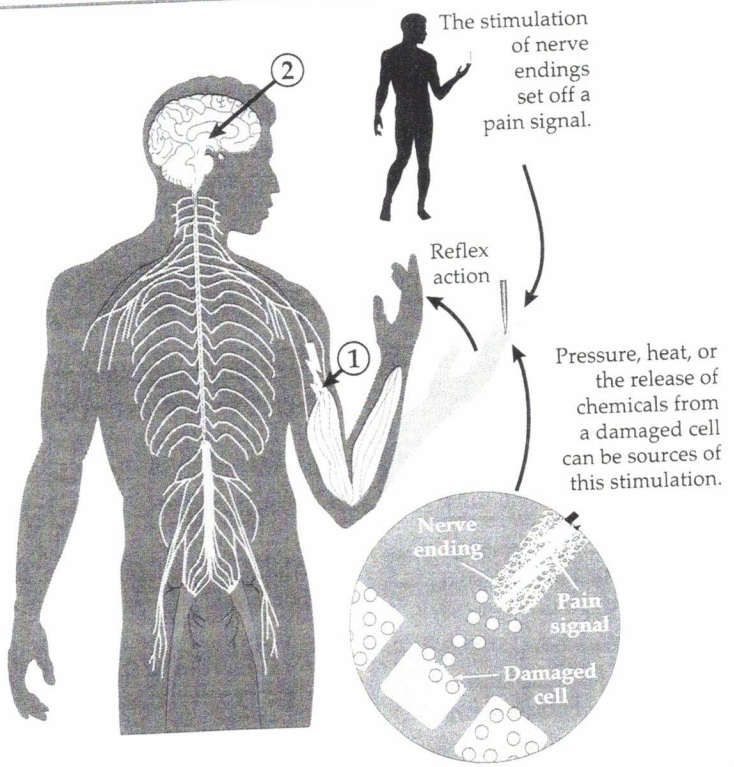
Peripheral nerve fibers enter the spinal column at the dorsal horn. Sensory aspects of pain are heavily determined by activity in the A-delta fibers, which project onto areas in the thalamus and the sensory areas of the cerebral cortex.

The motivational and affective elements of pain appear to be influenced more strongly by the C-fibers, which project onto different thalamic, hypothalamic, and cortical areas. The experience of pain, then, is determined by the balance of activity in these nerve fibers, which reflects the pattern and intensity of stimulation.

Several other regions of the brain are also involved in the modulation of pain. The periductal gray, a structure in the midbrain, has been tied to pain relief when it is stimulated. Neurons in the periductal gray connect to the reticular formation in the medulla, which makes connections with the neurons in the substantia gelatinosa of the dorsal horn of the spinal cord. Sensations are modulated by the dorsal horn in the spinal column and by downward pathways from the brain that interpret the pain experience. Inflammation that originally occurs in peripheral tissue may be amplified, as pain-related information is conveyed to the spinal dorsal horn (Ikeda et al., 2006).

Processes in the cerebral cortex are involved in cognitive judgments about pain, including the evaluation of its meaning. The psychological and neural mechanisms of the affective dimension of pain are a critical aspect of the pain experience. The affective dimension of pain is made up of feelings of unpleasantness and negative emotions associated with future concerns. Researchers call these concerns secondary affect (Price, 2000).

FIGURE 10.2 | The Experience of Pain
The signal goes to the spinal cord, where it passes immediately to a motor nerve ① connected to a muscle, in this case, in the arm. This causes a reflex action that does not involve the brain. But the signal also goes up the spinal cord to the thalamus ②, where the pain is perceived.



Pain sensation, intensity, and duration interact to influence pain, its perceived unpleasantness, and related emotions through a central network of pathways in the limbic structures and the thalamus, which direct their inputs to the cortex. In the cortical regions of the brain, nociceptive input is integrated with contextual information about the painful experience, which contributes to the strong emotions often experienced during pain and which can themselves exacerbate pain (Meagher, Arnau, & Rhudy, 2001). The overall experience of pain, then, is a complex outcome of the interaction of these elements of the pain experience (Figure 10.2). An example of just how complex pain and its management can be is provided in Box 10.2.

Neurochemical Bases of Pain and Its Inhibition

The brain can control the amount of pain an individual experiences by transmitting messages back down the spinal cord to block the transmission of pain signals. One landmark study that confirmed this hypothesis was conducted by D. V. Reynolds (1969). He demonstrated that, by electrically stimulating a portion of a rat brain, one could produce such a high level of analgesia that the animal would not feel the pain of abdominal surgery, a phenomenon termed stimulation-produced analgesia (SPA). Reynolds's findings prompted researchers to look for the neurochemical basis of this effect, and in 1972, H. Akil, D. J. Mayer, and J. C. Liebeskind (1972, 1976) uncovered the existence of endogenous opioid peptides.

What are **endogenous opioid peptides?** Opiates, including heroin and morphine, are drugs manufactured from plants that help control pain. Opioids are opiate-like substances produced within the body that constitute a neurochemically based, internal pain regulation system. Opioids are produced in many parts of the brain and glands of the body, and they project onto specific selective receptor sites in various parts of the body.

BOX

Phantom Limb Pain: A Case History

Nerve injury of the shoulder is becoming increasingly common because motorcycles are widely accessible and, all too often, their power is greater than the skill of their riders. On hitting an obstruction, the rider is catapulted forward and hits the road at about the speed the bike was traveling. In the most severe of these injuries, the spinal roots are avulsed—that is, ripped out of the spinal cord—and no repair is possible.

C. A., age 25, an Air Force pilot, suffered such an accident. After 8 months, he had completely recovered from the cuts, bruises, and fractures of his accident. There had been no head injury, and he was alert, intelligent, and busy as a student shaping a new career for himself. His right arm was completely paralyzed from the shoulder down, and the muscles of his arm were thin. In addition, the limp arm was totally anesthetic [illegible] that he had no sensation of any stimuli applied to it. [illegible] being questioned, he stated that he could sense [illegible] clearly an entire arm, but it had no relationship to [illegible] real arm. This "phantom" arm seemed to him to [illegible] placed across his chest, while the real, paralyzed [illegible] hung at his side. The phantom never moved and [illegible] fingers were tightly clenched in a cramped fist, with [illegible] nails digging into the palm. The entire arm felt [illegible] though it was on fire." Nothing has helped his condition, and he finds that he can control the pain only [illegible] absorbing himself in his work.

Source: Melzack & Wall, 1982, pp. 21–22.

The endogenous opioid peptides fall into three general families:

1. Beta-endorphins, which produce peptides that project to the limbic system and brain stem, among other places
2. Proenkephalin, which are peptides that have widespread neuronal, endocrine, and central nervous system distributions
3. Prodynorphins, found in the gut, the posterior pituitary, and the brain (Akil et al., 1984)

Each of these families of opioids has several forms with differing potencies, pharmacological profiles, and receptor selectivities (Akil et al., 1984). For example, one opioid receptor may be receptive to beta-endorphins but not to proenkephalin or prodynorphins. Thus, the system of endogenous opioid peptides in the body is highly complex.

Endogenous opioid peptides, then, are important in the natural pain suppression system of the body. Clearly, however, this pain suppression system is not always in operation. Particular factors must trigger its arousal. Research on animals suggests that stress is one such factor. Acute stress reduces sensitivity to pain. This phenomenon is called stress-induced analgesia (SIA), and research demonstrates that SIA can be accompanied by an increase in brain endogenous opioid peptides (Lewis, Terman, Shavit, Nelson, & Liebeskind, 1984).

The release of endogenous opioid peptides may be one of the mechanisms underlying various techniques of pain control (Bolles & Fanselow, 1982). Because opioids are powerful analgesics, they are now used to treat chronic pain, including that due to malignancies (Brody, 2002).

CLINICAL ISSUES IN PAIN MANAGEMENT

Historically, pain has been managed by physicians and other health care workers. Traditional pain management methods include pharmacological, surgical, and sensory techniques. Increasingly, psychologists have become involved in pain management, and as a result, techniques that include a heavily psychological component have been used to combat pain. These techniques include biofeedback, relaxation, hypnosis, acupuncture, distraction, and guided imagery. As these methods have gained prominence in the treatment of pain, the importance of patients' self-management, involving responsibility for and commitment to the course of pain treatment, has assumed centrality in the management of chronic pain (Glenn & Burns, 2003).

Acute and Chronic Pain

There are two main kinds of clinical pain: acute and chronic. **Acute pain** typically results from a specific injury that produces tissue damage, such as a wound or broken limb. As such, it is self-limiting and typically disappears when the tissue damage is repaired. Jesse's pain, from moving into his new apartment, is an example of acute pain. Acute pain is usually short in duration and is defined as pain that goes on for 6 months or

less. While it is going on, it can produce substantial anxiety and prompt its sufferer to engage in an urgent search for relief. The pain decreases and anxiety dissipates once painkillers are administered or the injury begins to heal.

Types of Chronic Pain

Chronic pain typically begins with an acute episode, but unlike acute pain, it does not decrease with treatment and the passage of time. There are several different kinds of chronic pain. **Chronic benign pain** typically persists for 6 months or longer and is relatively unresponsive to treatment. The pain varies in severity and may involve any of a number of muscle groups. Chronic low back pain and myofascial pain syndrome are examples.

Recurrent acute pain involves a series of intermittent episodes of pain that are acute in character but chronic inasmuch as the condition persists for more than 6 months. Migraine headaches, temporomandibular disorder (involving the jaw), and trigeminal neuralgia (involving spasms of the facial muscles) are examples.

Chronic progressive pain persists longer than 6 months and increases in severity over time. Typically, it is associated with malignancies or degenerative disorders, such as cancer or rheumatoid arthritis. More than 130 million Americans suffer from chronic pain at any given time (American Occupational Therapy Association, 2002), with back pain being the most common (Table 10.1). Chronic pain is not necessarily present every moment, but the fact that it is chronic virtually forces sufferers to organize their lives around it.

Acute Versus Chronic Pain

The distinction between acute and chronic pain is important in clinical management for several reasons. First, acute and chronic pain present different psychological profiles because chronic pain often carries an overlay of psychological distress, which complicates diagnosis and treatment. The realization that pain is interfering with desired activities and the perception that one has little control over that fact produce psychological distress in pain patients (Maxwell, Gatchel, & Mayer, 1998). Depression, anxiety, and anger are common and may exacerbate pain and pain-related behaviors (Lautenbacher, Spernal, Schreiber, & Krieg, 1999; Plehn, Peterson, & Williams, 1998). One study found that pain is present in two-thirds of patients who seek care from physicians with primary symptoms of depression (Bair et al., 2004). Thus, pain and depression appear to be heavily intertwined.

Some chronic pain patients develop maladaptive coping strategies, such as catastrophizing their illness, engaging in wishful thinking, or withdrawing socially, which can further complicate treatment and lead to more care seeking (Severeijns, Vlaeyen, van der Hout, & Picavet, 2004). When patients have endured their pain for long periods of time without any apparent relief, it is easy to imagine that the pain will only get worse and be a constant part of the rest of their life—beliefs that magnify the distress of chronic pain and feed back into the pain itself (Tennen, Affleck, & Zautra, 2006). When these psychological issues are effectively treated, this fact may in itself reduce chronic pain (Fishbain, Cutler, Rosomoff, & Rosomoff, 1998). The sheer duration of chronic pain can account for the fact that many chronic pain patients become nearly completely disabled over the course of their pain treatment (Groth-Marnat & Fletcher, 2000).

A second reason to distinguish between acute and chronic pain is that most of the pain control techniques presented in this chapter work well to control acute pain but are less successful with chronic pain, which requires multiple individualized techniques for its management.

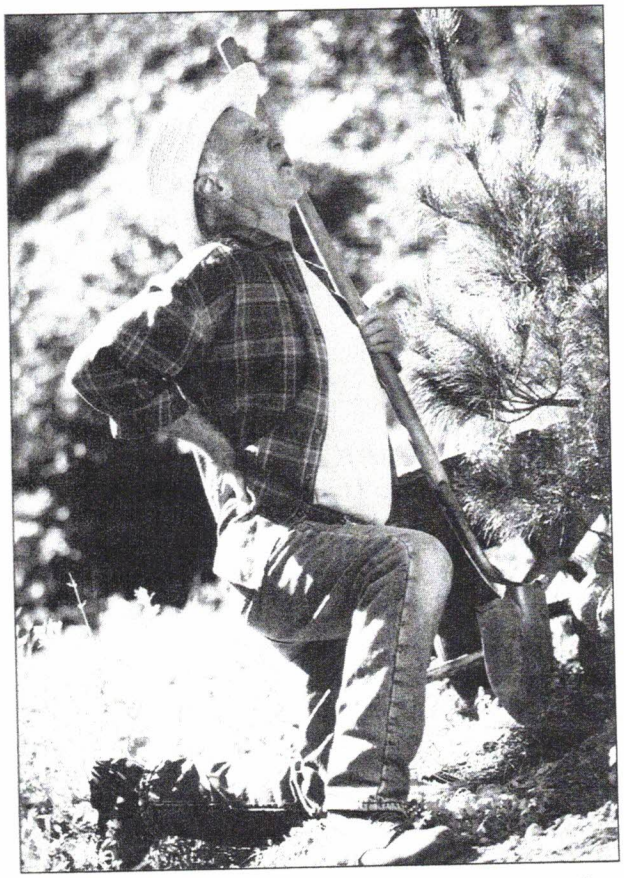
Third, chronic pain involves the complex interaction of physiological, psychological, social, and behavioral components, more than is the case with acute pain. For example, chronic pain patients often experience social rewards from the attention they receive from family members, friends, or even employers; these social rewards, or secondary gains, of pain can help maintain pain behaviors (Osterhaus, Lange, Linssen, & Passchier, 1997).

The psychological and social components of pain are important in part because they are an integral aspect of the experience of pain and influence the likelihood of

TABLE 10.1 | Common Sources of Chronic Pain

- Back pain—70–85% of Americans have back trouble at some point in their lives.
- Headaches—approximately 45 million Americans have chronic recurrent headaches.
- Cancer pain—the majority of advanced cancer patients suffer moderate to severe pain.
- Arthritis pain—arthritis affects 40 million Americans.
- Neurogenic pain—pain resulting from damage to peripheral nerves or the central nervous system.
- Psychogenic pain—pain not due to a physical cause.

Source: National Institute of Neurological Disorders and Stroke, 2007.



More than 130 million Americans, many of them elderly, suffer from chronic pain.

successful pain programs (Burns, 2000). As such, chronic pain management is complicated and must be thought of not as a particular pain that simply goes on for a long time but as an unfolding physiological, psychological, and behavioral experience that evolves over time into a syndrome (Flor, Birbaumer, & Turk, 1990).

Who Becomes a Chronic Pain Patient?

Of course, all chronic pain patients were once acute pain patients. What determines who makes the transition to chronic pain? One might assume that pain intensity is implicated in the transition into chronic pain, but, in fact, functional disability appears to play a more important role. Patients for whom pain interferes with life activities make the transition into the chronic pain experience (Epping-Jordan et al., 1998). Chronic pain patients may experience pain especially strongly because of high sensitivity to noxious stimulation, impairment in pain regulatory systems, and an overlay of psychological distress (Sherman et al., 2004).

Unlike acute pain, chronic pain usually has been treated through a variety of methods, used both by patients themselves and by physicians. Chronic pain may be exacerbated by inappropriate prior treatments, by misdiagnosis, and/or by inappropriate prescriptions of medications (Kouyanou, Pither, & Wessely, 1997).

The Lifestyle of Chronic Pain

By the time a pain patient is adequately treated, this complex, dynamic interaction of physiological, psychological, social, and behavioral components is often tightly integrated, making it difficult to modify (Flor et al., 1990). The following case history suggests the disruption and agony that can be experienced by the chronic pain sufferer:

> A little over a year ago, George Zessi, 54, a New York furrier, suddenly began to have excruciating migraine headaches. The attacks occurred every day and quickly turned Zessi into a pain cripple. "I felt like I was suffering a hangover each morning without even having touched a drop. I was seasick without going near a boat," he says. Because of the nausea that often accompanies migraines, Zessi lost fifty pounds. At his workshop, Zessi found himself so sensitive that he could not bear the ringing of a telephone. "I was incapacitated. It was difficult to talk to anyone. On weekends, I couldn't get out of bed," he says. A neurologist conducted a thorough examination and told Zessi he was suffering from tension. He took several kinds of drugs, but they did not dull his daily headaches. (Clark, 1977, p. 58)

As this case history suggests, chronic pain can entirely disrupt a person's life. Many such sufferers have left their jobs, abandoned their leisure activities, withdrawn from their families and friends, and developed an entire lifestyle around pain. Typically, chronic pain sufferers have little social or recreational life and may even have difficulty performing simple tasks of self-care. Because their income is often reduced, their standard of living may decline, and they may need public assistance. Their lifestyle becomes oriented around the experience of pain and its treatment. A good night's sleep is often elusive for months or years at a time (Currie, Wilson, & Curran, 2002). Work-related aspirations and personal goals may be set aside because life has become dominated by chronic pain (Karoly & Ruehlman, 1996). Therefore, the loss of self-esteem that is experienced by these patients can be substantial.

Some patients receive compensation for their pain because it has resulted from an injury, such as an automobile accident. Compensation can actually increase

the perceived severity of pain, the amount of disability experienced, the degree to which pain interferes with life activities, and the amount of distress that is reported (Ciccone, Just, & Bandilla, 1999; Groth-Marnat, & Fletcher, 2000) because it provides an incentive for being in pain.

The Toll of Pain on Relationships

Chronic pain can take a special toll on marriage and other family relationships. Chronic pain patients often do not communicate well with their families, and sexual relationships almost always deteriorate. Ironically, among those chronic pain patients whose spouses remain supportive, such positive attention may inadvertently maintain or increase expression of pain and the experience of disability (Ciccone, Just, & Bandilla, 1999; Turk, Kerns, & Rosenberg, 1992).

Social relationships, in addition to the marital relationship, can be threatened by chronic pain as well. The resulting reduction in social contact that pain patients experience may contribute to their tendency to turn inward and become self-absorbed. Neurotic behavior, including preoccupation with physical and emotional symptoms, can result. Pain patients often have to deal with negative stereotypes that physicians and other providers hold about chronic pain patients, and this experience, too, may exacerbate adverse psychological responses to pain (Marbach, Lennon, Link, & Dohrenwend, 1990). Many chronic pain patients are clinically depressed; a large number have also contemplated or attempted suicide.

Chronic Pain Behaviors

Chronic pain leads to a variety of pain-related behaviors that can also maintain the pain experience. For example, sufferers may avoid loud noises and bright lights, reduce physical activity, and shun social contacts. These alterations in lifestyle then become part of the pain problem and may persist and interfere with successful treatment (Philips, 1983). Understanding what pain behaviors an individual engages in, knowing whether they persist after the treatment of pain, and determining how they can be eliminated are important factors in treating the total pain experience.

Pain and Personality

Because psychological factors are so clearly implicated in the experience of pain, and because at least some pain serves clear functions for the chronic pain sufferer, researchers have examined whether there is a **pain-prone personality**—a constellation of personality traits that predispose a person to experience chronic pain.

Research suggests that this hypothesis is too simplistic. First, pain itself can produce alterations in personality that are consequences, not causes, of the pain experience. Second, individual experiences of pain are far too varied and complex to be explained by a single personality profile. Nonetheless, certain personality correlates are reliably associated with chronic pain, including neuroticism, introversion, and the use of passive coping strategies (Ramirez-Maestre, Lopez–Martinez, & Zarazaga, 2004). Because findings like these provide clues to the treatment of pain, researchers have continued to refine their understanding of profiles of pain patients.

Pain Profiles

Developing psychological profiles of different groups of pain patients has proven to be helpful for treatment. Although these profiles are not thought of as pain-prone personalities, they are useful in specifying problems that patients with particular types of pain have or may develop.

To examine these issues, researchers have drawn on a variety of personality instruments, especially the Minnesota Multiphasic Personality Inventory (MMPI) (Johansson & Lindberg, 2000). Chronic pain patients typically show elevated scores on three MMPI subscales: hypochondriasis, hysteria, and depression. This constellation of factors is commonly referred to as the "neurotic triad" because it frequently shows up in the personality profiles of patients with neurotic disorders as well.

Depression reflects the feelings of despair or hopelessness that can often accompany long-term experience with unsuccessfully treated pain. Pain does not appear to be a sufficient condition for the development of depression, but rather leads to a reduction in activity level and in perceptions of personal control or mastery, which, in turn, can lead to depression (Nicassio, Radojevic, Schoenfeld-Smith, & Dwyer, 1995). Depression also increases perceptions of pain (Dickens, McGowan, & Dale, 2003), and so it can feed back into the total pain experience, both aggravating the pain itself and increasing the likelihood of debilitating pain behaviors, such as leaving work (Linton & Buer, 1995). This profile has implications for the treatment of pain because interventions with depressed pain patients must address chronic depression and the thought disorders that result, in addition to the pain itself (Ingram, Atkinson, Slater, Saccuzzo, & Garfin, 1990).

Chronic pain is also associated with other forms of psychopathology including anxiety disorders, substance use disorders, and other psychiatric problems (Nash, Williams, Nicholson, & Trask, 2006; Vowles, Zvolensky, Gross, & Sperry, 2004). The reason chronic pain and psychopathology are so frequently associated is not fully known. One possibility is that chronic pain activates and exacerbates a latent psychological vulnerability that was not previously recognized, leading to diagnosable psychopathology (Dersh, Polatin, & Gatchel, 2002).

Pain and Stereotyped Responses to Stress

Chronic pain may result from a predisposition to respond to a bodily insult with a specific bodily response, such as tensing one's jaw or altering one's posture. This response may then be exacerbated by stress. The chronic jaw pain or back pain that may result can be aggravated by inadequate coping, further exacerbating the pain syndrome and leading to pain behaviors that occur in the process of attempting to cope with pain (for example, taking time off from work or cutting back on activities in the home).

For example, patients suffering from myofascial pain dysfunction syndrome (a set of disorders in which the chronic pain originates within the head or neck muscles) show increased activity in particular facial muscles in response to stress (Kapel, Glaros, & McGlynn, 1989). Other research suggests distinctive patterns of cephalic blood flow for people predisposed to muscle contraction or migraine headaches in response to stress (Haynes, Gannon, Bank, Shelton, & Goodwin, 1990).

Knowing that these distinctive patterns are aggravated by stress provides the potential for pain management that teaches patients to recognize the sources of stress in their lives and to cope in ways that counteract their stereotypic bodily responses to stress.

PAIN CONTROL TECHNIQUES

We now turn to pain control techniques, examining individual techniques that have been used to reduce or control pain. What exactly is pain control? **Pain control** can mean that a patient no longer feels anything in an area that once hurt. It can mean that the person feels sensation but not pain. It can mean that he or she feels pain but is no longer concerned about it. Or it can mean that he or she is still hurting but is now able to tolerate it.

Some pain control techniques work because they eliminate feeling altogether (for example, spinal blocking agents), whereas others may succeed because they reduce pain to sensation (such as sensory control techniques), and still others succeed because they enable patients to tolerate pain more successfully (such as the more psychological approaches). It will be useful to bear these distinctions in mind as we evaluate the success of individual techniques in the control of pain.

Pharmacological Control of Pain

The traditional and most common method of controlling pain is through the administration of drugs. In particular, morphine (named after Morpheus, the Greek god of sleep) has been the most popular painkiller for decades (Melzack & Wall, 1982). A highly effective painkiller, morphine does have the disadvantage of addiction, and patients may build up a tolerance to it. Nonetheless, it is a mainstay of pain control, especially in the case of severe pain.

Any drug that can influence neural transmission is a candidate for pain relief. Some drugs, such as local anesthetics, can influence transmission of pain impulses from the peripheral receptors to the spinal cord. The application of an analgesic to a wound is an example of this approach. The injection of drugs, such as spinal blocking agents that block the transmission of pain impulses up the spinal cord, is another method.

Pharmacological relief from pain may also be provided by drugs that act directly on higher brain regions involved in pain. Antidepressants, for example, combat pain not only by reducing anxiety and improving mood but also by affecting the downward pathways from the brain that modulate pain. As such, antidepressant administration is often a successful pain reduction technique for depressed pain patients, as well as for pain patients not showing clinical signs of depression.

Sometimes pharmacological treatments make the pain worse rather than better. Patients may consume large quantities of painkillers that are only partially effective and that have a variety of undesirable side effects, including inability to concentrate and addiction. Nerve-blocking agents may be administered to reduce pain, but these can also produce side effects, including anesthesia, limb paralysis, and loss of bladder control; moreover, even when they are successful, the pain will usually return within a short time.

The main concern practitioners have about the pharmacological control of pain is addiction. However,

BOX 10.3

Managing Pain . . . or Not

The management of pain in the hospital setting is controversial. Many physicians and other medical providers fear that if patients receive too much medication during their hospitalizations, they will become addicted to painkillers (Rose, DeVellis, Howard, & Mutran, 1996). As a result, in hospital settings, patients are often undermedicated, and pain is a significant problem.

In recent years, many prominent pain researchers have called for the reevaluation of these policies. The rate of addiction among people hospitalized for surgeries or other procedures who have received painkillers on a short-term basis is very small. Addiction, quite simply, is not a risk for most people. Moreover, consider the following letters to the editor of *Time* magazine following an article on precisely this problem:

> My father died in 1994 after a long illness. In the end, his heart simply wore out, and morphine was the wonderful drug that allowed him to relax and breathe easily. My father wasn't "snowed under" but, rather, was kept comfortable with small doses as needed. He no longer worried about dying (as he had for years), because he felt good mentally, emotionally, and physically. And when his time came, he died in peace.

> When I had an operation several years ago, I asked my surgeon to start giving me pain killers while I was still in surgery, since I had read that this procedure would help curb post-operative pain. Not only did he do so, but he also gave me a morphine pump so I could administer my own pain medication. But most important, I was controlling a part of my recuperation. I didn't end up a drug addict and was out of the hospital sooner than expected.

These reports are not unusual, and increasingl medical providers are finding that proper medicatio for pain is not the risky venture it was once thought be and that patients can participate actively and r sponsibly in controlling the amount of medicatio they receive.

it now appears that this threat is less than was once thought to be the case. One estimate is that about 15% of patients with cancer-related pain and as many as 80% with noncancer chronic pain do not receive sufficient pain medication, leading to a cycle of stress, distress, and disability (Chapman & Gavrin, 1999). In three studies involving 25,000 patients treated with opioids who had no history of drug abuse, only seven cases of addiction were reported (Brody, 2002), suggesting that the concern over addiction is indeed exaggerated. (Box 10.3 pursues this issue further.) Even long-term use of prescription pain drugs for such conditions as arthritis appears to produce very low rates of addiction.

However, concerns about potential addiction are so great that patients with legitimate complaints requiring pain medication are often undermedicated. At present, this issue is one of the most controversial and significant ones faced by researchers and practitioners concerned with pain management.

Surgical Control of Pain

The surgical control of pain also has an extensive history. Surgical treatment involves cutting or creating lesions in the so-called pain fibers at various points in the body so that pain sensations can no longer be conducted. Some surgical techniques attempt to disrupt the conduct pain from the periphery to the spinal cord; others designed to interrupt the flow of pain sensations fr the spinal cord upward to the brain.

Although these surgical techniques are sometir successful in reducing pain temporarily, the effects often short-lived. Therefore, many sufferers who h submitted to one or more operations to reduce pain gain only short-term benefits, at substantial cost: the ri possible side effects, and tremendous expense of surg It is now believed that the nervous system has substa regenerative powers and that blocked pain impulses their way to the brain via different neural pathways.

Moreover, there is some indication that surgery ultimately worsen the problem because it damage nervous system, and this damage can itself be a cause of chronic pain. Hence, whereas surgical t ment for pain was once relatively common, resear and practitioners are increasingly doubtful of its even as a treatment of last resort.

Sensory Control of Pain

One of the oldest known techniques of pain con **counterirritation,** a sensory method. Counter tion involves inhibiting pain in one part of the

by stimulating or mildly irritating another area. The next time you hurt yourself, you can demonstrate this technique on your own (and may have done so already) by pinching or scratching an area of your body near the part that hurts. Typically, the counterirritation produced when you do this will suppress the pain to some extent.

This common observation has been increasingly incorporated into the pain treatment process. An example of a pain control technique that uses this principle is dorsal column stimulation (Nashold & Friedman, 1972). A set of small electrodes is placed or implanted near the point at which the nerve fibers from the painful area enter the spinal cord. When the patient experiences pain, he or she activates a radio signal, which delivers a mild electrical stimulus to that area of the spine, thus inhibiting pain. Sensory control techniques have had some success in reducing the experience of pain. However, their effects are often only short-lived, and they may therefore be appropriate primarily for temporary relief from acute pain or as part of a general regimen for chronic pain.

In recent years, pain management experts have turned increasingly to exercise and other ways of increasing mobility to help the chronic pain patient. At one time, it was felt that the less activity, the better, so that healing could take place. In recent years, however, exactly the opposite philosophy has held sway, with patients urged to stay active to maintain their functioning. This approach has been especially successful with older people managing the discomfort of musculoskeletal disorders (Avlund, Osler, Damsgaard, Christensen, & Schroll, 2000).

We now turn to psychological techniques for the management of pain. Unlike the pharmacological, surgical, and sensory pain management techniques considered so far, these more psychological techniques require active participation and learning on the part of the patient. Therefore, they are more effective for managing slow-rising pains, which can be anticipated and prepared for, than sudden, intense, or unexpected pains.

Biofeedback

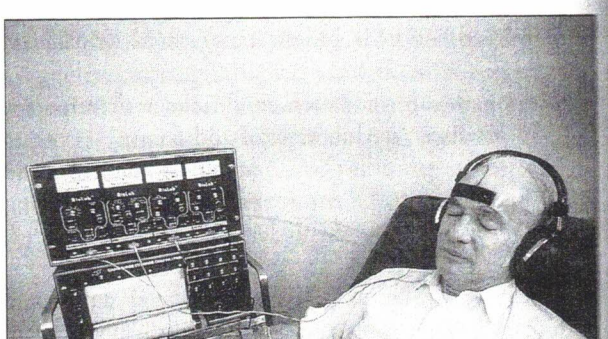
Biofeedback, a method of achieving control over a bodily process, has been used to treat a variety of health problems, including stress (see Chapter 6) and hypertension (see Chapter 13). It has also been used as a pain control technique.

What is Biofeedback?

Biofeedback comprises a wide variety of techniques that provide biophysiological feedback to a patient about some bodily process of which the patient is usually unaware. Biofeedback training can be thought of as an operant learning process. First, a target body function to be brought under control, such as blood pressure or heart rate, is identified. This function is then tracked by a machine, and information about the function is passed on to the patient. For example, heart rate might be converted into a tone, so the patient can hear how quickly or slowly his or her heart is beating. The patient then attempts to change the bodily process. Through trial and error and continuous feedback from the machine, the patient learns what thoughts or behaviors will modify the bodily function.

Thus, for example, a patient might learn that blocking out all sounds, concentrating, and breathing slowly help reduce heart rate. Although it is not always clear to the patient exactly what he or she is doing that achieves success, the patient may still become proficient at controlling a bodily function that was once automatic. Once patients are able to bring a process under bodily control with feedback from the machine, they can usually come to make the same changes on their own, without the need for the machine.

Biofeedback has been used to treat a number of chronic disorders, including Reynaud's disease (a disorder of the cardiovascular system in which the small arteries in the extremities constrict, limiting blood flow and producing a cold, numb aching), temporomandibular joint pain (Glaros & Burton, 2004), hypertension (see Chapter 13), and a broad array of pains (Mishra, Gatchel, & Gardea, 2000).



Biofeedback has been used successfully to treat muscle-tension headaches, migraine headaches, and Reynaud's disease. However, evidence to date suggests that other, less expensive relaxation techniques may be equally successful.

BOX 10.4

Using Relaxation to Combat Pain

The following are case histories of patients treated with relaxation to reduce pain that, in some instances, proved resistant to other pain control methods.

CASE 1

A 65-year-old ex-steeplejack was hospitalized for evaluation of increasingly severe intermittent chest pain which had been present for over 10 years. An extensive workup revealed esophagitis (inflammation of the esophagus). The patient used relaxation exercises frequently both for general relaxation and for relief of moderate pain. "I get into it and just sort of forget all about the pain." Over a period of six months, he found the method very useful. "If I catch the pain early enough, I can stop it before it gets too bad." He typically used the method for 10 to 15 minutes, following which he went directly to sleep.

CASE 2

A dramatic response was seen in a 22-year-old man who was hospitalized following extensive bullet wounds in the abdomen and hip. During the three months of hospitalization, he suffered severe pain, which responded partially to surgery. He was anxious, depressed, irritable, and occasionally panicky due to the continual pain. He ate poorly and steadily lost weight. Using relaxation, he was able to sleep if the pain was not severe. He stated, "I stay there as long as I can—may be 30 minutes. The trouble is, I go to sleep." There was a marked improvement in his general mood and he began eating well.

Source: French & Tupin, 1974, pp. 283, 285.

Does Biofeedback Work? How successful is biofeedback in treating pain patients? Despite widely touted claims for its efficacy, there is only modest evidence that it is effective in reducing pain (White & Tursky, 1982). Even when biofeedback is effective, it may be no more so than less expensive, more easily used techniques, such as relaxation (Blanchard, Andrasik, & Silver, 1980; Bush, Ditto, & Feuerstein, 1985).

In addition, when biofeedback training is successful, it is not clear exactly why. There is little evidence that success at controlling a target process and corresponding reduction of pain are related, which raises the possibility that the beneficial effects of biofeedback result from something other than modification of the target process—perhaps relaxation, suggestion, an enhanced sense of control, or even a placebo effect.

Relaxation Techniques

Relaxation training has been employed with pain patients extensively, either alone or in concert with other pain control techniques. Originally developed to treat anxiety-related disorders (Jacobson, 1938), relaxation is known to promote coping with stress (see Chapter 6). One rationale for teaching pain patients relaxation techniques, then, is that it enables them to cope more successfully with stress and anxiety, which may also ameliorate pain.

Relaxation may also affect pain directly. For example, the reduction of muscle tension or the diversion of blood flow induced by relaxation may reduce pains that are tied to these physiological processes.

What Is Relaxation? In relaxation, an individual shifts his or her body into a state of low arousal by progressively relaxing different parts of the body. Controlled breathing is another component of relaxation, in which breathing shifts from relatively short, shallow breaths to deeper, longer breaths. Anyone who has been trained in prepared childbirth techniques will recognize that these procedures are used for pain management during early labor.

An alternative method of inducing relaxation is through meditation. In this process, a person attempts to focus attention fully on some very simple and usually unchanging stimulus. For example, one may repeat a very simple syllable (such as "Om") slowly over and over again; this process is used in transcendental meditation, and the syllable is called a mantra. Box 10.4 gives two examples of the use of relaxation in pain control.

Does Relaxation Work? How successful have relaxation strategies been in the management of pain? Meditation per se does not appear to work, primarily because it does not reliably achieve the target state of relaxation (Holmes, 1981). Relaxation is modestly successful with some acute pains and may be of value in treating chronic pain when used in conjunction with other methods of pain control. Some of the beneficial

physiological effects of relaxation training may be due to the release of endogenous opioid mechanisms, and there seem to be some beneficial effects of relaxation on immune system functioning as well (McGrady et al., 1992; Van Rood, Bogaards, Goulmy, & von Houwelingen, 1993).

Hypnosis

Hypnosis is one of the oldest techniques for managing pain, and it is one of the most misunderstood. Its mere mention conjures up visions of Svengali-like power seekers forcing others to do their bidding by inducing a hypnotic trance. In one of his most difficult cases, Sherlock Holmes was nearly assassinated by a young man ordered to kill him while under the hypnotic control of a bewitching woman.

In fact, there are strict limitations on what a hypnotized subject will do while in a trance. Although such subjects may perform some minor feats that they do not customarily perform, they typically cannot be induced to do injury to themselves or others (Hilgard, 1965, 1971). So much for mythology.

That hypnosis can help control pain has been noted for centuries. Old medical textbooks and anthropological accounts of healing rituals provide anecdotal evidence of such extreme interventions as surgery conducted with no apparent pain while the patient was under a hypnotic trance:

> In 1829, prior to the discovery of anesthetic drugs, a French surgeon, Dr. Cloquet, performed a remarkable operation on a sixty-four-year-old woman who suffered from cancer of the right breast. After making an incision from the armpit to the inner side of the breast, he removed both the malignant tumor and also several enlarged glands in the armpit. What makes this operation remarkable is that, during the surgical procedure, the patient, who had not received any drugs, conversed quietly with the physician and showed no signs of experiencing pain. During the surgery, her respiration and pulse rate appeared stable and there were no noticeable changes in her facial expression. The ability of this patient to tolerate the painful procedures was attributed to the fact that she had been mesmerized immediately prior to the operation. (cited in Chaves & Barber, 1976, p. 443)

Cloquet's case is one of the first reports of painless surgery with mesmerism or, as it was later called, hypnosis.

How Does Hypnosis Work?

As an interven-
tion, hypnosis relies on several pain reduction tech-
niques. First, a state of relaxation is brought about s
that the trance can be induced; relaxation alone ca
of course, help reduce pain. Next, the patient is e
plicitly told that the hypnosis will reduce pain; th
suggestion that pain will decline is also sufficient t
reduce pain. Hypnosis is itself a distraction from th
pain experience, and distraction can reduce the expe
rience of pain.

In the hypnotic trance, the patient is usually in-
structed to think about the pain differently; as note
earlier in this chapter, the meaning attached to pain in-
fluences its occurrence. And finally, the patient unde
going the painful procedure with hypnosis is often give
painkillers. The beneficial effects of hypnosis in reducin
pain are due at least in part to the composite effects o
relaxation, reinterpretation, distraction, and drugs. De-
bate has centered on whether hypnosis is merely the sum
of these other methods or whether it adds an alter
state of consciousness to the experience. This issue ha
not yet been resolved.

How Hypnosis Effective?

In a study that mad
use of hypnotherapy, 28 patients with irritable bowl syn-
drome were randomly assigned to receive either hypno
therapy directed to modifying gastric experiences or a
supportive verbal therapy as a control group. The hyp
notherapy was found to reduce discomfort associate
with the gastric, colonic response to their syndrome
suggesting that hypnotherapy may have clinical benefi
for this patient group (Simrén, Ringström, Björnsson
& Abrahamsson, 2004).

Regardless of the exact mechanism by which
works, the efficacy of hypnosis for the management o
some acute pains is now established (Jensen & Patterson
2006). It has been used successfully to control acut
pain due to childbirth, dental procedures, burns, hea
aches, and medical procedures (Liossi, White, & Hatira
2006; Lutgendorf et al., 2007). It has also been used
with success in the treatment of chronic pain, such a
that due to cancer (Kogan et al., 1997), and may be e
pecially successful in conjunction with other pain con
trol techniques (Allison & Faith, 1996). The hypnot
treatment of chronic pain produces better pain contro
in some cases, than medication management, physica
therapy, and education or advice. The effects of self
hypnosis on chronic pain are roughly comparable t
those of progressive muscle relaxation and similar relax
ation therapies (Jensen & Patterson, 2006).

Acupuncture

Acupuncture has been in existence in China for more than 2,000 years. In acupuncture treatment, long, thin needles are inserted into specially designated areas of the body that theoretically influence the areas in which a patient is experiencing a disorder. Although the main goal of acupuncture is to cure illness, it is also used in pain management because it appears to have an analgesic effect. In fact, in China, a substantial percentage of patients are able to undergo surgery with only the analgesia of acupuncture. During surgery, these patients are typically conscious, fully alert, and able to converse while the procedures are going on.

How Does Acupuncture Work?

How acupuncture controls pain is not fully known. It is possible that acupuncture functions partly as a counterirritation method of controlling pain. Researchers also believe that acupuncture may work because it is associated with other psychologically based techniques for pain control. In particular, patients believe that acupuncture will work, and acupuncture also induces a state of relaxation.

Before acupuncture begins, patients are usually fully prepared for it and are told what the sensations of the needles will be and how to tolerate them. Such informed preparation often reduces fear and increases tolerance of pain (see Chapter 9). Acupuncture needles and the process of inserting them are distracting; accordingly, attention may be directed away from pain. Patients undergoing acupuncture often receive analgesic drugs of various kinds, which also reduce the pain experience.

Finally, it is possible that acupuncture triggers the release of endorphins, thus reducing the experience of pain. When naloxone (an opiate antagonist that suppresses the effects of endorphins) is administered to acupuncture patients, the success of acupuncture in reducing pain is reduced (Mayer, Price, Barber, & Rafii, 1976).

Is Acupuncture Effective?

Overall, is acupuncture an effective method of pain control? It can help reduce some kinds of short-term pain, but it may not be as effective for chronic pain. An evaluation of the effectiveness of acupuncture is also limited by its relatively uncommon use in the United States and by a lack of formal studies of the technique. As a result, acupuncture and other less traditional treatments for pain are sometimes regarded with suspicion by managed care organizations (Lee, 2000).

Distraction

Individuals who are involved in intense activities, such as sports or military maneuvers, can be oblivious to painful injuries. These are extreme examples of a commonly employed pain technique: **distraction.** By focusing attention on an irrelevant and attention-getting stimulus or by distracting oneself with a high level of activity, one can turn attention away from pain.

How Does Distraction Work?

There are two quite different mental strategies for controlling discomfort. One is to distract oneself by focusing on another activity. Some examples of control techniques that rely on distraction are provided by children describing how they deal with stressful or painful events (Bandura 1991). For instance, an 11-year-old boy described how he reduced pain by distracting himself while in the dentist's chair:

> When the dentist says, "Open," I have to say the Pledge of Allegiance to the flag backwards three times before I am even allowed to think about the drill. Once he got all finished before I did.

The other kind of mental strategy for controlling stressful events is to focus directly on the events but to reinterpret the experience. The following is a description from an 8-year-old boy who confronted a painful event directly:

> As soon as I get in the dentist's chair, I pretend he's the enemy and I'm a secret agent, and he's torturing me to get secrets, and if I make one sound, I'm telling him secret information, so I never do. I'm going to be a secret agent when I grow up, so this is good practice.

According to Albert Bandura, who reported these stories, occasionally, the boy "got carried away with his fantasy role-playing. One time the dentist asked him to rinse his mouth. Much to the child's own surprise, he snarled, 'I won't tell you a damned thing,' which momentarily stunned the dentist."

Is Distraction Effective?

Distraction appears to be a useful technique of pain control, especially with acute pain (Cohen, Cohen, Blount, Schaen, & Zaf 1999). In one study, 38 dental patients were exposed to one of three conditions. One third of the group heard music during the dental procedure; one third heard the music coupled with a suggestion that the music might help them reduce stress; and the third group heard no music. Patients in both music groups reported

bout 30–50 million people in the United States experience hronic pain that requires treatment.

xperiencing less distress than did patients in the no-eatment group (Anderson, Baron, & Logan, 1991).

Distraction appears to be most effective for coping ith low-level pain. Its practical significance for chronic ain is limited by the fact that such patients cannot dis-act themselves indefinitely. Moreover, distraction by self lacks analgesic properties (McCaul, Monson, & Maki, 1992). Thus, while effective, distraction may be nost useful when used in conjunction with other pain ontrol techniques.

Coping Techniques

Coping skills training has been increasingly used for elping chronic pain patients manage pain. For exam-ple, one study with burn patients found that brief train-ng in cognitive coping skills, including distraction and ocusing on the sensory aspects of pain instead of their ainful qualities, led to reduced reported pain, increased atisfaction with pain control, and better pain coping kills (Haythornthwaite, Lawrence, & Fauerbach, 2001). Active coping skills have been found to reduce pain in patients with a variety of chronic pains (Mercado, Carroll, Cassidy, & Cote, 2000; Bishop & Warr, 2003), and passive coping has been tied to poor pain control (Walker, Smith, Garber, & Claar, 2005).

Do Coping Techniques Work? Is any particular coping technique effective for managing pain? The answer appears to depend on how long patients have had their pain. In a study of 30 chronic pain patients and 30 recent-onset pain patients, researchers found that those with recent-onset pain experienced less anxiety and depression and less pain when employing avoidance coping strategies rather than attentional strategies. Because the pain was short term, putting it out of mind worked (Mullen & Suls, 1982).

In contrast, for chronic pain patients, attending directly to the pain, rather than avoiding it, was more adaptive, enabling these patients to mobilize their resources for reducing or controlling the pain (Holmes & Stevenson, 1990). Such studies suggest that pain patients might be trained in different coping strategies, avoidant versus attentive, depending on the actual or expected duration of their pain (Holmes & Stevenson, 1990).

Patients' assessments of their coping abilities may be useful for planning interventions with chronic pain patients (Walker et al., 2005). A study found that patients who appraised their problem-solving abilities as poor suffered increased pain, depression, and disability, whereas those with a more favorable assessment of their problem-solving competence did better (Kerns, Rosenberg, & Otis, 2002).

Guided Imagery

Guided imagery has been used to control some acute pain and discomfort. In **guided imagery,** a patient is instructed to conjure up a picture that he or she holds in mind during the painful experience.

Some practitioners of guided imagery use it primarily to induce relaxation. The patient is encouraged to visualize a peaceful, relatively unchanging scene; to hold it in mind; and to focus on it fully. This process brings on a relaxed state, concentrates attention, and distracts the patient from the pain or discomfort—all techniques that have been shown to reduce pain.

The use of guided imagery to induce relaxation can control slow-rising pains, which can be anticipated and prepared for, or it can be used to control the discomfort of a painful medical procedure. As an example of the former use, advocates of prepared childbirth encourage a woman in labor to develop a focal point—a real or an imagined picture that she can focus on fully when labor pains begin. An example of using guided imagery to control the discomfort of a medical procedure is provided by a patient undergoing radiation therapy:

> When I was taking the radiation treatment, I imagined I was looking out my window and watching the trees and seeing the leaves go back and forth in the wind. Or, I would think of the ocean and watch the waves come in over and over again, and I would hope, "Maybe this will take it all away."

About 30–50 million people in the United States experience chronic pain that requires treatment.

experiencing less distress than did patients in the no-treatment group (Anderson, Baron, & Logan, 1991).

Distraction appears to be most effective for coping with low-level pain. Its practical significance for chronic pain is limited by the fact that such patients cannot distract themselves indefinitely. Moreover, distraction by itself lacks analgesic properties (McCaul, Monson, & Maki, 1992). Thus, while effective, distraction may be most useful when used in conjunction with other pain control techniques.

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Patients' assessments of their coping abilities m be useful for planning interventions with chronic pa patients (Walker et al., 2005). A study found that p tients who appraised their problem-solving abilities poor suffered increased pain, depression, and disabil whereas those with a more favorable assessment of the problem-solving competence did better (Kerns, Rosenber & Otis, 2002).

Guided Imagery

Guided imagery has been used to control some acu pain and discomfort. In **guided imagery,** a patient instructed to conjure up a picture that he or she holds mind during the painful experience.

Some practitioners of guided imagery use it prim ily to induce relaxation. The patient is encouraged visualize a peaceful, relatively unchanging scene; to ho it in mind; and to focus on it fully. This process brin on a relaxed state, concentrates attention, and distrac the patient from the pain or discomfort—all techniqu that have been shown to reduce pain.

The use of guided imagery to induce relaxation c control slow-rising pains, which can be anticipated an prepared for, or it can be used to control the discomfo of a painful medical procedure. As an example of th former use, advocates of prepared childbirth encoura a woman in labor to develop a focal point—a real or a imagined picture that she can focus on fully when labo pains begin. An example of using guided imagery t control the discomfort of a medical procedure is pro vided by a patient undergoing radiation therapy:

> When I was taking the radiation treatment, I imagined I was looking out my window and watching the trees and seeing the leaves go back and forth in the wind. Or, I would think of the ocean and watch the waves come in over and over again, and I would hope, "Maybe this wi take it all away."

A very different kind of visualization technique may be used by patients trying to take a more personally aggressive stance toward pain. Instead of using imagery to calm and soothe themselves, these patients use it to rouse themselves into a confrontive stance by imagining a combative, action-filled scene. The following examples are from patients who used aggressive imagery in conjunction with their chemotherapy treatment:

> I happened to see something my husband was watching on TV. It was on World War II and the Nazis were in it. They were ruthless. They killed everything. I visualized my white blood cells were the German Army, and that helped me get through chemotherapy.

> I imagined that the cancer was this large dragon and the chemotherapy was a cannon, and when I was taking the chemotherapy, I would imagine it blasting the dragon, piece by piece.

The use of aggressive imagery may help those coping with the uncomfortable effects of illness or treatment. When the body is in a state of excitement or arousal, pain can be inhibited. Moreover, aggressive imagery can serve as a distraction to pain, and it gives the patient something to focus on.

Although relaxation imagery is more often used to combat pain than is aggressive imagery, aggressive imagery may work, too. In fact, one chemotherapy patient apparently profited from the use of both:

> It was kind of a game with me, depending on my mood. If I was peaceful and wanted to be peaceful, I would image a beautiful scene, or if I wanted to do battle with the enemy, I would mock up a battle and have my defenses ready.

It is interesting to note that these two virtually opposite forms of imagery may actually achieve some beneficial effects in controlling pain through the same means. Both may induce a positive mood state (relaxation or excitement), which contributes to the reduction of pain. Further, both focus attention and provide a distraction from pain—one by concentrating attention on a single, unchanging or repetitive stimulus, the other by diverting attention to the drama of an active scene.

Does Guided Imagery Work? How effective is guided imagery in controlling pain? Guided imagery is typically used in conjunction with other pain control techniques, so its unique contribution to pain reduction, if any, is as yet unknown. If it does add to the control of pain, it will likely be in the treatment of ac slow-rising pain.

Additional Cognitive Techniques to Control Pain

In recent years, psychologists have included techni from cognitive-behavioral therapy to control pain. T additions have several objectives. First, they encou patients to reconceptualize the problem from c whelming to manageable. The rationale is that the problem must be seen as modifiable for cognitive behavioral methods to have any impact.

Second, clients must be convinced that the skills essary to control the pain can and will be taught to th thereby enhancing their expectations that the outcon this training will be successful (Gil et al., 1996).

Third, clients are encouraged to reconceptu their own role in the pain management process, f being passive recipients of pain to being active, sourceful, and competent individuals who can in the control of pain. These cognitions are impor in the pain experience and may promote feeling self-efficacy.

Fourth, clients learn how to monitor their thoug feelings, and behaviors to break up maladaptive co tions that may have resulted in response to pain. A noted in Chapter 3, patients often inadvertently un mine behavior change by engaging in discouraging talk. Leading pain patients to develop more up monologues increases the likelihood that cogni behavioral techniques will be successful.

Fifth, patients are taught how and when to em overt and covert behaviors in order to make adap responses to the pain problem. This skills-training c ponent of the intervention may include biofeedb training or relaxation.

Sixth, clients are encouraged to attribute their cess to their own efforts. By making internal attribut for success, patients come to see themselves as ef cious agents of change and may be in a better positio monitor subsequent changes in the pain and bring ab successful pain modification.

Seventh, just as relapse prevention is an impor part of health habit change, it is important in pain trol as well. Patients may be taught to identify situat likely to give rise to their pain and to develop alterna ways of coping with the pain rather than engaging in usual pain behaviors they have used in the past, suc withdrawing from social contact.

Do Cognitive-Behavioral Interventions Work?

Evaluation of cognitive-behavioral interventions suggests that these techniques can be successful (Keefe, Dunsmore, & Burnett, 1992). For example, back pain is the most common chronic pain in the United States, affecting 30% of the population annually. Cognitive-behavioral self-regulatory treatments are consistently helpful in managing this pain (Hoffman, Papas, Chatkoff, & Kerns, 2007). Techniques that enhance perceptions of self-efficacy may be especially so. Self-efficacy is important, both because it leads patients to undertake steps to control their pain and because perceptions of efficacy may offset the potential for depression that is so often seen in chronic pain patients.

MANAGEMENT OF CHRONIC PAIN: PAIN MANAGEMENT PROGRAMS

Only a half century ago, the patient who suffered from chronic pain had few treatment avenues available, except for the possibilities of addiction to morphine or other painkillers and rounds of only temporarily successful operations. Now, however, a coordinated form of treatment has developed to treat chronic pain.

These interventions are termed **pain management programs,** and they make available to patients all that is known about pain control. Pain management programs have evolved greatly over the past few decades. Initially, many pain treatment programs were inpatient, multiweek endeavors designed to decrease use of pain medication and restore daily living skills. Presently, however, most chronic pain management efforts are outpatient programs, both because they appear to be successful and because they are less costly.

The first pain management program was founded in Seattle at the University of Washington by John Bonica, MD, in 1960. At present, there are numerous such clinics around the country. Typically, these programs are interdisciplinary efforts, bringing together neurological, cognitive, behavioral, and psychological expertise concerning pain (Rains, Penzien, & Jamison, 1992). As such, they involve the expertise of physicians, clinical psychologists or psychiatrists, and physical therapists, with consultation from specialists in neurology, rheumatology, orthopedic surgery, internal medicine, and physical medicine. The goals of programs in pain management are to enable patients to reduce their pain as much as possible, to increase their levels of activity, to reduce perceptions of disability, to return to work, and to lead meaningful and rewarding lives, even if the pain cannot be entirely eliminated (Vendrig, 1999).

Initial Evaluation

Initially, patients are evaluated with respect to their pain and pain behaviors. Typically, such evaluation begins with a qualitative and quantitative assessment of the pain, including its location, sensory qualities, severity, and duration, as well as its onset and history. Functional status is then assessed, with patients providing information about the degree to which their work and family lives have been impaired.

Exploring how the patient has coped with the pain in the past helps establish treatment goals for the future. For example, patients who withdraw from social activities in response to their pain may need to increase their participation in social activities or their family life.

Most patients are evaluated for their emotional and mental functioning as well. Many patients are very distressed and may suffer significant emotional and cognitive disruption in their lives (Arnow et al., 2006; Iezzi, Archibald, Barnett, Klinck, & Duckworth, 1999). Formal evaluation of psychological distress, illness behavior, and psychosocial impairment is often a part of this phase of pain management, and a wide variety of tests are available to help pain management experts derive a complete and complex profile of each patient (Osman et al., 2005; Rains et al., 1992; Roelofs et al., 2004). Patients may be assessed for their stage of readiness to assume a self-management approach to pain, which is ultimately critical for success (Glenn & Burns, 2003).

Individualized Treatment

Individualized programs of pain management are developed following completion of the profile of the patient's pain. Such programs are typically structured and time limited. They provide concrete aims, rules, and endpoints so that the patient has specific goals to achieve.

Typically, these goals include decreasing the intensity of the pain, increasing physical activity, decreasing reliance on medications, improving psychosocial functioning, reducing perception of disability, returning to full work status, and reducing the need to use health care services. An overarching goal has been to get patients to adopt a self-management approach for dealing with their pain. As we saw earlier in a discussion of self-efficacy, accepting the role of self-management for controlling pain may be helpful in reducing pain severity

and interference with lifestyle (Glenn & Burns, 2003). For patients high in self-efficacy, involving them in choices regarding pain management techniques may be especially helpful (Rokke, Fleming-Ficek, Siemens, & Hegstad, 2004).

Components of Programs

Pain management programs include several common features. The first is patient education. All patients are provided with complete information about the nature of their condition. Often conducted in a group setting, the educational component of the intervention may include discussions of medications; assertiveness or social skills training; ways of dealing with sleep disturbance; depression as a consequence of pain; nonpharmacological measures for pain control, such as relaxation skills and distraction; posture, weight management, and nutrition; and other topics related to the day-to-day management of pain.

Most patients are then trained in a variety of measures to reduce pain. Typically, such programs include relaxation training and exercise and may include other components, such as temperature biofeedback for muscle contraction headaches or stretching exercises for back pain patients.

Because many pain patients are emotionally distressed, group therapy is often conducted to help them gain control of their emotional responses. Pain management programs also target the maladaptive cognitions that may arise in response to chronic pain. Given what has often been a history of unsuccessful treatment of their pain, patients often catastrophize, and so interventions are aimed at the distorted negative perceptions patients hold about their pain and their ability to overcome and live with it (Ukestad & Wittrock, 1996).

Increasingly, pain management programs are taking into account patients' typical coping strategies and the need to match pain treatments to preferred styles. By matching treatments to patients' methods of coping, treatment benefits may be maximized (Rokke & Al Absi, 1992).

Involvement of Family

Many pain management programs intervene at the family level, combining family therapy with other interventions. On the one hand, chronic pain patients often withdraw from their families; on the other hand, efforts by the family to be supportive can sometimes inadvertently reinforce pain behaviors. Working with the family to reduce such counterproductive behaviors may be necessary. For example, negative responses of caregivers to a family member's chronic pain may actually exacerbate the patient's pain. Intervening with caregivers to help them develop a less negative model of their loved one's pain can ameliorate this problem (Williamson, Walters, & Shaffer, 2002).

Relapse Prevention

Finally, relapse prevention and follow-up activities are typically initiated in pain management programs so that patients will not backslide once they are discharged from the outpatient program. As is true for other treatments, nonadherence to pain regimens is a common problem among pain patients. The incidence of relapse following initially successful treatment of persistent pain appears to range from about 30% to 60% (Turk & Rudy, 1991a), and for at least some pains, relapse apparently is directly related to nonadherence to treatment. Consequently, the use of relapse prevention techniques and adherence enhancement tactics may provide valuable assistance in the maintenance of posttreatment pain reduction (Turk & Rudy, 1991a).

Evaluation of Programs

Pain management programs appear to be successful in helping control chronic pain. Studies that have evaluated behavioral interventions in comparison with nontreatment have found that the behavioral interventions reduce reports of pain disability and psychological distress (Center for the Advancement of Health, 2000e; Haythornthwaite et al., 2001; Keefe et al., 1992). These interventions improve psychological and social functioning as well (Stevens, Peterson, & Maruta, 1988).

As the importance, complexity, and costs of pain have become increasingly clear, pain is now taken more seriously in the medical management of patients and is recognized as an important medical issue in its own right rather than the inconvenient symptom it was once regarded to be (Turk, 1994). Originally directed largely to the alleviation of pain itself, programs designed to manage chronic pain now acknowledge the complex interplay of physiological, psychological, behavioral, and social factors, representing a truly biopsychosocial approach to pain management.