Mr. Brandon is a 43-year-old man who sustained a back injury in a work-related incident. He reports severe shooting pains in his lower back and both buttocks. Mr. Brandon is not a candidate for surgery and has undergone physical therapy with little improvement in his pain. He reports that the pain makes it impossible for him to return to his former job, work around the house, or obtain enjoyment from leisure activities. He has been referred to a pain clinic for management. The concept map illustrates the relationships that exist among selected nursing diagnoses, interventions, and outcomes for the patient with chronic pain.
LEARNING OBJECTIVES

On completion of the chapter, the learner will be able to:

1. Differentiate between acute pain, chronic pain, and cancer pain.
2. Describe the negative consequences of pain.
3. Describe the pathophysiology of pain.
4. Describe factors that can alter the perception of pain.
5. Demonstrate appropriate use of pain measurement instruments.
6. Explain the physiologic basis of pain relief interventions.
7. Explain the impact of aging on pain.
8. Discuss when opioid tolerance may be a problem.
9. Identify appropriate pain relief interventions for selected groups of patients.
10. Compare the various types of neurosurgical procedures used to treat intractable pain.
11. Develop a plan to prevent and treat the adverse effects of opioid analgesic agents.
12. Use the nursing process as a framework for the care of patients with pain.
Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Merskey & Bogduk, 1994). It is the most common reason for seeking health care. It occurs with many disorders, diagnostic tests, and treatments. It disables and distresses more people than any single disease. Since nurses spend more time with the patient in pain than do other health care providers, nurses need to understand the pathophysiology of pain, the physiologic and psychological consequences of acute and chronic pain, and the methods used to treat pain. Nurses encounter patients in pain in a variety of settings, including acute care, outpatient, and long-term care settings, as well as in the home. Thus, they must have the knowledge and skills to assess pain, to implement pain relief strategies, and to evaluate the effectiveness of these strategies, regardless of setting.

The Fifth Vital Sign

Pain management is considered such an important part of care that the American Pain Society coined the phrase “Pain: The 5th Vital Sign” (Campbell, 1995) to emphasize its significance and to increase the awareness among health care professionals of the importance of effective pain management. Documentation of pain assessment is now as prominent as the documentation of the “traditional” vital signs. Pain assessment and management are also mandated by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) (2003). Calling pain the fifth vital sign suggests that the assessment of pain should be as automatic as taking a patient’s blood pressure and pulse. The JCAHO (2003) has incorporated pain and pain management into its standards. JCAHO’s standards state that “pain is assessed in all patients” and that “patients have the right to appropriate assessment and management of pain.” These standards reflect the importance of pain management.

Types of Pain

Pain is categorized according to its duration, location, and etiology. Three basic categories of pain are generally recognized: acute pain, chronic (nonmalignant) pain, and cancer-related pain.

In health care, the primary care provider’s role is to assess and ameliorate pain by administering medications and other treatments. The nurse collaborates with other health care professionals while administering most pain relief interventions, evaluating their effectiveness, and serving as patient advocate when the intervention is ineffective. In addition, the nurse serves as an educator to the patient and family, teaching them to manage the pain relief regimen themselves when appropriate.

The International Association for the Study of Pain definition mentioned earlier encompasses the multidimensional nature of pain (Merskey & Boduck, 1994). A broad definition of pain is “whatever the person says it is, existing whenever the experiencing person says it does” (McCaffery & Beebe, 1989, p.7). This definition emphasizes the highly subjective nature of pain and pain management. The patient is the best authority on the existence of pain. Therefore, validation of the existence of pain is based on the patient’s report that it exists.

Although it is important to believe the patient who reports pain, it is equally important to be alert to patients who deny pain in situations where pain would be expected. A nurse who suspects pain in a patient who denies it should explore with the patient the reason for suspecting pain, such as the fact that the disorder or procedure is usually painful or that the patient grimaces when moving or avoids movement. Exploring why the patient may be denying pain is also helpful. Some people deny pain because they fear the treatment that may result if they report or admit pain. Others deny pain for fear of becoming addicted to opioids (previously referred to as narcotics) if these medications are prescribed.

**Glossary**

- addiction: a behavioral pattern of substance use characterized by a compulsion to take the drug primarily to experience its psychic effects
- agonist: a substance that when combined with the receptor produces the drug effect or desired effect. Endorphins and morphine are agonists on the opioid receptors.
- algogenic: causing pain
- antagonist: a substance that blocks or reverses the effects of the agonist by occupying the receptor site without producing the drug effect. Naloxone (Narcan) is an opioid antagonist.
- balanced analgesia: using more than one form of analgesia concurrently to obtain more pain relief with fewer side effects
- breakthrough pain: a sudden and temporary increase in pain occurring in a patient being managed with opioid analgesia
- endorphins and enkephalins: morphine-like substances produced by the body. Primarily found in the central nervous system, they have the potential to reduce pain.
- dependence: occurs when a patient who has been taking opioids experiences a withdrawal syndrome when the opioids are discontinued; often occurs with opioid tolerance and does not indicate an addiction
- noiception: activation of sensory transmission in nerves by thermal, mechanical, or chemical energy impinging on specialized nerve endings. The nerves involved convey information about tissue damage to the central nervous system.
- non-nociceptor: a receptor preferentially sensitive to a noxious stimulus
- patient-controlled analgesia (PCA): self-administration of analgesic agents by a patient instructed about the procedure
- placebo effect: analgesia that results from the expectation that a substance will work, not from the actual substance itself
- prostaglandins: chemical substances that increase the sensitivity of pain receptors by enhancing the pain-provoking effect of bradykinin
- referred pain: pain perceived as coming from an area different from that in which the pathology is occurring. An example would be the perception of left arm or jaw pain in a person having a myocardial infarction.
- sensitization: a heightened response seen after exposure to a noxious stimulus. Response to the same stimulus is to feel more pain.
- tolerance: occurs when a person who has been taking opioids becomes less sensitive to their analgesic properties (and usually side effects). Characterized by the need for increasing doses to maintain the same level of pain relief.
ACUTE PAIN

Usually of recent onset and commonly associated with a specific injury, acute pain indicates that damage or injury has occurred. Pain is significant in that it draws attention to its existence and teaches the person to avoid similar potentially painful situations. If no lasting damage occurs and no systemic disease exists, acute pain usually decreases along with healing. For purposes of definition, acute pain can be described as lasting from seconds to 6 months. However, the 6-month time frame has been criticized (Brookoff, 2000) as inaccurate since many acute injuries heal within a few weeks and most heal by 6 weeks. In a situation where healing is expected in 3 weeks and the patient continues to suffer pain, it should be considered chronic and treated with interventions used for chronic pain. Waiting for the full 6-month time frame in this example could cause needless suffering.

CHRONIC (NONMALIGNANT) PAIN

Chronic pain is constant or intermittent pain that persists beyond the expected healing time and that can seldom be attributed to a specific cause or injury. It may have a poorly defined onset, and it is often difficult to treat because the cause or origin may be unclear. Although acute pain may be a useful signal that something is wrong, chronic pain usually becomes a problem in its own right.

Chronic pain may be defined as pain that lasts for 6 months or longer, although 6 months is an arbitrary period for differentiating between acute and chronic pain. An episode of pain may assume the characteristics of chronic pain before 6 months have elapsed, or some types of pain may remain primarily acute in nature for longer than 6 months. Nevertheless, after 6 months, most pain experiences are accompanied by problems related to the pain itself. Chronic pain serves no useful purpose. If it persists, it may become the patient’s primary disorder.

The nurse may come in contact with patients with chronic pain when they are admitted to the hospital for treatment or when they are seen out of the hospital for home care. Frequently the nurse is called on in community-based settings to assist patients in managing pain. For more information on common pain syndromes, see Chart 13-1.

CANCER-RELATED PAIN

Pain associated with cancer may be acute or chronic. Pain resulting from cancer is so ubiquitous that after fear of dying, it is the second most common fear of newly diagnosed cancer patients (Lema, 1997). More than half of the 1,308 cancer patients included in a study conducted by Foley (1999) reported being in moderate to severe pain 50% of the time. Pain in the patient suffering from cancer can be directly associated with the cancer (eg, bony infiltration with tumor cells or nerve compression), a result of cancer treatment (eg, surgery or radiation), or not associated with the cancer (eg, trauma). Most pain associated with cancer, however, is a direct result of tumor involvement. An approach to cancer pain management is illustrated in Figure 13-1. This three-step approach illustrates the types of analgesic medications used for various levels of pain. A cancer pain algorithm developed as a set of analgesic guiding principles appears in Figure 13-2.

PAIN CLASSIFIED BY LOCATION

The previous discussion of acute and chronic pain is an example of the categorization of pain according to duration. Pain is sometimes categorized according to location, such as pelvic pain, head-
Complex Regional Pain Syndrome
*Complex regional pain syndrome* (CRPS) is the name given to a group of conditions previously described as causalgia, reflex sympathetic dystrophy (RSD), and other diagnoses. Complex regional pain syndrome describes a variety of painful conditions that often follow an injury. The magnitude and duration of the pain far exceeds the expected duration and often results in significant impairment of motor function. Reflex sympathetic dystrophy is categorized as CRPS type I and occurs after a relatively minor trauma. Characterized by unexplained diffuse burning pain, usually in the periphery of an extremity, CRPS type I is accompanied by weakness, a skin color and temperature change relative to the other extremity, limited range of motion, hypesthesia, hypoesthesia, edema, altered hair growth, and sweating (Janig, 2001).

Pain, which worsens with movement, cutaneous stimulation, or stress, often occurs after surgery or trauma to the extremity but is not limited to the area of surgery or trauma. CRPS type I is more common than CRPS type II and is usually managed through a pain clinic. Currently, regional sympathetic blockade and regional IV bretylium offer promise for relief. Tricyclic antidepressants may be tried as well. Complex regional pain syndrome type II refers to causalgia. Type II is more likely to develop after trauma with detectable peripheral nerve lesions (Janig, 2001).

**Postmastectomy Pain Syndrome (PMP)**

*Postmastectomy pain syndrome* (PMP) occurs after mastectomy with node dissection but is not necessarily related to the continuation of disease. Characterized by the sensation of constriction accompanied by a burning, pricking, or numbness in the posterior arm, axilla, or chest wall, PMP is often aggravated by movement of the shoulder, resulting in a frozen shoulder from immobilization (Miaskowski & Dibble, 1995).

*Post-traumatic headache* disorder occurs after trauma to the head and is characterized by daily and persistent headache. It is more likely to follow mild head injury than moderate to severe injury (Uomoto & Esselman, 1993).

**Fibromyalgia (Fibrositis)**

*Fibromyalgia*, a chronic pain syndrome characterized by generalized musculoskeletal pain, trigger points, stiffness, fatigability, and sleep disturbances, is aggravated by stress and overexertion. Treatment consists of NSAIDs, trigger point injections with local anesthetics, tricyclic antidepressants, stress reduction, and regular exercise.

**Hemiplegia-Associated Shoulder Pain**

*Hemiplegia-associated shoulder pain* is a pain syndrome that affects as many as 80% of stroke patients. It may result from stretching of the shoulder joint due to the uncompensated pull of gravity on the impaired arm. It may be preventable with functional electrical stimulation of involved shoulder muscles.

**Pain Associated With Sickle Cell Disease**

Pain experienced by patients with sickle cell disease results from venous occlusion caused by the sickle shape of the blood cells, impaired circulation to a muscle or organ, ischemia, and infarction. Acute pain may be managed with IV opioid analgesics administered according to a schedule or by a patient-controlled analgesia (PCA) pump and NSAIDs. Warm soaks and elevating the affected body part may help as well. Meperidine (Demerol) therapy is not recommended in patients with compromised renal function, nor is cold therapy. Patients with sickle cell disease may have a long history of chronic pain. Some issues related to their history include tolerance, possible long-term dependence, racial prejudice, and inadequate pain treatment.

**AIDS-Related Pain**

As AIDS progresses, so do problems that produce increasing amounts of pain, such as neuropathy, esophagitis, headaches, postherpetic pain, and abdominal, back, bone, and joint pain. Pain relief interventions are individualized and may consist of NSAIDs, long-acting opioids, such as fentanyl patches, and topical lidocaine. Tricyclic antidepressants may provide comfort in neuropathic and postherpetic pain.

**Burn Pain**

Possibly the most severe pain, burn pain tends to be underrated by health care professionals the longer they work with burn patients. Besides administration of IV opioid analgesic agents, current therapies to ameliorate pain in burn patients include debridement under general anesthesia; anxiety reduction; intervention with PCA devices, such as hand-held nitrous oxide delivery system; and cognitive techniques, particularly hypnosis.

**Guillain-Barré Syndrome and Pain**

A progressive, inflammatory disorder of the peripheral nervous system, Guillain-Barré syndrome is characterized by flaccid paralysis accompanied by paresthesia and pain—muscle pain and severe, unremitting, burning pain. Complaints of severe pain may be difficult to accept in the face of the characteristic flaccid facial response; therefore, the nurse must be sensitive and learn to disregard nonverbal cues that contradict the verbal report of pain. Treatment interventions include NSAIDs for muscle pain and opioids if NSAIDs are ineffective. Causalgia and neurogenic pain may be relieved by systemic or epidural opioids or, possibly, antiseizure agents or tricyclic antidepressants. To relieve the burning, some patients beg to have windows opened and clothing removed, even in cold weather. This suggests that gentle ice massage may help. Research is needed, however, to test this theory.

**Opioid Tolerance**

Opioid tolerance is common among patients treated for chronic pain, especially patients being treated by multiple health care providers. Opioid tolerance should be suspected when a patient (1) complains of significantly more pain than is usually associated with the condition, (2) requires unusually high doses of opioids to achieve pain relief, or (3) experiences an unusually low incidence and severity of side effects from opioids. Cancer patients also often develop a tolerance to opioids, requiring larger and larger doses of medication to obtain pain relief. In such cases, the nurse must recognize what is happening, seek additional information from the patient or family, and then procure additional prescriptions for analgesics or an alternative intervention. In patients undergoing surgery, epidural local anesthetic agents provide excellent postoperative analgesia, but the problem of opioid tolerance must be elicited from the patient preoperatively.

Occasionally a recovering heroin addict is seen in an acute pain situation (surgery or trauma). This patient may be undergoing treatment with naltrexone (Trexan), a long-acting form of the opioid antagonist naloxone (Narcan). Both the short-acting naloxone and the long-acting naltrexone act by binding to the opioid receptors, so opioids cannot be effective. If surgery is planned, the naltrexone should be discontinued a few days before the procedure. Should a patient receiving naltrexone be in immediate need of pain relief, very high doses of opioids are necessary. Alternative methods of pain relief (local or regional blockade and NSAIDs) should be incorporated in the pain management plan.
interpersonal relationships he or she engaged in before the pain began. Disabilities may range from curtailing participation in physical activities to being unable to take care of personal needs, such as dressing or eating. The nurse needs to understand the effects of chronic pain on the patient and family and needs to be knowledgeable about pain relief strategies and appropriate resources to assist effectively with pain management.

Pathophysiology of Pain

The sensory experience of pain depends on the interaction between the nervous system and the environment. The processing of noxious stimuli and the resulting perception of pain involve the peripheral and central nervous systems.

PAIN TRANSMISSION

Among the nerve mechanisms and structures involved in the transmission of pain perceptions to and from the area of the brain that interprets pain are nociceptors, or pain receptors, and chemical mediators. Nociceptors are receptors that are preferentially sensitive to a noxious stimulus. Nociceptors are also called pain receptors, but the former term is preferred.

Nociceptors

Nociceptors are free nerve endings in the skin that respond only to intense, potentially damaging stimuli. Such stimuli may be mechanical, thermal, or chemical in nature. The joints, skeletal muscle, fascia, tendons, and cornea also have nociceptors that have the potential to transmit stimuli that produce pain. However, the large internal organs (viscera) do not contain nerve endings that respond only to painful stimuli. Pain originating in these organs results from intense stimulation of receptors that have other purposes. For example, inflammation, stretching, ischemia, dilation, and spasm of the internal organs all cause an intense response in these multipurpose fibers and can cause severe pain.

Nociceptors are part of complex multidirectional pathways. These nerve fibers branch very near their origin in the skin and send fibers to local blood vessels, mast cells, hair follicles, and sweat glands. When these fibers are stimulated, histamine is released from the mast cells, causing vasodilation. Nociceptors respond to high-intensity mechanical, thermal, and chemical stimuli. Some receptors respond to only one type of stimuli; others, called polymodal nociceptors, respond to all three types of stimuli. These highly specialized neurons transfer the mechanical, thermal, or chemical stimulus into electrical activity or action potentials.

The cutaneous fibers located more centrally further branch and communicate with the paravertebral sympathetic chain of the nervous system and with large internal organs. As a result of the connections between these nerve fibers, pain is often accompanied by vasomotor, autonomic, and visceral effects. In a patient with severe acute pain, for example, gastrointestinal peristalsis may decrease or stop.

Peripheral Nervous System

A number of algogenic (pain-causing) substances affect the sensitivity of nociceptors and are released into the extracellular tissue as a result of tissue damage. Histamine, bradykinin, acetylcholine, serotonin, and substance P are chemicals that increase the transmission of pain. The transmission of pain is also referred to as nociception. Prostaglandins are chemicals substances thought to increase the sensitivity of pain receptors by enhancing the pain-provoking effect of bradykinin. These chemical mediators also cause vasodilation and increased vascular permeability, resulting in redness, warmth, and swelling of the injured area.

Once nociception is initiated, the nociceptive action potentials are transmitted by the peripheral nervous system (Porth, 2002). The first-order neurons travel from the periphery (skin, cornea, visceral organs) to the spinal cord via the dorsal horn. There are two main types of fibers involved in the transmission of nociception. Smaller, myelinated Aδ (A delta) fibers transmit nociception rapidly, which produces the initial “fast pain.” Type C fibers are larger, unmyelinated fibers that transmit what is called second pain. This type of pain has dull, aching, or burning qualities that last longer than the initial fast pain. The type and concentration of nerve fibers to transmit pain vary by tissue type.

If there is repeated C fiber input, a greater response is noted in dorsal horn neurons, causing the person to perceive more pain. In other words, the same noxious stimulus produces hyperalgesia, and the person reports greater pain than was felt at the first stimulus. For this reason, it is important to treat patients with analgesic agents when they first feel the pain. Patients require less medication and experience more effective pain relief if analgesia is administered before the patient becomes sensitized to the pain.

Chemicals that reduce or inhibit the transmission or perception of pain include endorphins and enkephalins. These morphine-like neurotransmitters are endogenous (produced by the body). They are examples of substances that reduce nociceptive transmission when applied to certain nerve fibers. The term “endorphin” is a combination of two words: endogenous and morphine. Endorphins and enkephalins are found in heavy concentrations in the central nervous system, particularly the spinal and medullary dorsal horn, the periaqueductal gray matter, hypothalamus, and amygdala. Morphine and other opioid medications act at receptor sites to suppress the excitation initiated by noxious stimuli. The binding of opioids to receptor sites is responsible for the

<table>
<thead>
<tr>
<th>Pain Level</th>
<th>Analgesic Regimen</th>
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<tr>
<td>SEVERE PAIN</td>
<td>Strong narcotic Non-narcotic Adjuvant drug</td>
</tr>
<tr>
<td>MODERATE PAIN</td>
<td>Weak narcotic Non-narcotic Adjuvant drug</td>
</tr>
<tr>
<td>MILD PAIN</td>
<td>Non-narcotic Adjuvant drug</td>
</tr>
</tbody>
</table>

FIGURE 13-7 The World Health Organization three-step ladder approach to relieving cancer pain. Analgesic regimens are based on pain reported as ranging from mild to moderate to severe. Various opioid (narcotic) and nonopioid medications may be combined with other medications to control pain.

<table>
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<tr>
<th>Pain Level</th>
<th>Analgesic Stage</th>
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<tbody>
<tr>
<td>SEVERE PAIN</td>
<td>Step 3</td>
</tr>
<tr>
<td>MODERATE PAIN</td>
<td>Step 2</td>
</tr>
<tr>
<td>MILD PAIN</td>
<td>Step 1</td>
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PAIN RELIEF

Nociception rapidly, which produces the initial “fast pain.” Type C fibers are larger, unmyelinated fibers that transmit what is called second pain. This type of pain has dull, aching, or burning qualities that last longer than the initial fast pain. The type and concentration of nerve fibers to transmit pain vary by tissue type.

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effects noted after their administration. Each receptor (mu, kappa, delta) responds differently when activated. Table 13-1 summarizes the classification and action of opioid receptors.

**Central Nervous System**

After tissue injury occurs, nociception (the neurologic transmission of pain impulses) to the spinal cord via the A_δ_ and C fibers continues. The fibers enter the dorsal horn, which is divided into laminae based on cell type. The laminae II cell type is commonly referred to as the substantia gelatinosa. In the substantia gelatinosa are projections that relay nociception to other parts of the spinal cord (Fig. 13-3).

Nociception continues from the spinal cord to the reticular formation, thalamus, limbic system, and cerebral cortex. Here nociception is localized and its characteristics become apparent to the person, including the intensity. The involvement of the reticular formation, limbic, and reticular activating systems is responsible for the individual variations in the perception of noxious stimuli. Individuals may report the same stimulus differently based on their anxiety, past experiences, and expectations. This is a result of the conscious perception of pain.

For pain to be consciously perceived, neurons in the ascending system must be activated. Activation occurs as a result of input from the nociceptors located in the skin and internal organs. Once activated, the inhibitory interneuronal fibers in the
dorsal horn inhibit or turn off the transmission of noxious stimulating information in the ascending pathway.

**Descending Control System**

The descending control system is a system of fibers that originate in the lower and midportion of the brain (specifically the periaqueductal gray matter) and terminate on the inhibitory interneuronal fibers in the dorsal horn of the spinal cord. This system is probably always somewhat active; it prevents continuous transmission of stimuli as painful, partly through the action of the endorphins. As nociception occurs, the descending control system is activated to inhibit pain.

Cognitive processes may stimulate endorphin production in the descending control system. The effectiveness of this system is illustrated by the effects of distraction. The distractions of visitors or a favorite TV show may increase activity in the descending control system. Therefore, the person who has visitors may not report pain because activation of the descending control system results in less noxious or painful information being transmitted to consciousness. Once the distraction by the visitors ends, activity in the descending control system decreases, resulting in increased transmission of painful stimuli.

The interconnections between the descending neuronal system and the ascending sensory tract are called inhibitory interneuronal fibers. These fibers contain enkephalin and are primarily activated through the activity of non-nociceptor peripheral fibers (fibers that normally do not transmit painful or noxious stimuli) in the same receptor field as the pain receptor, and descending fibers, grouped together in a system called descending control. The enkephalins and endorphins are thought to inhibit pain impulses by stimulating the inhibitory interneuronal fibers, which in turn reduce the transmission of noxious impulses via the ascending system (Puig & Montes, 1998).

The classic gate control theory of pain, described by Melzack and Wall in 1965, was the first to clearly articulate the existence of a pain-modulating system (Melzack, 1996). This theory proposes that stimulation of the skin evokes nervous impulses that are then transmitted by three systems located in the spinal cord. The substantia gelatinosa in the dorsal horn, the dorsal column fibers, and the central transmission cells act to influence nociceptive impulses. The noxious impulses are influenced by a “gating mechanism.” Melzack and Wall proposed that stimulation of the large-diameter fibers inhibits the transmission of pain, thus “closing the gate.” Conversely, when smaller fibers are stimulated, the gate is opened. The gating mechanism is influenced by nerve impulses that descend from the brain. This theory proposes a specialized system of large-diameter fibers that activate selective cognitive processes via the modulating properties of the spinal gate. Figure 13-4 shows a schematic representation of a gate control system and nociceptive pathways.

The gate control theory was important because it was the first theory to suggest that psychological factors play a role in the perception of pain. The theory guided research toward the cognitive-behavioral approaches to pain management. This theory helps to explain how interventions such as distraction and music therapy provide pain relief.

Melzack (1996) extended the gate control theory after carefully analyzing phantom limb pain. He proposed that a large, widespread network of neurons exists that consists of loops between the thalamus and cortex and between the cortex and the limbic system. Melzack labeled this network the neuromatrix.
Information is processed in the neuromatrix, a characteristic pattern emerges. This pattern, referred to as the neurosignature, is a continuous outflow from the neuromatrix. Ultimately, the neurosignature output, with a constant stream of input and varying patterns, produces the feelings of the whole body with constantly changing qualities.

Melzack (1996) theorized that in the absence of modulating inputs from the missing limb, the active neuromatrix produces a neurosignature pattern that is perceived as pain. The neuromatrix theory highlights the role of the brain in sustaining the experience of pain. Some researchers have criticized this theory as not adding to the understanding of how psychological factors influence pain (Keefe, Lefebvre & Starr, 1996). While the neuromatrix theory might explain unusual pain phenomena, its contribution to understanding pain management remains to be seen.

**Factors Influencing The Pain Response**

A person’s pain experience is influenced by a number of factors, including past experiences with pain, anxiety, culture, age, gender, and expectations about pain relief. These factors may increase or decrease the person’s perception of pain, increase or decrease tolerance for pain, and affect the responses to pain.

**Past Experience**

It is tempting to expect that a person who has had multiple or prolonged experiences with pain would be less anxious and more tolerant of pain than one who has had little pain. For most people, however, this is not true. Often, the more experience a person has had with pain, the more frightened he or she is about subsequent painful events. This person may be less able to tolerate pain; that is, he or she wants relief from pain sooner and before it becomes severe. This reaction is more likely to occur if the person has received inadequate pain relief in the past. A person with repeated pain experiences may have learned to fear the escalation of pain and its inadequate treatment. Once a person experiences severe pain, that person knows just how severe it can be. Conversely, someone who has never had severe pain may have no fear of such pain.

The way a person responds to pain is a result of many separate painful events during a lifetime. For some, past pain may have been constant and unrelenting, as in prolonged and chronic and persistent pain. The individual who has pain for months or years may become irritable, withdrawn, and depressed.

The undesirable effects that may result from previous experience to the need for the nurse to be aware of the patient’s past experiences with pain. If pain is relieved promptly and adequately, the person may be less fearful of future pain and better able to tolerate it.
Anxiety and Depression

Although it is commonly believed that anxiety will increase pain, this is not necessarily true. Research has demonstrated no consistent relationship between anxiety and pain, nor has research shown that preoperative stress reduction training reduces postoperative pain (Keogh, Ellery, Hunt et al., 2001; Rhudy & Meagher, 2000). Postoperative anxiety is most related to preoperative anxiety and postoperative complications. However, anxiety that is relevant or related to the pain may increase the patient’s perception of pain. For example, a patient who was treated 2 years ago for breast cancer and now has hip pain may fear that the pain indicates metastasis. In this case, the anxiety may result in increased pain. Anxiety that is unrelated to the pain may distract the patient and may actually decrease the perception of pain. For example, a mother who is hospitalized with complications from abdominal surgery and is anxious about her children may perceive less pain as her anxiety about her children increases.

The routine use of antianxiety medications to treat anxiety in someone with pain may prevent the person from reporting pain because of sedation and may impair the patient’s ability to take deep breaths, get out of bed, and cooperate with the treatment plan. The most effective way to relieve pain is by directing the treatment at the pain rather than at the anxiety.

Just as anxiety is associated with pain because of concerns and fears about the underlying disease, depression is associated with chronic pain and unrelied cancer pain. In chronic pain situations, depression is associated with major life changes due to the limiting effects of the pain, specifically unemployment. Longer durations of pain are associated with an increased incidence of depression (Wall, 1999). Unrelied cancer pain drastically interferes with the patient’s quality of life, and relieving the pain may go a long way toward treating the depression.

Culture

Beliefs about pain and how to respond to it differ from one culture to the next. Early in childhood, individuals learn from those around them what responses to pain are acceptable or unacceptable. For example, a child may learn that a sports injury is not expected to hurt as much as a comparable injury caused by a motor vehicle crash. The child also learns what stimuli are expected to be painful and what behavioral responses are acceptable. These beliefs vary from one culture to another; therefore, people from different cultures who experience the same intensity of pain may not report it or respond to it in the same ways.

Cultural factors must be taken into account to effectively manage pain. Many studies have examined the cultural aspects of pain. Inconsistent results, methodologic weaknesses or flaws (Lasch, 2000), and failure of many researchers to carefully distinguish ethnicity, culture, and race make it difficult to interpret the findings of many of these studies. Factors that help to explain differences in a cultural group include age, gender, education level, and income. In addition, the degree to which a patient identifies with a culture influences the degree to which he or she will adopt new health behaviors or cling to traditional health beliefs and practices. Other factors that affect a patient’s response to pain include his or her interaction with the health care system and provider factors (Lasch, Wilkes, Montuori et al., 2000).

The nurse’s cultural values may differ from those of other cultures. The nurse’s cultural expectations and values may include avoiding exaggerated expressions of pain, such as excessive crying.

NURSING RESEARCH PROFILE 13-1

Pain Management Outcomes for Hospitalized Hispanic Patients


Purpose

It has been suggested that members of minority groups are likely to receive inadequate pain management. Hispanics are the fastest-growing ethnic group in the United States, yet few studies have examined pain and its management in this group. The purposes of the study were to describe the experience of acute pain and pain management and outcomes of pain management, and to identify predictors of patient satisfaction in a minority sample.

Study Sample and Design

This cross-sectional, descriptive study explored the outcomes of the pain experience of hospitalized Hispanic patients and identified factors that contribute to patient satisfaction with pain management. The study sample consisted of 104 patients who were postoperative or diagnosed with a painful condition and who were hospitalized for at least 24 hours. The subjects identified themselves as Hispanic and spoke English.

The researchers used the American Pain Society’s Patient Outcome Questionnaire—Modified and the Pain Management Index to measure the degree of pain, effectiveness of pain management, and patient satisfaction. Data related to analgesic orders and administration were obtained from the patients’ medical records.

Findings

Ninety-eight percent of the patients reported pain in the last 24 hours. The most interference caused by the pain was for participation in activities related to postoperative recovery (mean = 7.1, SD = 2.9) (on a 0–10 numeric scale with higher scores indicating more interference).

The study found that 90% of patients had analgesics prescribed. The least pain interference was in the area of interpersonal relationships (mean = 3.1, SD = 3.2). The mean score on satisfaction with pain management (on a 1–6 scale with higher scores indicating greater satisfaction) was 4.74 (SD = 1.2). Satisfaction with pain management was inversely and significantly correlated with pain intensity.

Nursing Implications

The findings in this study are similar to those noted in a sample of Caucasian patients. The satisfied and dissatisfied groups differed in the areas of pain rating now and general level of pain and interference related to pain regarding sleep, general activity, mood, and relationships. The reason for the reported high degree of satisfaction when those who reported pain and interference with activities is unclear. In spite of the inverse correlation between pain intensity and satisfaction, the satisfaction ratings were high. Further research is needed to identify the factors that determine satisfaction with pain management.
and moaning, seeking immediate relief from pain, and giving complete descriptions of the pain. A patient’s cultural expectations may be to moan and complain about pain, to refuse pain relief measures that do not cure the cause of the pain, or to use adjectives such as “unbearable” in describing the pain. A patient from another cultural background may behave in a quiet, stoic manner rather than express the pain loudly. The nurse must react to the person’s pain perception and not to the pain behavior because the behavior is different from his or her own culture.

Recognizing the values of one’s own culture and learning how these values differ from those of other cultures help to avoid evaluating the patient’s behavior on the basis of one’s own cultural expectations and values. A nurse who recognizes cultural differences will have a greater understanding of the patient’s pain and will be more accurate in assessing pain and behavioral responses to pain, as well as more effective in relieving the pain.

The main issues to consider when caring for patients of a different culture are:

- What does the illness mean to the patient?
- Are there culturally based stigmas related to this illness or pain?
- What is the role of the family in health care decisions?
- Are traditional pain-relief remedies used?
- What is the role of stoicism in that culture?
- Are there culturally determined ways of expressing and communicating pain?
- Does the patient have any fears about the pain?
- Has the patient seen or does the patient want to see a traditional healer?

Regardless of the patient’s culture, nurses need to learn about that particular culture and be aware of power and communication issues that will affect care outcomes. Nurses need to avoid stereotyping patients by culture and provide individualized care rather than assuming that a patient of a specific culture will exhibit more or less pain. In addition to avoiding stereotyping, health care providers need to individualize the amount of medications or therapy according to the information provided by the patient. Nurses need to recognize that stereotypes exist and become sensitive to how stereotypes negatively affect care. Patients in turn must be instructed about how and what to communicate about their pain.

Age

Age has long been the focus of research on pain perception and pain tolerance, and again the results have been inconsistent. For example, although some researchers have found that older adults require a higher intensity of noxious stimuli than do younger adults before they report pain (Washington, Gibson & Helme, 2000), others have found no differences in responses of younger and older adults (Edwards & Filligim, 2000). Other researchers have found that elderly patients (older than 65 years of age) reported significantly less pain than younger patients (Li, Greenwald, Gennis et al., 2001). Experts in the field of pain management have concluded that if pain perception is diminished in the elderly person, it is most likely secondary to a disease process (eg, diabetes) rather than to aging (American Geriatrics Society, 1998). More research is needed in the area of aging and its effects on pain perception to understand what the elderly are experiencing.

Although many elderly people seek health care because of pain, others are reluctant to seek help even when in severe pain because they consider pain to be part of normal aging. Assessment of pain in older adults may be difficult because of the physiologic, psychosocial, and cognitive changes that often accompany aging. In one study, as many as 93% of nursing home residents reported being in pain daily for the past 6 months (Weiner, Peterson, Ladd et al., 1999). Unrelieved pain contributes to the problems of depression, sleep disturbances, delayed rehabilitation, malnutrition, and cognitive dysfunction (Miaskowski, 2000).

The way an older person responds to pain may differ from the way a younger person responds. Because elderly people have a slower metabolism and a greater ratio of body fat to muscle mass than younger people, small doses of analgesic agents may be sufficient to relieve pain, and these doses may be effective longer (Buffum & Buffum, 2000). Elderly patients deal with pain according to their lifestyle, personality, and cultural background, as do younger adults. Many elderly people are fearful of addiction and, as a result, will not report that they are in pain or ask for pain medication. Others fail to seek care because they fear that the pain may indicate serious illness or they fear loss of independence.

Elderly patients must receive adequate pain relief after surgery or trauma. When an elderly person becomes confused after surgery or trauma, the confusion is often attributed to medications, which are then discontinued. However, confusion in the elderly may be a result of untreated and unrelieved pain. In some cases postoperative confusion clears once the pain is relieved. Judgments about pain and the adequacy of treatment should be based on the patient’s report of pain and pain relief rather than on age.

Gender

Researchers have studied gender differences in pain levels and in responses to pain. Once again, the results have been inconsistent. In one study, women tended to report higher levels of pain than men and reported their highest intensity of pain during the day, while men reported the highest intensity at night (Morin, Lund, Villarroel et al., 2000). Kelly (1998) reported no gender differences in pain.

Riley, Robinson, Wade et al. (2001) compared pain intensity, pain unpleasantness, and pain-related emotions (depression, anxiety, frustration, fear, and anger) in men and women who were asked to rate their experiences with chronic pain. Women had higher pain intensity, pain unpleasantness, frustration, and fear compared to men. Robinson, Riley, Meyers et al. (2001) reported that men and women are socialized to respond differently and differ in their expectations relative to pain perception. In a study of responses of men and women to chronic pain and anxiety, Edwards, Auguston and Fillingim (2000) noted no difference between genders regarding pain and depression. There was, however, a difference in anxiety and gender, with men being more anxious about their pain.

The pharmacokinetics and pharmacodynamics of opioids differ in men and women and have been attributed to hepatic metabolism, where the microsomal enzyme activity differs (Vallerand & Polomano, 2000). Genetic factors play a role in the varied responses to nonsteroidal anti-inflammatory drugs (NSAIDs) seen in men and women (Buffum & Buffum, 2000).

Placebo Effect

A placebo effect occurs when a person responds to the medication or other treatment because of an expectation that the treatment will work rather than because it actually does so. Simply
receiving a medication or treatment may produce positive effects. The placebo effect results from the natural (endogenous) production of endorphins in the descending control system. It is a true physiologic response that can be reversed by naloxone, an opioid antagonist (Wall, 1999).

A patient’s positive expectations about treatment may increase the effectiveness of a medication or other intervention. Often the more cues the patient receives about the intervention’s effectiveness, the more effective it will be. A person who is informed that a medication is expected to relieve pain is more likely to experience pain relief than one who is told that a medication is unlikely to have any effect.

Researchers have shown that different verbal instructions given to patients about therapies affect patient behavior and significantly reduce opioid intake. Pollo, Amanzio, Arslanina et al. (2001) studied the effect of information and expectations in patients who had undergone thoracotomy. Patients in three groups were given an intravenous infusion of normal saline solution and could receive a dose of buprenorphine (Buprenex) on request. One group was given no information about the analgesic effect of the regimen; one group was informed that the infusion received could be an analgesic or a placebo; the third was told that the infusion was a powerful analgesic. Although the three groups did not differ in reported level of pain, the group told that the infusion was a powerful analgesic used less opioid than the other two groups.

A meta-analysis of 114 published research studies comparing placebo with no treatment showed similar results (Hrobjartsson & Gotzsche, 2001). The studies analyzed investigated many clinical conditions; 27 of the 114 trials involved the treatment of pain. Other clinical conditions in the studies included obesity, asthma, hypertension, insomnia, and anxiety. Pain was the only condition in which a placebo effect was demonstrated.

The American Society of Pain Management Nurses (1996) holds the position that placebos (tablets or injections with no active ingredients) should not be used to assess or manage pain in any patient regardless of age or diagnosis. Furthermore, the group recommends that all health care institutions have policies in place prohibiting the use of placebos for this purpose. Educational programs should be conducted to educate providers about effective pain management, and ethics committees should assist in formulating these policies (Chart 13-2).

Nursing Assessment of Pain

The highly subjective nature of pain makes pain assessment and management challenges for every clinician. The report of pain is a social transaction; thus, assessment and management of pain require a good rapport with the person in pain. In assessing a patient with pain, the nurse reviews the patient’s description of the pain and other factors that may influence pain (eg, previous experience, anxiety, and age) as well as the person’s response to pain relief strategies. Documentation of the pain level as rated on a pain scale becomes part of the patient’s medical record, as does a record of the pain relief obtained from interventions.

Pain assessment includes determining what level of pain relief the acutely ill patient believes is needed to recover quickly or improve function, or what level of relief the chronically or terminally ill patient requires to maintain comfort (Chart 13-3). Part of a thorough pain assessment is to understand the patient’s expectations and misconceptions about pain (Chart 13-4). A person who understands that pain relief not only contributes to comfort but also hastens recovery is more likely to request or self-administer treatment appropriately.

CHARACTERISTICS OF PAIN

The factors to consider in a complete pain assessment are the intensity, timing, location, quality, personal meaning, aggravating and alleviating factors, and pain behaviors. The pain assessment begins by observing the patient carefully, noting the patient’s overall posture and presence or absence of overt pain behaviors and asking the person to describe, in his or her own words, the specifics of the pain. The words used to describe the pain may point toward the etiology. For example, the classic description of chest pain that results from a myocardial infarction includes pressure or squeezing on the chest. A detailed history should follow the initial description of pain.

Intensity

The intensity of pain ranges from none to mild discomfort to excruciating. There is no correlation between reported intensity and the stimulus that produced it. The reported intensity is influenced by the person’s pain threshold and pain tolerance. Pain threshold is the smallest stimulus for which a person reports pain, and the tolerance is the maximum amount of pain a person can tolerate. To understand variations, the nurse can ask about the present pain intensity as well as the least and the worst pain intensity. Various tools and surveys are helpful to patients trying to describe pain intensity. Examples of pain scales appear in Figure 13-5.

Timing

Sometimes the etiology of pain can be determined when time aspects are known. Therefore, the nurse inquires about the onset, duration, relationship between time and intensity, and whether there are changes in rhythmic patterns. The patient is asked if the pain began suddenly or increased gradually. Sudden pain that rapidly reaches maximum intensity is indicative of tissue rupture, and immediate intervention is necessary. Pain from ischemia gradually increases and becomes intense over a longer time. The chronic pain of arthritis illustrates the usefulness of determining the relationship between time and intensity, because people with arthritis usually report that pain is worse in the morning.
Pain at the End of Life

Pain is one of the most feared symptoms at the end of life. Most patients will experience pain as a terminal illness progresses. The inadequate treatment of cancer pain has been well documented (Agency for Health Care Policy and Research, 1994), and in the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT) (1995) investigators noted that nearly 40% of severely chronically ill and older patients who died in hospitals suffered moderate to severe pain in the last 3 days of life. The suffering caused by unrelieved pain touches all aspects of quality of life (activity, appetite, sleep) and can weaken an already fatigued person. Psychologically, unrelieved pain can create anxiety, and depression, negatively affect relationships, and promote thoughts of suicide.

The Joint Commission on Accreditation of Health Care Organizations (JCAHO) implemented pain standards in January 2001. These standards present a unique opportunity to improve care for hospitalized patients. Even though hospices and palliative care agencies are not subject to JCAHO review, many patients with chronic illness who are receiving palliative care may be hospitalized at various times. The standards emphasize pain assessment, patient and family education, continuity of care for symptom management, and evaluation of interventions.

Current barriers to pain management include lack of education, lack of access to opioids, fear of addiction, and legislative issues.

Need for Education
Ferrell et al. (2000) noted that of 45,683 nursing text pages reviewed, 902 were related to pain at the end of life. The end-of-life content constituted 2% of text pages, while the pain content represented only 0.5%. The researchers concluded that more specific content is needed to assist in educating students about pain and pain at the end of life.

Accessibility
The lack of access to opioids is another barrier to adequate pain relief. Patients may have difficulty affording medications. Some pharmacists, fearing crime, paperwork, and regulatory oversight, may not stock opioids or may keep limited quantities on hand. Some insurance companies limit the types of medications and the amount and frequency of renewal of analgesics.

Addiction Fears
The fear of addiction plays a role even at the end of life. Family members may be hesitant to assist the patient in pain management for fear of the social stigma of addiction. This causes needless pain and suffering.

Legal Barriers
Legislative issues play a role in the inadequate management of pain. Many states are enacting Intractable Pain Statutes. These laws aim to reduce physicians’ fear of civil or criminal liability or disciplinary action for aggressively managing pain. The tracking system by the Drug Enforcement Agency acts as a deterrent since opioids prescribed by physicians can be tracked. Some physicians fear that prescribing “too many” opioids could be interpreted as treating an addicted patient.

Other Issues
Pain management at the end of life differs little from general pain management. Patients still require comprehensive pain assessment and pain management, even though assessment may be hampered by confusion, delirium, or unconsciousness. Caregivers are taught to observe for signs of restlessness or facial expressions as a “proxy” indicator of pain.

Analgesic agents should be titrated to find the most effective dose and the best tolerated route. The nurse and family members should assess the effectiveness of the current pain therapy. If the pain is not relieved, a larger dose of medication may be necessary. If the pain continues, another medication may be needed or the patient should be given a different analgesic. The titration process requires frequent assessment to effectively manage pain. The analgesic agent or treatment should be appropriate for the type of pain. For example, neuropathic pain, usually described as burning, tingling, numbness, shooting, stabbing or electric, requires a different treatment approach compared to acute pain.

Nonpharmacologic approaches, such as guided imagery and relaxation, can be used to decrease pain and help the patient cope. Careful patient positioning and environmental control are other methods to increase patient comfort.

Respiratory depression should be assessed because over time, patients become tolerant to this side effect. The rate, depth, and level of consciousness should be monitored to determine whether respiratory depression is occurring and requires treatment. A respiratory rate of 6 per minute or greater is usually adequate. If respiratory depression is suspected, a decrease in the opioid dose may be indicated. Frequent stimulation to encourage deep breathing may be required until the opioid is metabolized. In the last few days of life the patient may become restless, which is an indicator of pain. The need to increase the opioid to provide pain relief and the respiratory effects of opioids are considered in decision making. However, comfort should be a priority in the case of a person who clearly is at the end of life, where cure is no longer the goal.

Side effects from analgesics must be managed as in other painful conditions. Tolerance to constipation is rare. Thus, a careful bowel regimen involving diet, bowel stimulants, stool softeners, and/or osmotic agents, must be instituted. Vigilance in the assessment, management, and treatment evaluation of other side effects is similar to that included in previous discussions.

Careful assessment and management of pain at the end of life can make a “good” death possible. Education of health care providers and the family can help patients realize the goal of adequate pain relief throughout the dying process.

Location
The location of pain is best determined by having the patient point to the area of the body involved. Some general assessment forms have drawings of human figures, and the patient is asked to shade in the area involved. This is especially helpful if the pain radiates (referred pain). The shaded figures are helpful in determining the effectiveness of treatment or change in the location of pain over time.

Quality
The nurse asks the patient to describe the pain in his or her own words without offering clues. For example, the patient is asked to describe what the pain feels like. Sufficient time must be allowed for the patient to describe the pain and for the nurse to carefully record all words that are used. If the patient cannot describe the quality of the pain, words such as burning, aching, throbbing, or stabbing can be offered. It is important to document the exact words used to describe the pain and which words were suggested by the nurse conducting the assessment.

Personal Meaning
Patients experience pain differently, and the pain experience can mean many different things. It is important to ask how the pain has affected the person’s daily life. Some people can continue to
work or study, while others may be disabled. The patient is asked if family finances have been affected. For others, the recurrence of pain may mean worsening of the disease, such as the spread of cancer. The meaning attached to the pain experience helps the nurse understand how the patient is affected and assists in planning treatment.

Aggravating and Alleviating Factors

The nurse asks the patient what if anything makes the pain worse and what makes it better and asks specifically about the relationship between activity and pain. This helps detect factors associated with pain. For example, in a patient with advanced metastatic cancer, pain with coughing may signal spinal cord compression. The nurse ascertains whether environmental factors influence pain since they may easily be changed to help the patient. For example, making the room warmer may help the patient relax and improve the patient’s pain. Finally, the patient is asked if family finances have been affected. For others, the recurrence of pain may mean worsening of the disease, such as the spread of cancer. The meaning attached to the pain experience helps the nurse understand how the patient is affected and assists in planning treatment.

Knowledge of alleviating factors assists the nurse in developing a treatment plan. Therefore, it is important to ask about the patient’s use of medication (prescribed and over the counter) and the amount and frequency. In addition, the nurse asks if herbal remedies, nonpharmacologic interventions, or alternative therapies have been used with success. This information assists the nurse in determining teaching needs.

Pain Behaviors

When experiencing pain, people express pain with many different behaviors. These nonverbal and behavioral expressions of pain are not consistent or reliable indicators of the quality or intensity of pain, and they should not be used to determine the presence of or the degree of pain experienced. Patients may gripe, cry, rub the affected area, guard the affected area, or immobilize it. Others may moan, groan, grunt, or sigh. Not all patients exhibit the same behaviors, and there may be different meanings associated with the same behavior.

**Common Concerns and Misconceptions About Pain and Analgesia**

- Complaining about pain will distract my doctor from his primary responsibility—curing my illness.
- Pain is a natural part of aging.
- I don’t want to bother the nurse—he/she is busy with other patients.
- Pain medicine can’t really control pain.
- People get addicted to pain medicine easily.
- It is easier to put up with pain than with the side effects that come from pain medicine.
- Good patients avoid talking about pain.
- Pain medicine should be saved in case the pain gets worse.
- Pain builds character. It’s good for you.
- Patients should expect to have pain; it’s part of almost every hospitalization.


Sometimes in the nonverbal patient, pain behaviors are used as a proxy to assess pain. It is unwise to make judgments and formulate treatment plans based on behaviors that may or may not indicate pain. In the case of an unconscious person, pain should always be assumed to be present and treated. All patients have a right to adequate pain management.

Physiologic responses to pain, such as tachycardia, hypertension, tachypnea, pallor, diaphoresis, mydriasis, hypervigilance, and increased muscle tone, are related to stimulation of the autonomic nervous system. These responses are short-lived as the body adapts to the stress. These physiologic signs could be the result of a change in the patient’s condition, such as the onset of hypovolemia. Using physiologic signs to indicate pain is unreliable. Although it is important to observe for any and all pain behaviors, the absence of these behaviors does not indicate an absence of pain.

**INSTRUMENTS FOR ASSESSING THE PERCEPTION OF PAIN**

Only the patient can accurately describe and assess his or her pain. Clinicians consistently underestimate a patient’s level of pain (McCaffery & Ferrell, 1997; McCaffery, Ferrell & Pasaro, 2000; Puntillo, Miaskowski, Kehrle et al., 1997; Thomas et al., 1998). Therefore, a number of pain assessment instruments have been developed to assist in the assessment of a patient’s perception of pain (see Fig. 13-5). Such instruments may be used to document the need for intervention, to evaluate the effectiveness of the intervention, and to identify the need for alternative or additional interventions if the initial intervention is ineffective in relieving the pain. For a pain assessment instrument to be useful, it must require little effort on the part of the patient, be easy to understand and use, be easily scored, and be sensitive to small

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**Figure 13-5** Examples of pain intensity scales.
Purpose
Nurses have a key role in pain assessment and management in all areas of clinical practice. Although previous studies have identified lack of knowledge about pain management as a factor contributing to undertreatment of pain, little is known about their personal opinions related to pain management. This study was conducted to explore how nurses’ personal opinions about pain intensity influence their decisions about pain assessment and about titration of the prescribed opioid to relieve severe pain.

Study Sample and Design
In this descriptive study, surveys were distributed as a pretest to a convenience sample of nurses attending pain conferences before receiving any information on pain. Data were collected at 20 locations throughout the United States. The surveys presented two vignettes describing patients with postoperative pain. The patients were identical except for their behavior; one patient was smiling and joking while the other remained quiet in bed and grimaced. Nurses were asked to identify their personal opinions about both patients’ reported pain intensity, what they would document in the patient record, and what opioid dose they would administer. Patients in both vignettes rated their pain as 8 on a scale of 0 to 10, indicating inadequate pain management and ineffective opioid doses to relieve severe pain. In both vignettes, it was made clear that increasing the opioid dose would be safe and appropriate. Completed surveys were returned by 1,276 nurses. Of these, a random sample of 100 surveys from each section of the country was obtained for a total of 400 surveys. Data from the 400 surveys were analyzed.

Findings
Although the nurses who completed the surveys indicated that they would record the patients’ pain as 8, fewer nurses believed the smiling patient than the grimacing patient. More nurses (78.3%) believed the grimacing patient’s pain intensity and 90% would have documented it correctly. A total of 39% of nurses reported believing the patient who was smiling, and 85.5% stated that they would have documented the reported pain intensity correctly. Nurses were also more likely to correctly increase the opioid dose for the grimacing patient; 62.5% of nurses indicated that they would have increased the dose for the grimacing patient, while only 47.3% reported that they would do so for the smiling patient. Of those nurses who would have increased the opioid dose for the grimacing patient, 16.3% would not do so for the smiling patient.

Nursing Implications
Comparing these results with those of previous studies conducted in 1990 and 1995, the authors noted considerable improvement in assessment and titration of opioids. However, the findings demonstrate that there is a continuing need for education about the different patient responses to pain and the importance of the patient’s report of the intensity of pain. More education is needed to address nurses’ responsibilities for opioid titration.

Guidelines for Using Pain Assessment Scales
Using a written scale to assess pain may not be possible if the person is seriously ill, is in severe pain, or has just returned from surgery. In these cases, the nurse can ask the patient, “On a scale of 0 to 10, 0 being no pain and 10 being pain as bad as it can be, how bad is your pain now?” For patients who have difficulty with a 0 to 10 scale, a 0 to 5 scale may be tried. Whichever scale is used, it should be used consistently. Most patients usually can respond without difficulty. Ideally, the nurse teaches the patient how to use the pain scale before the pain occurs (eg, before surgery). The patient’s numerical rating is documented and used to assess the effectiveness of pain relief interventions.

If the person does not speak English or cannot communicate clearly information needed to manage pain, an interpreter, translator, or family member familiar with the person’s method of communication should be consulted and a method established for pain assessment. Often a chart can be constructed with English words on one side and the foreign language on the other. The patient can then point to the corresponding word to tell the clinician about the pain.

When a person with pain is cared for at home by family caregivers or the home care nurse, a pain scale may help in assessing the effectiveness of the interventions, if the scale is used before and after the interventions are administered. Scales that address the location and pattern of pain may be useful to the home care nurse in identifying new sources or sites of pain in the chronically or terminally ill patient and in monitoring changes in the patient’s level of pain. The patient and family caregivers can be taught to use a pain assessment scale to assess and manage the patient’s pain. The home care nurse who sees
the patient only at intervals may thus benefit from consulting the patient’s or family’s written record of the pain scores to evaluate how effective the pain management strategies have been over time.

On occasion, a person will deny having pain when most people in similar circumstances would report significant pain. For example, it is not uncommon for a patient recovering from a total joint replacement to deny feeling “pain,” but on further questioning will readily admit to having a “terrible ache, but I wouldn’t call it pain.” From then on, when evaluating this person’s pain, the nurse would use the patient’s words rather than the word “pain.”

NURSE’S ROLE IN PAIN MANAGEMENT

Before discussing what the nurse can do to intervene in the patient’s pain, the nurse’s role in pain management is reviewed. The nurse helps relieve pain by administering pain-relieving interventions (including both pharmacologic and nonpharmacologic approaches), assessing the effectiveness of those interventions, monitoring for adverse effects, and serving as an advocate for the patient when the prescribed intervention is ineffective in relieving pain. In addition, the nurse serves as an educator to the patient and family to enable them to manage the prescribed intervention themselves when appropriate.
Identifying Goals for Pain Management

The information the nurse obtains from the pain assessment is used to identify goals for managing the pain. The goals identified are shared or validated with the patient. For a few patients, the goal may be elimination of the pain. For many, however, this expectation may be unrealistic. Other goals may include a decrease in the intensity, duration, or frequency of pain, and a decrease in the negative effects the pain has on the patient. For example, pain may have a negative effect by interfering with sleep and thereby hampering recovery from an acute illness or decreasing appetite. In such instances, the goals might be to sleep soundly and to take adequate nutrition. Chronic pain may affect the person’s quality of life by interfering with work or interpersonal relationships. Thus, a goal may be to decrease time lost from work or to increase the quality of interpersonal relationships.

To determine the goal, a number of factors are considered. The first is the severity of the pain, as judged by the patient. The second factor is the anticipated harmful effects of pain. A high-risk patient is at much greater risk for the harmful effects of pain than a young healthy patient. The third factor is the anticipated duration of the pain. In patients with pain from a disease such as cancer, the pain may be prolonged, possibly for the remainder of the patient’s life. Therefore, interventions will be needed for some time and should not detract from the patient’s quality of life. A different set of interventions is required if the patient is likely to have pain for only a few days or weeks.

In a study of the dying experience, family members of 2,451 people who had died were interviewed (Lynn, Teno, Phillips et al., 1997). Of these patients, 55% were conscious during their last 3 days of life. Of the conscious patients, 4 in 10 were considered by their family members to be in severe pain most of the time. These findings strongly suggest that pain relief for dying patients should be a primary goal.

The goals for the patient may be accomplished by pharmacologic or nonpharmacologic means, but most success will be achieved with a combination of both. In the acute stages of illness, the patient may be unable to participate actively in relief measures, but when sufficient mental and physical energy is present, the patient may learn self-management techniques to relieve the pain. Thus, as the patient progresses through the stages of recovery, a goal may be to increase the patient’s use of self-management pain relief measures.

Establishing the Nurse–Patient Relationship and Teaching

A positive nurse–patient relationship and teaching are key to managing analgesia in the patient with pain, because open communication and patient cooperation are essential to success. A positive nurse–patient relationship characterized by trust is essential. By conveying to the patient the belief that he or she has pain, the nurse often helps reduce the patient’s anxiety. Acknowledging to the patient, “I know that you have pain” often eases the patient’s mind. Occasionally, patients who fear that no one believes the reported pain feel relieved when they know that the nurse can be trusted to believe the pain exists.

Teaching is equally important, because the patient or family may be responsible for managing the pain at home and preventing or managing side effects. Teaching patients about pain and strategies to relieve it may reduce pain in the absence of other pain relief measures and may enhance the effectiveness of the pain relief measures used.

The nurse also provides information by explaining how pain can be controlled. The patient is informed, for example, that pain should be reported in the early stages. When the patient waits too long to report pain, sensitization may occur and the pain may be so intense that it is difficult to relieve. The phenomenon of sensitization is important in effective pain management. Since a heightened response is seen after exposure to a noxious stimulus, the response to that stimulus will be greater, causing the person to feel more pain. When health care providers assess and treat pain before it becomes severe, sensitization is diminished or avoided, and thus less medication is needed.

Providing Physical Care

The patient in pain may be unable to participate in the usual activities of daily living or to perform usual self-care and may need assistance to carry out these activities. The patient is usually more comfortable when physical and self-care needs have been met and efforts have been made to ensure as comfortable a position as possible. A fresh gown and change of bed linens, along with efforts to make the person feel refreshed (e.g., brushing teeth, combing hair), often increase the level of comfort and improve the effectiveness of the pain relief measures.

Providing physical care to the patient also gives the nurse (in acute, long-term, and home settings) the opportunity to perform a complete assessment and to identify problems that may contribute to the patient’s discomfort and pain. Appropriate and gentle physical touch during care may be reassuring and comforting. If topical treatments such as fentanyl (an opioid analgesic) patches or intravenous or intraspinal catheters are used, the skin around the patch or catheter should be assessed for integrity during physical care.

Managing Anxiety Related to Pain

Anxiety may affect a patient’s response to pain. The patient who anticipates pain may become increasingly anxious. Teaching the patient about the nature of the impending painful experience and the ways to reduce pain often decreases anxiety; a person who is experiencing pain will use previously learned strategies to reduce anxiety and pain. Learning about measures to relieve pain may lessen the threat of pain and give the person a sense of control.

What the nurse explains about the available pain relief measures and their effectiveness may also affect the patient’s anxiety level. The patient’s anxiety may be reduced by explanations that point out the degree of pain relief that can be expected from each measure. For example, the patient who is informed beforehand that an intervention may not eliminate pain completely is less likely to become anxious when a certain amount of pain persists. Anxiety resulting from anticipation of pain or the pain experience itself may often be managed effectively by establishing a relationship with the patient and by patient teaching.

A patient who is anxious about pain may be less tolerant of the pain, which in turn may increase the anxiety level. To prevent the pain and anxiety from escalating, the anxiety-producing cycle must be interrupted. Low levels of pain are easier to reduce or control than are more intense levels. (This concept of sensitization was previously discussed.) Consequently, pain relief measures should be used before pain becomes severe. Many patients believe that they should not request pain relief measures until they cannot tolerate the pain, making it difficult for medications to provide relief. Therefore, it is important to explain to all patients that pain relief or control is more successful if such measures begin before the pain becomes unbearable.
Pain Management Strategies

Reducing pain to a “tolerable” level was once considered the goal of pain management. However, even patients who have described pain relief as adequate often report disturbed sleep and marked distress because of pain. In view of the harmful effects of pain and inadequate pain management, the goal of tolerable pain has been replaced by the goal of relieving the pain. Pain management strategies include both pharmacologic and nonpharmacologic approaches. These approaches are selected on the basis of the patient’s requirements and goals. Appropriate analgesic medications are used as prescribed. They are not considered a last resort to be used only when other pain relief measures fail. Any intervention is most successful if initiated before pain sensitization occurs, and the greatest success is usually achieved if several interventions are applied simultaneously.

PHARMACOLOGIC INTERVENTIONS

Managing a patient’s pain pharmacologically is accomplished in collaboration with the physician or other primary care provider, the patient, and often the family. The physician or nurse practitioner prescribes specific medications for pain or may insert an intravenous line for administering analgesic medications. Alternatively, an anesthesiologist or nurse anesthetist may insert an epidural catheter for their administration. However, it is the nurse who maintains the analgesia, assesses its effectiveness, and reports if the intervention is ineffective or produces side effects.

The pharmacologic management of pain requires close collaboration and effective communication among health care providers. In the home setting, it is often the family who manages the patient’s pain and assesses the effectiveness of pharmacologic interventions, while it is the home care nurse who evaluates the adequacy of pain relief strategies and the family’s ability to manage the pain. The home care nurse reinforces teaching and ensures communication among the patient, family care providers, physician, pharmacist, and other health care providers involved in the patient’s care.

Premedication Assessment

Before administering any medication, the nurse asks the patient about allergies to medications and the nature of any previous allergic responses. True allergic or anaphylactic responses to opioids are rare, but it is not uncommon for a patient to report an allergy to one of the opioids. On further examination, the nurse often learns that the extent of the allergy was “itching” or “nausea and vomiting.” These responses are not allergies; rather, they are side effects that, when necessary, can be managed while the patient’s pain is relieved. The patient’s description of responses or reactions should be documented and reported before administering the medication.

The nurse obtains the patient’s medication history (eg, current, usual, or recent use of prescription or over-the-counter medications or herbal agents), along with a history of health problems. Certain medications or conditions may affect the analgesic medication’s effectiveness or the metabolism and excretion of analgesic agents. Before administering analgesic agents, the nurse should assess the patient’s pain status, including the intensity of current pain, changes in pain intensity after the previous dose of medication, and side effects of the medication.

Approaches for Using Analgesic Agents

Medications are most effective when the dose and interval between doses are individualized to meet the patient’s needs. The only safe and effective way to administer analgesic medications is by asking the patient to rate the pain and by observing the response to medications.

BALANCED ANESTHESIA

Pharmacologic interventions are most effective when a multimodal or balanced analgesia approach is used. Balanced analgesia refers to use of more than one form of analgesia concurrently to obtain more pain relief with fewer side effects. Three general categories of analgesic agents are opioids, NSAIDs, and local anesthetics. These agents work by different mechanisms. Using two or three types of agents simultaneously can maximize pain relief while minimizing the potentially toxic effects of any one agent. When one agent is used alone, it usually must be used in a higher dose to be effective. In other words, although it might require 15 mg morphine to relieve a certain pain, it may take only 8 mg morphine plus 30 mg ketorolac (an NSAID) to relieve the same pain.

PRO RE NATA (PRN)

In the past, the standard method used by most nurses and physicians in administering analgesia was to administer the analgesic pro re nata (PRN), or “as needed.” The standard practice was for the nurse to wait for the patient to complain of pain and then administer analgesia. As a result, many patients remained in pain because they did not know they needed to ask for medication or waited until the pain became intolerable.

By its very nature, the PRN approach to analgesia leaves the patient sedated or in severe pain much of the time. To receive pain relief from an opioid analgesic, the serum level of that opioid must be maintained at a minimum therapeutic level (Fig. 13-8). By the time the patient complains of pain, the serum opioid level is below the therapeutic level. From the time the patient requests pain medication until the nurse administers the medication, the patient’s serum level continues to fall. The lower the serum opioid level, the more difficult it is to achieve the therapeutic level with the next dose. The only way to ensure significant periods of analgesia, using this method, is to give doses large enough to produce periods of sedation.

PREVENTIVE APPROACH

Currently, a preventive approach to relieving pain by administering analgesic agents is considered the most effective strategy because a therapeutic serum level of medication is maintained. With the preventive approach, analgesic agents are administered at set intervals so that the medication acts before the pain becomes severe and before the serum opioid level falls to a subtherapeutic level.

Administering analgesic medication on a time basis, rather than on the basis of the patient’s report of pain, prevents the serum drug level from falling to subtherapeutic levels. An example of this would be giving the patient the prescribed morphine or the prescribed NSAID (ibuprofen) every 4 hours rather than waiting until the patient complains of pain. If the patient’s pain is likely to occur around the clock or for a great portion of a 24-hour period, a regular around-the-clock schedule of administering analgesia may be indicated. Even if the analgesic is prescribed PRN, it can be administered on a preventive basis before the pa-
The patient is in severe pain, as long as the prescribed interval between doses is observed. The preventive approach reduces the peaks and troughs in the serum level and provides more pain relief for the patient with fewer adverse effects.

Smaller doses of medication are needed with the preventive approach because the pain does not escalate to a level of severe intensity. Thus, a preventive approach may result in the administration of less medication over a 24-hour period, thereby helping prevent tolerance to analgesic agents and decreasing the severity of side effects (e.g., sedation and constipation). Better pain control can be achieved with a preventive approach, reducing the amount of time the patient spends in pain.

In using the preventive approach, the nurse assesses the patient for sedation before administering the next dose. The goal is to provide analgesia before the pain becomes severe. It would not be safe to medicate a patient (with an opioid) repeatedly if he or she was sedated or having no pain. It may be necessary to decrease the dosage of the opioid analgesic so that the patient receives pain relief with less sedation.

**INDIVIDUALIZED DOSAGE**

The dosage and the interval between doses should be based on the patient’s requirements rather than on an inflexible standard or routine. People metabolize and absorb medications at different rates and experience different levels of pain. Therefore, one dose of an opioid medication given at specified intervals may be effective for one patient but ineffective for another.

Because of the fear of promoting addiction or causing respiratory depression, health care providers tend to prescribe and administer inadequate dosages of opioid agents to treat acute pain or chronic pain in the terminally ill patient (Chart 13-5). However, even prolonged administration of opioid agents is associated with an extremely low incidence (less than 1%) of addiction. Furthermore, small doses are not necessarily safe doses. For example, some patients receiving a relatively small dose (25 to 50 mg) of meperidine (Demerol) intramuscularly have experienced respiratory depression, whereas other patients have not exhibited any sedation or respiratory depression with very large doses of opioids.

**Figure 13-8** Relationship of mode of delivery of analgesia to serum analgesic level. Top: intramuscular (IM) and intravenous patient-controlled analgesia (PCA); bottom: transdermal (TD) and transmucosal (●).

**Chart 13-5 • Ethics and Related Issues**

**Inadequate Pain Management**

**Situation**

When taking over the care of ethnic minority patients at the change of shift from a particular colleague, you usually find these patients to be in a great deal of pain. Your nonsystematic observations have led you to conclude these patients receive only a small portion of the analgesia prescribed for them. You have heard a nurse colleague state a belief that people of certain ethnic groups have “no pain tolerance” and are “just looking for drugs.”

**Dilemma**

Racial biases are difficult to change and deal with. To confront this nurse may not alter the behavior but will certainly disrupt the working relationships on the unit. It would be easier to look the other way. On the other hand, you believe that the nurse is giving inadequate and unethical care to selected patients and placing them at greater risk for postoperative complications.

**Discussion**

• What information would you need to collect before acting?
• From whom could you seek counsel?
• Are the two aspects of the dilemma equally important?
Therefore, the effects of opioid analgesic medications must be monitored, especially when the first dose is given or when the dose is changed or given more frequently. The time, date, the patient’s pain rating (scale of 0 to 10), the analgesic agent, other pain relief measures, side effects, and patient activity are recorded. When the first dose of an analgesic is administered, the nurse needs to record a pain rating score, blood pressure, and respiratory and pulse rates (all of which are considered “vital signs”). If the pain has not decreased in 30 minutes (sooner if an intravenous route is used) and the patient is reasonably alert and has a satisfactory respiratory status, blood pressure, and pulse rate, then some change in analgesia is indicated. Although the dose of analgesic medication is safe for this patient, it is ineffective in relieving the pain. Therefore, another dose of medication may be indicated. In such instances, the nurse consults with the physician to determine what further action is warranted.

**PATIENT-CONTROLLED ANALGESIA**

Used to manage postoperative pain as well as chronic pain, patient-controlled analgesia (PCA) allows patients to control the administration of their own medication within predetermined safety limits. This approach can be used with oral analgesics as well as with continuous infusions of opioid analgesic agents by intravenous, subcutaneous, or epidural routes. PCA can be used in the hospital or home setting.

The PCA pump permits the patient to self-administer continuous infusions of medication (basal rates) safely and to administer extra medication (bolus doses) with episodes of increased pain or painful activities. A PCA pump is electronically controlled by a timing device. Patients experiencing pain can administer small amounts of medication directly into their intravenous, subcutaneous, or epidural catheter by pressing a button. The pump then delivers a preset amount of medication.

The PCA pump also can be programmed to deliver a constant, background infusion of medication or basal rate and still allow the patient to administer additional bolus doses as needed. The timer can be programmed to prevent additional doses from being administered until a specified time period has elapsed (lock-out time) and until the first dose has had time to exert its maximal effect. Even if the patient pushes the button multiple times in rapid succession, no additional doses are released. If another dose is required at the end of the delay period, the button must be pushed again to receive the dose. Patients who are controlling their own opioid administration usually become sedated and stop pushing the button before any significant respiratory depression occurs. Nevertheless, assessing respiratory status remains a major role for the nurse.

A continuous infusion plus bolus doses may be effective with cancer patients who require large doses of analgesics, or for postsurgical patients. Although this allows for uninterrupted sleep, the risk of sedation increases, especially when the patient has minimal or decreasing pain.

Patients who use PCA achieve better pain relief (Walder, Schafer, Henzi et al., 2001) and often require less pain medication than those who are treated in the standard PRN fashion. Because the patient can maintain a near-constant level of medication, the periods of severe pain and sedation that occur with the traditional PRN regimen are avoided.

To initiate PCA or any analgesia used at home or in the hospital, it is important to avoid playing “catch-up.” Pain should be brought under control before PCA starts, often by the use of an initial, larger bolus dose or loading dose. Then, after control is achieved, the pump is programmed to deliver small doses of medication at a time. If the patient with severe pain has a low serum level of opioid analgesic because of an inadequate basal rate, it is difficult to regain control with the small doses available by pump. Before the PCA pump is used, repeated bolus doses of an intravenous opioid may be administered as prescribed over a short time until the pain is relieved. Then PCA is initiated. If pain control is not achieved with the maximal dose of medication prescribed, further prescriptions are obtained. The goal is to achieve a minimum therapeutic level of analgesia and to allow the patient to maintain that level by using the PCA pump. The patient is instructed not to wait until the pain is severe before pushing the button to obtain a bolus dose. The patient is also reminded not to become so distracted by an activity or visitor that he or she forgets to self-administer a prescribed dose of medication. One potential drawback to distraction is that a patient who is using a PCA pump may not self-administer any analgesia during the time of effective distraction. When distraction ends suddenly (eg, the movie ends or the visitors leave), the patient may be left without a therapeutic serum opioid level. When intermittent distraction is used for pain relief, a continuous low-level background infusion of opioid through the PCA pump may be prescribed so that when the distraction ends, it will not be necessary to try to catch up.

If PCA is to be used in the patient’s home, the patient and family are taught about the operation of the pump and the side effects of the medication and strategies to manage them.

**Local Anesthetic Agents**

Local anesthetics work by blocking nerve conduction when applied directly to the nerve fibers. They can be applied directly to the site of injury (eg, a topical anesthetic spray for sunburn) or directly to nerve fibers by injection or at the time of surgery. They can also be administered through an epidural catheter.

**TOPICAL APPLICATION**

Local anesthetic agents have been successful in reducing the pain associated with thoracic or upper abdominal surgery when injected by the surgeon intercostally. Local anesthetic agents are rapidly absorbed into the bloodstream, resulting in decreased availability at the surgical or injury site and an increased anesthetic level in the blood, increasing the risk of toxicity. Therefore, a vasoconstrictive agent (eg, epinephrine or phenylephrine) is added to the anesthetic agent to decrease its systemic absorption and to maintain its concentration at the surgical or injury site.

A topical anesthetic agent known as eutectic mixture or emulsion of local anesthetics, or EMLA cream, has been effective in preventing the pain associated with invasive procedures such as lumbar puncture or the insertion of intravenous lines. To be effective, EMLA must be applied to the site 60 to 90 minutes before the procedure.

**INTRASPINAL ADMINISTRATION**

Intermittent or continuous administration of local anesthetic agents through an epidural catheter has been used for years to produce anesthesia during surgery. Although the administration of local anesthetic agents in the spinal canal is still largely confined to acute pain, such as postoperative pain and pain associated with labor and delivery, the epidural administration of local anesthetic agents for pain management is increasing.
A local anesthetic agent administered through an epidural catheter is applied directly to the nerve root. The anesthetic agent can be administered continuously in low doses, intermittently on a schedule, or on demand as the patient requires it, and is often combined with the epidural administration of opioids. Surgical patients treated with this combination experience fewer complications after surgery, ambulate sooner, and have shorter hospital stays than patients receiving standard therapy (Correll, Viscusi, Grunwald et al., 2001).

**Opioid Analgesic Agents**

Opioids can be administered by various routes, including oral, intravenous, subcutaneous, intraspinal, intranasal, rectal, and transdermal routes. The goal of administering opioids is to relieve pain and improve quality of life; therefore, the route of administration, dose, and frequency of administration are determined on an individual basis. Factors that are considered in determining the route, dose, and frequency of medication include the characteristics of the pain (eg, its expected duration and severity), the overall status of the patient, the patient’s response to analgesic medications, and the patient’s report of pain. Although the oral route is usually preferred for administering opioids, oral opioids must be given frequently enough and in large enough doses to be effective. Opioid analgesic agents given orally may provide a more consistent serum level than those given intramuscularly.

If the patient is expected to require opioid analgesic agents at home, the patient’s and the family’s ability to administer opioids as prescribed is considered in planning. Steps are taken to ensure that the medication will be available to the patient. Many pharmacies, especially those in smaller rural areas or inner cities, may be reluctant to stock large amounts of opioids. Therefore, arrangements for obtaining these prescription medications must be made ahead of time.

With the administration of opioids by any route, side effects must be considered and anticipated. Anticipating side effects and taking steps to minimize them increase the likelihood that the patient will receive adequate pain relief without interrupting therapy to treat these effects.

**Respiratory Depression and Sedation**

Respiratory depression is the most serious adverse effect of opioid analgesic agents administered by intravenous, subcutaneous, or epidural routes. However, it is relatively rare because doses administered through these routes are small, and tolerance to respiratory depressant effects increases if the dose is increased slowly. The risk of respiratory depression increases with age and the concomitant use of other opioids or other central nervous system depressants. The risk of respiratory depression also increases when the catheter is placed in the thoracic area and when the intra-abdominal or intrathoracic pressure is increased.

The patient receiving opioids by any route must be assessed frequently for changes in respiratory status. Specific notable changes are decreasing respiratory rate or shallow respirations. Despite the risks associated with their use, intravenous and epidural opioids are considered safe, with the risks related to epidural administration no greater than those related to intravenous or other systemic routes of administration. Sedation, which may occur with any method of administering opioids, is likely to occur when opioid doses are increased. However, the patient often develops tolerance quickly, so that in a short time the patient is no longer sedated by the dose that initially caused sedation. Increasing the time between doses or reducing the dose temporarily, as prescribed, usually prevents deep sedation from occurring. The patient at risk for sedation must be monitored closely for changes in respiratory status. The patient is also at risk for other problems associated with sedation and immobility. Therefore, the nurse must initiate strategies to prevent problems such as skin breakdown.

**Nausea and Vomiting**

Nausea and vomiting frequently occur with opioid use. Usually these effects occur some hours after the initial injection. Patients, especially postoperative patients, may not think to tell the nurse that they are nauseated, particularly if the nausea is mild. However, the patient receiving an opioid should be assessed for nausea and vomiting, which may be triggered by a position change and may be prevented by having the patient change positions slowly. Adequate hydration and the administration of antiemetic agents may decrease the incidence. Opioid-induced nausea and vomiting often subside within a few days.

**Constipation**

Constipation, a common side effect of opioid use, may become so severe that the patient is forced to choose between relief of pain and relief of constipation. This situation can occur in patients after surgery and in patients receiving large doses of opioids to treat cancer-related pain. Preventing constipation must be a high priority in all patients receiving opioids. Whenever a patient receives opioids, a bowel regimen should begin at the same time. Tolerance to this side effect does not occur; rather, it persists even with long-term use of opioids.

Several strategies may help prevent and treat opioid-related constipation. Mild laxatives and a high intake of fluid and fiber may be effective in managing mild constipation. Unless contraindicated, a mild laxative and a stool softener should be administered on a regular schedule. Continued severe constipation, however, often requires the use of a stimulating cathartic agent, such as senna derivatives (Senokot) or bisacodyl (Dulcolax). Oral laxatives and stool softeners may prevent constipation; rectal suppositories may be used if oral agents fail (Plaisance & Ellis, 2002).

**Inadequate Pain Relief**

One factor commonly associated with ineffective pain relief is an inadequate dose of opioid. This is most likely to occur when the caregiver underestimates the patient’s pain or the route of administration is changed without the differences in absorption and action being considered. Consequently, the patient receives doses too small to be effective and, possibly, too infrequently to relieve pain. For example, if opioid delivery is changed from the intravenous route to the oral route, the oral dose must be approximately three times greater than that given parenterally to provide relief. Because of differences in absorption of orally administered opioids among individuals, the patient must be assessed carefully to ensure that the pain is relieved.

Table 13-2 lists opioids and dosages that are equivalent to morphine. In general, no recalculation needs to be done when switching from one brand of an agent to another brand of the same medication, with the exception of extended-release oral morphine. Currently, three brands of extended-release morphine (MS Contin, Oramorph, Kadian) are commonly used by cancer patients. Although these agents come in the same dosage form and contain the same drug, they are not considered therapeutically equivalent because they employ different release mechanisms. Patients who need to switch brands should be monitored carefully both for overdose and for inadequate pain relief.
OTHER EFFECTS OF OPIOIDS

During the health history, when asked about drug allergies, patients with previous hospital experience (especially for surgery) may report that they are “allergic” to morphine. This report should be thoroughly investigated. Commonly, this “allergy” will be described as itching only. Pruritus (itching) is a frequent problem associated with opioids administered through any route, but it is not an allergic reaction. Itching can be relieved by administering prescribed antihistamines. Euphoriadically administered opioids may also cause urinary retention or pruritus. The patient should be monitored and may require urinary catheterization. Small doses of naloxone may be prescribed to relieve these problems in patients who are receiving epidural opioids for the relief of acute postoperative pain.

A number of factors may influence the safety and effectiveness of opioid administration. Opioid analgesic agents are primarily metabolized by the liver and excreted by the kidney. Therefore, metabolism and excretion of analgesic medications will be impaired in patients with liver or kidney disease, increasing the risk of cumulative or toxic effects. In addition, normeperidine, a metabolite of meperidine, may rapidly or unexpectedly accumulate to toxic levels. This is more likely to occur in patients with impaired kidney function and may result in seizures in susceptible patients.

Patients with untreated hypothyroidism are more susceptible to the analgesic effects and side effects of opioids. In contrast, patients with hyperthyroidism may require larger doses for pain relief. Patients with a decreased respiratory reserve from disease or aging may be more susceptible to the depressant effects of opioids and must be carefully monitored for respiratory depression.

Dehydrated patients are at increased risk for the hypotensive effects of opioids. Patients who become hypotensive after the administration of an opioid should be kept recumbent and rehydrated unless fluids are contraindicated. Patients who are dehydrated are also more likely to experience nausea and vomiting with opioid use. Rehydration usually relieves these symptoms.

Patients receiving certain other medications, such as monoamine oxidase (MAO) inhibitors, phenothiazines, or tricyclic antidepressants, may have an exaggerated response to the depressant effects of opioids. Patients taking these medications should receive small doses of opioids and must be monitored closely. Continued pain in these patients indicates that a therapeutic level of the analgesic has not been achieved. The patient must be monitored for sedation even if an analgesic effect has not been obtained.

TOLERANCE AND ADDICTION

There is no maximum safe dosage of opioids, nor is there any easily identifiable therapeutic serum level. Both the maximal safe dosage and therapeutic serum level are relative and individual. Tolerance (the need for increasing doses of opioids to achieve the same therapeutic effect) will develop in almost all patients taking opioids over an extended period. Patients requiring opioids over a long term, especially cancer patients, will need increasing doses to relieve pain. After the first few weeks of therapy, the patient’s dosing requirements usually level off. Patients who become tolerant to the analgesic effects of large doses of morphine may obtain pain relief by switching to a different opioid. Symptoms of physical dependence may occur when the opioids are discontinued; dependence often occurs with opioid tolerance and does not indicate an addiction.

Addiction is a behavioral pattern of substance use characterized by a compulsion to take the drug primarily to experience its psychic effects. Fear that patients will become addicted or dependent on opioids has contributed to inadequate treatment of pain. This fear is commonly expressed by health care providers as well as patients and results from lack of knowledge about the low risk of addiction.

In an often-cited classic study (Porter & Jick, 1980) of more than 11,000 patients receiving opioids for a medical indication, only four patients without a history of substance abuse could be identified as becoming addicted. Addiction following therapeutic opioid administration is so negligible that it should not be a consideration when caring for the patient in pain. Thus, patients and health care providers should be dissuaded from withholding pain medication because of concerns about addiction.

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**Table 13-2 • Equianalgesic Conversion Table**

<table>
<thead>
<tr>
<th>Drug</th>
<th>IV/IM/SQ</th>
<th>PO</th>
<th>IV:PO Ratio</th>
<th>Half-life (in hours)</th>
<th>Duration (in hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine sulfate</td>
<td>10 mg</td>
<td>30 mg</td>
<td>1:3</td>
<td>2 to 3</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Codeine</td>
<td>130 mg</td>
<td>200 mg</td>
<td>NA</td>
<td>2 to 3</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>1.5 mg</td>
<td>7.5 mg</td>
<td>1:5</td>
<td>2 to 3</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Levorphanol</td>
<td>2 mg</td>
<td>4 mg</td>
<td>1:2</td>
<td>12 to 15</td>
<td>4 to 6</td>
</tr>
<tr>
<td>Meperidine</td>
<td>75 mg</td>
<td>300 mg</td>
<td>1:4</td>
<td>3 to 4</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Methadone</td>
<td>10 mg</td>
<td>20 mg</td>
<td>1:2</td>
<td>12 to 190</td>
<td>4 to 8</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>NA</td>
<td>20 to 30 mg</td>
<td>NA</td>
<td>2 to 3</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>1 mg or 10-mg suppository</td>
<td>NA</td>
<td>NA</td>
<td>2 to 3</td>
<td>2 to 4</td>
</tr>
<tr>
<td>Fentanyl (transdermal)</td>
<td>100-mg patch = 4 mg/hr</td>
<td>morphine sulphate based on anecdotal experience</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NA = not applicable.

Nonsteroidal Anti-inflammatory Drugs

NSAIDs are thought to decrease pain by inhibiting cyclo-oxygenase (COX), the rate-limiting enzyme involved in the production of prostaglandin from traumatized or inflamed tissues. There are two types of COX: COX-1 and COX-2. COX-1 is involved with mediating prostaglandin formation involved in the maintenance of physiologic functions. Some of the physiologic functions include platelet aggregation through the provision of thromboxane precursors and increased gastric mucosal blood flow. This prevents ischemia and promotes mucosal integrity. Inhibition of COX-1 will result in gastric ulceration, bleeding, and renal damage. The second type, COX-2, mediates prostaglandin formation that results in symptoms of pain, inflammation, and fever. Thus, inhibition of COX-2 is desirable. Newer NSAIDs such as celecoxib (Celebrex), rofecoxib (Vioxx), and valdecoxib (Bextra) are COX-2 inhibitors. Ibuprofen (Advil, Motrin), another NSAID, blocks both COX-1 and COX-2 and is effective in relieving mild to moderate pain and has a low incidence of adverse effects. Aspirin, the oldest NSAID, also blocks COX-1 as well as COX-2; however, because it causes frequent and severe side effects, aspirin is infrequently used to treat significant acute or chronic pain.

NSAIDs are very helpful in treating arthritic diseases and may be especially powerful in treating cancer-related bone pain. They have been effectively combined with opioids to treat postoperative and other severe pain. The use of an NSAID with an opioid relieves pain more effectively than the opioid alone. In such cases, the patient may obtain pain relief with less opioid and fewer side effects. It has been shown that intraoperative administration of NSAIDs results in improved postoperative pain control following laparoscopic surgery and in some cases shorter hospital stays (McLaughlin, 1994).

A regimen of a fixed-dose, time-contingent NSAID (eg, every 4 hours) and a separately administered fluctuating dose of opioid may be effective in managing moderate to severe cancer pain. In more severe pain, the opioid dose will also be fixed, with an additional fluctuating dose as needed for breakthrough pain (a sudden increase in pain despite the administration of pain-relieving medications). These regimens result in better pain relief with fewer opioid-related side effects.

Most patients tolerate NSAIDs well. However, those with impaired kidney function may require a smaller dose and must be monitored closely for side effects. Patients taking NSAIDs bruise easily because NSAIDs have some anticoagulant effect. Moreover, they may displace other medications, such as warfarin (Coumadin), from serum proteins and increase their effects. High doses or prolonged use can irritate the stomach and in some cases result in gastrointestinal bleeding as well. Thus, monitoring the patient for gastrointestinal bleeding is indicated.

Gerontologic Considerations Related to Analgesic Agents

Physiologic changes in older adults require that analgesic agents be administered with caution. Drug interactions are more likely to occur in older adults because of the higher incidence of chronic illness and the increased use of prescription and over-the-counter medications. Although the elderly population is an extremely heterogeneous group, differences in response to pain or medications by a patient in this 40-year span (60 to 100 years) are more likely to be due to chronic illness or other individual factors than age. Before administering opioid and nonopioid analgesic agents to elderly patients, the nurse needs to obtain a careful medication history to identify potential drug interactions.

Absorption and metabolism of medications are altered in elderly patients because of decreased liver, renal, and gastrointestinal function. In addition, changes in body weight, protein stores, and distribution of body fluid alter the distribution of medications in the body. As a result, medications are not metabolized as quickly and blood levels of the medication remain higher for a longer period. Elderly patients are more sensitive to medications and at an increased risk for drug toxicity (American Geriatrics Society, 1998).

Opioid and nonopioid analgesic medications can be given effectively to elderly patients but must be used cautiously because of the increased susceptibility to depression of both the nervous and the respiratory systems. Although there is no reason to avoid opioids simply because a person is elderly, meperidine should be avoided because its active and neurotoxic metabolite, normeperidine, is more likely to accumulate in the elderly. In addition, because of decreased binding of meperidine by plasma proteins, blood concentrations of the medication twice those found in younger patients may result.

In many cases, the initial dose of analgesic medication prescribed for an elderly patient may be the same as that for a younger person, or slightly smaller than the normal dose, but because of slowed metabolism and excretion related to aging, the safe interval for subsequent doses may be longer (or prolonged). As always, the best guide to pain management and administration of analgesic agents in all patients regardless of age is what the patient says. The elderly patient may obtain more pain relief for a longer time than a younger patient. As a result, smaller, less frequent doses may be required. The American Geriatrics Society (2002) has published clinical practice guidelines for managing chronic pain in elderly patients.

Tricyclic Antidepressant Agents and Anticonvulsant Medications

Pain of neurologic origin (eg, causalgia, tumor impingement on a nerve, postherpetic neuralgia) is difficult to treat and in general is not responsive to opioid therapy. When these pain syndromes are accompanied by dysesthesia (burning or cutting pain), they may be responsive to a tricyclic antidepressant or an anticonvulsant agent. When indicated, tricyclic antidepressant agents, such as amitriptyline (Elavil) or imipramine (Tofranil), are prescribed in doses considerably smaller than those generally used for depression. The patient needs to know that a therapeutic effect may not occur before 3 weeks. Antiseizure medications such as phenytoin (Dilantin) or carbamazepine (Tegretol) also are used in doses lower than those prescribed for seizure disorders. Because a variety of medications can be tried, the nurse should be familiar with the possible side effects and should teach the patient and family how to recognize these effects.

ROUTES OF ADMINISTRATION

The route selected for administering an analgesic agent (Table 13-3) depends on the patient’s condition and the desired effect of the medication. Analgesic agents can be administered by parenteral, oral, rectal, transdermal, transmucosal, intraspinal, or epidural routes. Each method of administration has advantages and disadvantages. The route chosen should be based on the patient’s needs.

Parenteral

Parenteral administration (intramuscular, intravenous, or subcutaneous) of the analgesic medication produces effects more rapidly than oral administration, but these effects are of shorter...
duration. Parenteral administration may be indicated if the patient is not permitted oral intake or is vomiting. Medication administered by the intramuscular route enters the bloodstream more slowly than medication given intravenously and is metabolized slowly. The rate of absorption may be erratic; it depends on the site selected and the amount of body fat.

The intravenous route is an alternative to intramuscular injection for many but not all analgesic medications. The intravenous route is the preferred parenteral route in most acute care situations because it is much more comfortable for the patient. In addition, peak serum levels and pain relief occur more rapidly and reliably. Because it peaks rapidly (usually within minutes) and is metabolized quickly, an appropriate intravenous dose will be smaller and prescribed at shorter intervals than an intramuscular dose.

Intravenous opioids may be administered by IV push or slow push (eg, over a 5- to 10-minute period) or by continuous infusion with a pump. Continuous infusion provides a steady level of analgesia and is indicated when pain occurs over a 24-hour period (eg, after surgery for the first day or so, or in a patient with prolonged cancer pain who cannot take medication by other routes). The dose of analgesic agent is calculated carefully to relieve pain without producing respiratory depression and other side effects.

The subcutaneous route for infusion of opioid analgesic agents is used for patients with severe pain such as cancer pain; it is particularly useful for patients with limited intravenous access who cannot take oral medications, and patients who are managing their pain at home. The dose of opioid that can be infused through this route is limited because of the small volume that can be administered at one time into the subcutaneous tissue. However, this route is often an effective and convenient way to manage pain.

**Oral Route**

If the patient can take medication by mouth, oral administration is preferred over parenteral administration because it is easy, noninvasive, and not painful. Severe pain can be relieved with oral opioids if the doses are high enough (see Table 13-2).

In terminally ill patients with prolonged pain, doses may gradually be increased as the disease progresses and causes more pain or as the person builds up a tolerance to the medication. If these higher doses are increased gradually, they usually provide additional pain relief without producing respiratory depression or sedation. If the route of administration is changed from a parenteral route to the oral route at a dose that is not equivalent in strength (equianalgesic), the smaller oral dose may result in a withdrawal reaction and recurrence of pain.

**Rectal Route**

The rectal route of administration may be indicated in patients who cannot take medications by any other route. The rectal route may also be indicated for patients with bleeding problems, such as hemophilia. The onset of action of opioids administered rectally is unclear but is delayed compared with other routes of administration. Similarly, the duration of action is prolonged.

**Transdermal Route**

The transdermal route has been used to achieve a consistent opioid serum level through absorption of the medication via the skin. This route is most often used for cancer patients who are at home or in hospice care and who have been receiving oral sustained-release morphine. Fentanyl (Duragesic) is the only commercially available transdermal medication. The preparation is a patch consisting of a reservoir containing the medication and a membrane.

When the transdermal system is first applied to the skin, the fentanyl, which is fat-soluble, binds to the skin and fat layers. Then it is slowly and systematically absorbed. Therefore, there is a delay in effect while the dermal layer is being saturated. A drug reservoir actually forms in the upper layer of skin. This results in a slowly rising serum level and a slow tapering of the serum level once the patch is removed (see Fig. 13-8). Because it takes 12 to 24 hours for the fentanyl levels to gradually increase from the first patch, the last dose of sustained-release morphine should be given at the same time the first patch is applied (Donner et al., 1996). Transdermal fentanyl is associated with slightly less constipation than oral opioids. Absorption is increased in the febrile patient. A heating pad should never be applied to the area where the patch is applied. Transdermal fentanyl is much more expensive than sustained-release morphine but less costly than methods that deliver parenteral opioids.

Once it is determined that switching from other routes of morphine administration to the patch is appropriate, the correct dosage for the patch must be calculated. If the patient uses an opioid other than morphine, conversion to milligrams of oral morphine is the first step. After determining how many milligrams of morphine (or morphine equivalents) the patient has been using over 24 hours, an initial dose of transdermal fentanyl can be calculated.

Pasaro (1997) suggests one method of calculating the initial dose of fentanyl: the patient’s daily dose of morphine is divided by two. Thus, the equivalent of 400 mg morphine used per day would be equivalent to 200 g fentanyl per hour. Patients switched from morphine to fentanyl need to be assessed not only for pain and potential side effects but also for dependence, reflected by withdrawal symptoms, which may consist of shivering, a feeling of coldness, sweating, headache, and paresthesia (Puntillo, Casella et al., 1997). Patients may require short-acting opioids for breakthrough pain before the systemic fentanyl level reaches a therapeutic level.

These conversions and the conversion-type table in the transdermal fentanyl packet insert should be used only to establish the initial dose of fentanyl when the patient switches from oral morphine to fentanyl (and not vice versa). These tables and equations

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### Table 13-3 • Administration Routes for Analgesics

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenteral</td>
<td>Intramuscular (IM)</td>
</tr>
<tr>
<td></td>
<td>Intravenous (IV)</td>
</tr>
<tr>
<td></td>
<td>Subcutaneous (SC)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>Oral (PO)</td>
</tr>
<tr>
<td></td>
<td>Rectal (PR)</td>
</tr>
<tr>
<td>Transdermal</td>
<td>Skin</td>
</tr>
<tr>
<td>Transmucosal</td>
<td>Oral mucosa</td>
</tr>
<tr>
<td></td>
<td>Intranasal mucosa</td>
</tr>
<tr>
<td></td>
<td>Bronchial mucosa</td>
</tr>
<tr>
<td>Epidural</td>
<td>Epidural space</td>
</tr>
<tr>
<td>Intraspinal</td>
<td>Spinal canal</td>
</tr>
</tbody>
</table>
are not meant to be used to determine the dosages of oral morphine for a patient who has been receiving transdermal fentanyl. Many patients will not achieve satisfactory analgesia from the initial dose of transdermal fentanyl and will require an increase in their fentanyl dose to treat breakthrough pain. If the table or equation is used incorrectly to calculate a morphine dose, there is a risk of overdose. If the patient requires a change from transdermal fentanyl back to oral or intravenous morphine (as in the case of surgery), the patch should be removed and intravenous morphine supplied on an assessed need basis.

Before applying a new patch, the patient should be carefully checked for any older, forgotten patches. These should be discarded. Patches should be replaced every 72 hours.

**Transmucosal Route**

The person with cancer pain who is being cared for at home may be receiving continuous opioids using sustained-release morphine, hydromorphone, oxycodone, transdermal fentanyl, or other medications. These patients often experience short episodes of severe pain (eg, after coughing or moving), or they may experience sudden increases in their baseline pain resulting from a change in their condition. These periods, called breakthrough pain, can be well managed with an oral dose of a short-acting transmucosal opioid that has a rapid onset of action. Currently the only transmucosal opioid available is fentanyl, a lozenge on an applicator stick (often referred to as a lollipop by patients).

Currently the only approved and commercially available transmucosal opioid analgesic agents in a nasal spray form are butorphanol (Stadol) and fentanyl. Butorphanol is a complex medication that simultaneously acts to induce or promote (agonist) and inhibit or reverse (antagonist) opioid effects. It works like an opioid agonist and an opioid antagonist at the same time. Butorphanol in any form cannot be combined with other opioids (eg, for cancer breakthrough pain) because the antagonist component will block the action of the opioids the patient is already receiving. The principal use of this agent is for brief, moderate to severe pain, such as migraine headaches.

Intranasal fentanyl is useful in cancer-related breakthrough pain. Given in this form, analgesia is achieved within 5 to 10 minutes and was rated as achieving analgesia superior to oral morphine by 50% of patients in one study (Zeppetella, 2000).

**Intraspinal and Epidural Routes**

Infusion of opioids or local anesthetic agents into the subarachnoid space (intrathecal space or spinal canal) or epidural space has been used for effective control of pain in postoperative patients and those with chronic pain unrelieved by other methods. A catheter is inserted into the subarachnoid or the epidural space at the thoracic or lumbar level for administration of opioid or anesthetic agents (Fig. 13-9). With intrathecal administration, the medication infuses directly into the subarachnoid space and cerebrospinal fluid, which surrounds the spinal cord. With epidural administration, medication is deposited in the dura of the spinal canal and diffuses into the subarachnoid space. It is believed that pain relief from intraspinal administration of opioids is based on the existence of opioid receptors in the spinal cord.

Infusion of opioids and local anesthetic agents through an intrathecal or epidural catheter results in pain relief with fewer side effects, including sedation, than with systemic analgesia. Adverse effects associated with intraspinal administration include spinal headache resulting from loss of spinal fluid when the dura is punctured. This is more likely to occur in younger (less than 40 years of age) patients. The dura must be punctured with the intrathecal route, and dural puncture may occur inadvertently with the epidural route. When dural puncture inadvertently occurs, spinal fluid seeps out of the spinal canal. The resultant headache is likely to be more severe with an epidural needle because it is larger than a spinal needle, and therefore more spinal fluid escapes.

Although respiratory depression generally peaks 6 to 12 hours after epidural opioids are administered, it can occur earlier or up to 24 hours after the first injection. Depending on the lipophilicity (affinity for body fat) of the opioid injected, the time frame for respiratory depression can be short or long. Morphine is hydrophilic, and the time for peak effect is longer compared to fentanyl, which is a lipophilic opioid. All patients should be monitored closely for at least the first 24 hours after the first injection, longer if changes in respiratory status or level of consciousness occur. Opioid antagonist agents such as naloxone must be available for intravenous use if respiratory depression occurs.

The patient is also observed for urinary retention, pruritus, nausea, vomiting, and dizziness. Precautions must be taken to avoid infection at the catheter site and catheter displacement. Only medications without preservatives should be administered.
The patient and family also need to learn how to recognize side effects and what to do about them. Although respiratory depression is uncommon, urinary retention may be a problem, and patients and families must be prepared to deal with it if it occurs. Implanted analgesic delivery systems can be safely and confidently used at home only if health care personnel are available for consultation and, possibly, intervention on short notice.

**NONPHARMACOLOGIC INTERVENTIONS**

Although pain medication is the most powerful pain relief tool available to nurses, it is not the only one. Nonpharmacologic nursing activities can assist in relieving pain with usually low risk to the patient. Although such measures are not a substitute for medication, they may be all that is necessary or appropriate to relieve episodes of pain lasting only seconds or minutes. In instances of severe pain that lasts for hours or days, combining nonpharmacologic interventions with medications may be the most effective way to relieve pain.

**Cutaneous Stimulation and Massage**

The gate control theory of pain proposes that the stimulation of fibers that transmit nonpainful sensations can block or decrease the transmission of pain impulses. Several nonpharmacologic pain relief strategies, including rubbing the skin and using heat and cold, are based on this theory.

Massage, which is generalized cutaneous stimulation of the body, often concentrates on the back and shoulders. A massage does not specifically stimulate the non-pain receptors in the same receptor field as the pain receptors, but it may have an impact through the descending control system (see earlier discussion). Massage also promotes comfort because it produces muscle relaxation.

**Ice and Heat Therapies**

Ice and heat therapies may be effective pain relief strategies in some circumstances; however, their effectiveness and mechanism of action need further study. Proponents believe that ice and heat stimulate the non-pain receptors in the same receptor field as the injury.

For greatest effect, ice should be placed on the injury site immediately after injury or surgery. Ice therapy after joint surgery can significantly reduce the amount of analgesic medication required subsequently. Ice therapy may also relieve pain if applied later. Care must be taken to assess the skin prior to treatment and to protect the skin from direct application of the ice. Ice should be applied to an area for no longer than 20 minutes at a time. This prevents the rebound phenomenon that occurs as the body attempts to warm up, rendering the treatment useless. Long applications of ice may result in frostbite or nerve injury. Both ice and heat therapy must be applied carefully and monitored closely to avoid injuring the skin. Neither therapy should be applied to areas with impaired circulation or used with patients with impaired sensation.

Application of heat increases blood flow to an area and contributes to pain reduction by speeding healing. Both dry and moist heat may provide some analgesia, but their mechanisms of action are not well understood. Application of heat to inflamed joints, for example, may provide temporary comfort, but increasing the intra-articular temperature may impair healing (Oosterveld & Rasker, 1994a, 1994b).

**Transcutaneous Electrical Nerve Stimulation**

Transcutaneous electrical nerve stimulation (TENS) uses a battery-operated unit with electrodes applied to the skin to produce a tingling, vibrating, or buzzing sensation in the area of pain. It has
been used in both acute and chronic pain relief and is thought to decrease pain by stimulating the non-pain receptors in the same area as the fibers that transmit the pain. This mechanism is consistent with the gate control theory of pain and explains the effectiveness of cutaneous stimulation when applied in the same area as an injury. For example, when TENS is used in a postoperative patient, the electrodes are placed around the surgical wound.

Another possible explanation for the effectiveness of TENS is the placebo effect (the patient expects it to be effective). In a review of the literature, Carroll, Tramer, McQuay et al. (1996) found that in 15 of 17 studies with randomized control group designs, TENS was ineffective in relieving postoperative pain. In 17 of 19 studies that did not use this design, the authors of these studies concluded that TENS had a positive analgesic effect. The review of these studies suggests that a placebo effect may explain the effectiveness of TENS.

**Distraction**

Distraction helps relieve both acute and chronic pain (Johnson & Petrie, 1997). Distraction, which involves focusing the patient's attention on something other than the pain, may be the mechanism responsible for other effective cognitive techniques. Distraction is thought to reduce the perception of pain by stimulating the descending control system, resulting in fewer painful stimuli being transmitted to the brain. The effectiveness of distraction depends on the patient's ability to receive and create sensory input other than pain. Distraction techniques may range from simple activities, such as watching TV or listening to music, to highly complex physical and mental exercises. Pain relief generally increases in direct proportion to the person's active participation, the number of sensory modalities used, and the person's interest in the stimuli. Therefore, the stimulation of sight, sound, and touch is likely to be more effective in reducing pain than is the stimulation of a single sense.

Visits from family and friends are effective in relieving pain. Watching an action-packed movie on a large screen with “Surround-Sound” through headphones may be effective (provided the person finds it acceptable). Others may benefit from games and activities (eg, chess) that require concentration. Not all patients obtain pain relief with distraction, especially those in severe pain. With severe pain, the patient may be unable to concentrate well enough to participate in complex physical or mental activities.

**Relaxation Techniques**

Skeletal muscle relaxation is believed to reduce pain by relaxing tense muscles that contribute to the pain. Considerable evidence supports relaxation as effective in relieving chronic low back pain (NIH Technology Assessment Panel, 1995). Few studies, however, support its effectiveness in reducing postoperative pain. This may be due to the relatively small role skeletal muscles play in postoperative pain, or to the need for the patient to practice the relaxation technique for it to be effective. Practicing the technique may not be possible when it is taught only once, immediately before surgery. A patient who already knows a technique for relaxing may only need to be reminded to use it to reduce or prevent increased pain.

A simple relaxation technique consists of abdominal breathing at a slow, rhythmic rate. The patient may close both eyes and breathe slowly and comfortably. A constant rhythm can be maintained by counting silently and slowly with each inhalation (“in, two, three”) and exhalation (“out, two, three”). When teaching this technique, the nurse may count out loud with the patient at first. Slow, rhythmic breathing may also be used as a distraction technique. Relaxation techniques, as well as other noninvasive pain relief measures, may require practice before the patient becomes skilled in using them.

Almost all people with chronic pain can benefit from some method of relaxation. Regular relaxation periods may help to combat the fatigue and muscle tension that occur with and increase chronic pain.

**Guided Imagery**

Guided imagery is using one’s imagination in a special way to achieve a specific positive effect. Guided imagery for relaxation and pain relief may consist of combining slow, rhythmic breathing with a mental image of relaxation and comfort. The nurse instructs the patient to close the eyes and breathe slowly in and out. With each slowly exhaled breath, the patient imagines muscle tension and discomfort being breathed out, carrying away pain and tension and leaving behind a relaxed and comfortable body. With each inhaled breath, the patient imagines healing energy flowing to the area of discomfort.

If guided imagery is to be effective, it requires a considerable amount of time to explain the technique and time for the patient to practice it. Usually, the patient is asked to practice guided imagery for about 5 minutes, three times a day. Several days of practice may be needed before the intensity of pain is reduced. Many patients begin to experience the relaxing effects of guided imagery the first time they try it. Pain relief can continue for hours after the imagery is used. The patient needs to be informed that guided imagery may work only for some people. Guided imagery should be used only in combination with all other forms of treatment that have demonstrated effectiveness.

**Hypnosis**

Hypnosis, which has been effective in relieving pain or decreasing the amount of analgesic agents required in patients with acute and chronic pain, may promote pain relief in particularly difficult situations (eg, burns). The mechanism by which hypnosis acts is unclear. Its effectiveness depends on the hypnotic susceptibility of the individual (Farthing, Venturino, Brown et al., 1997). In some cases, hypnosis may be effective in the first session, with effectiveness increasing in additional sessions. In other cases, hypnosis does not work at all. Usually, hypnosis must be induced by a specially skilled person (a psychologist or a nurse with specialized training in hypnosis). Sometimes patients learn to perform self-hypnosis.

**Neurologic and Neurosurgical Approaches to Pain Management**

In some situations, especially with long-term and severe intractable pain, usual pharmacologic and nonpharmacologic methods of pain relief are ineffective. In those situations, neurologic and neurosurgical approaches to pain management may be considered. Intractable pain refers to pain that cannot be relieved satisfactorily by the usual approaches, including medications. Such pain usually is the result of malignancy (especially of the cervix, bladder, prostate, and lower bowel), but it may occur in other conditions, such as postherpetic neuralgia, trigeminal neuralgia, spinal cord arachnoiditis, and uncontrollable ischemia and other forms of tissue destruction.

Neurologic and neurosurgical methods available for pain relief include (1) stimulation procedures (intermittent electric-
Electrical stimulation, or neuromodulation, is a method of suppressing pain by applying controlled low-voltage electrical pulses to the different parts of the nervous system. Electrical stimulation is thought to relieve pain by blocking painful stimuli (the gate control theory). This pain-modulating technique is administered by many modes. TENS and dorsal spinal cord stimulation are the most common types of electrical stimulation used. (See previous discussion of TENS.) In addition, there are also brain-stimulating techniques in which electrodes are implanted in the periventricular area of the posterior third ventricle, allowing the patient to stimulate this area to produce analgesia.

In spinal cord stimulation, a technique used for the relief of chronic, intractable pain, ischemic pain, and pain from angioma, a surgically implanted device allows the patient to apply pulsed electrical stimulation to the dorsal aspect of the spinal cord to block pain impulses (Linderoth & Meyerson, 2002). (The largest accumulation of afferent fibers is found in the dorsal column of the spinal cord.) The dorsal column stimulation unit consists of a radiofrequency stimulation transmitter, a transmitter antenna, a radiofrequency receiver, and a stimulation electrode. The battery-powered transmitter and antenna are worn externally; the receiver and electrode are implanted. A laminectomy is performed to interrupt the transmission of pain (Hodge & Christensen, 2002). Care must be taken to destroy only the sensation of pain, leaving motor functions intact.

Deep brain stimulation is performed for special pain problems when the patient does not respond to the usual techniques of pain control. With the patient under local anesthesia, electrodes are introduced through a burr hole in the skull and inserted into a selected site in the brain, depending on the location or type of pain. After the effectiveness of stimulation is confirmed, the implanted electrode is connected to a radiofrequency device or pulse-generator system operated by external telemetry. It is used in neuropathic pain that may occur with damage or injury that occurred following stroke, brain or spinal cord injuries, or phantom limb pain. Use of deep brain stimulation has decreased and may be related to improved pain control and intraspinal therapies (Rezai & Lozano, 2002).

**Interruption of Pain Pathways**

As described above, stimulation of a peripheral nerve, the spinal cord, or the deep brain using minute amounts of electricity and a stimulating device is used if all other pharmacologic and nonpharmacologic treatments fail to provide adequate relief. These treatments are reversible. If they need to be discontinued, the nervous system continues to function. Treatments that interrupt the pain pathways, however, are permanent.

Pain-conducting fibers can be interrupted at any point from their origin to the cerebral cortex. Some part of the nervous system is destroyed, resulting in varying amounts of neurologic deficit and incapacity. In time, pain usually returns as a result of either regeneration of axonal fibers or the development of alternative pain pathways.

Destructive procedures used to interrupt the transmission of pain include cordotomy and rhizotomy. These procedures are offered if the patient is thought to be near the end of life and will have an improved quality of life as an outcome (Linderoth & Meyerson, 2002). Often these procedures can provide pain relief for the duration of a patient’s life. The use of other methods to interrupt pain transmission is waning since the use of intraspinal therapies and newer pain management treatments are available.

**CORDOTOMY**

A cordotomy is the division of certain tracts of the spinal cord (Fig. 13-10). It may be performed percutaneously, by the open method after laminectomy, or by other techniques. Cordotomy is performed to interrupt the transmission of pain (Hodge & Christensen, 2002). Care must be taken to destroy only the sensation of pain, leaving motor functions intact.

**RHIZOTOMY**

Sensory nerve roots are destroyed where they enter the spinal cord. A lesion is made in the dorsal root to destroy neuronal dysfunction and reduce nociceptive input. With the advent of microsurgical techniques, the complications are few, with mild sensory deficits and mild weakness (Fig. 13-11).

**Nursing Interventions**

With each of these procedures, patients are provided with written and verbal instructions about their expected effect on pain and on possible untoward consequences. The patient is monitored for
specific effects of each method of pain intervention, both positive and negative. The specific nursing care of patients who undergo neurologic and neurosurgical procedures for the relief of chronic pain depends on the type of procedure performed, its effectiveness in relieving the pain, and the changes in neurologic function that accompany the procedure. After the procedure, the patient’s pain level and neurologic function are assessed. Other nursing interventions that may be indicated include positioning, turning and skin care, bowel and bladder management, and interventions to promote patient safety. Pain management remains an important aspect of nursing care with each of these procedures.

ALTERNATIVE THERAPIES

People suffering chronic, debilitating pain are often desperate. Often they will try anything, recommended by anyone, at any price. Information about an array of potential therapies can be found on the Internet and in the self-help section of the bookstore. Therapies specifically recommended for pain from these sources include but are not limited to chelation, therapeutic touch, music therapy, herbal therapy, reflexology, magnetic therapy, electrotherapy, polarity therapy, acupressure, emu oil, pectin therapy, aromatherapy, homeopathy, and macrobiotic dieting. Many of these “therapies” (with the exception of macrobiotic dieting) are probably not harmful. However, they have yet to be proven effective by the standards used to evaluate the effectiveness of medical and nursing interventions. The National Institutes of Health has established an office to examine the effectiveness of alternative therapies.

Despite the lack of scientific evidence that these therapies are effective, a patient may find any one of them helpful via the placebo response. It is important when caring for a patient who is using or considering using untested therapies (often referred to as alternative therapies) not to diminish the patient’s hope and potential placebo response. This must be weighed against the professional nurse’s responsibility to protect the patient from costly and potentially harmful and dangerous therapies that the patient is not in a position to evaluate scientifically.

Problems arise when patients do not find relief but are deprived of conventional therapy because the alternative therapy “should be helping,” or when patients abandon conventional therapy for alternative therapy. In addition, few alternative therapies are free. Desperate patients may risk financial ruin seeking alternative therapies that do not work.

The nurse’s role is to help the patient and family understand scientific research and how that differs from anecdotal evidence. Without diminishing the placebo effects the patient may receive, the nurse encourages the patient to assess the effectiveness of the therapy continually using standard pain assessment techniques. In addition, the nurse encourages the patient using alternative therapies to combine them with conventional therapies and to discuss this use with the physician.

Promoting Home and Community-Based Care

In preparing the patient and family to manage pain at home, the patient and family need to be taught and guided about what type of pain or discomfort to expect, how long the pain is expected to last, and when the pain indicates a problem that should be reported. The person who has experienced acute pain as a result of injury, illness, procedure, or surgery will probably receive one or more prescriptions for analgesic medication.

TEACHING PATIENTS SELF-CARE

The patient and family need to understand the purpose of each medication, the appropriate time to use it, the associated side effects, and the strategies that can be used to prevent these problems. The patient and family often need reassurance that pain can be successfully managed at home.

Inadequate control of pain at home is a common reason people seek health care or are readmitted to the hospital. When chronic pain exists, anxiety and fear are often intensified at the time the patient is about to return home. The patient and family are instructed about the techniques for assessing pain, using pain assessment tools, and administering pain medications. These instructions are given verbally and in writing (Chart 13-6).

Opportunities are provided for the patient and family members to practice administering the medication until they are comfortable and confident with the procedure. They are instructed about the risks of respiratory and central nervous system depression associated with opioids and ways to assess for these complications. If the medications cause other predictable effects, such as constipation, the instructions include measures for preventing and treating the problem, as described earlier. Steps are taken to ensure that the needed medications are available from the local pharmacy so that the patient receives the medication when required.

Education for patients and families must stress the need for keeping analgesic agents away from children, who might mistake them for candy. Elderly patients may become lax about this because no children live in the home, but visiting children can be placed at risk. Additionally, analgesic agents must be kept away from other family members who may take them inadvertently.
Further, analgesic medications should be stored safely and out of sight to prevent others from taking them for their own use or for diverting them to others.

**CONTINUING CARE**

If the patient is to receive parenteral or intraspinal analgesia at home, a referral to a home care nurse is indicated. The home care nurse makes a home visit to assess the patient and to determine if the pain management program is being implemented and if the technique for injecting or infusing the analgesic agent is being carried out safely and effectively. If the patient has an implanted infusion pump in place, the nurse examines the condition of the pump or injection site and may refill the reservoir with medication as prescribed or may supervise family members in the procedure. Any change in the patient’s need for analgesic medications is assessed. In collaboration with the physician, the nurse then assists the patient and family in modifying the medication dose. These efforts enable the patient to obtain adequate pain relief while remaining at home and with family.

As tolerance develops, ever-increasing amounts of opioids are needed. It is important to assure the patient and family that slowly increasing doses will not cause an increased risk of respiratory depression and central nervous system depression, because the patient will become tolerant to these effects also. However, the patient will not become tolerant to the constipating effects of opioids and will require increased efforts to prevent constipation.

**Evaluating Pain Management Strategies**

An important aspect of caring for the patient in pain is reassessing the pain after the intervention has been implemented. The measure’s effectiveness is based on the patient’s assessment of pain, as reflected in pain assessment tools. If the intervention was ineffective, the nurse needs to consider other measures. If these are ineffective, the pain relief goals need to be reassessed in collaboration with the physician. The nurse serves as a patient advocate in obtaining additional pain relief.
REASSESSMENTS

After interventions have had a chance to work, the patient is asked to rate the intensity of pain. This assessment is repeated at appropriate intervals after the intervention and compared with the previous rating. These assessments indicate the effectiveness of the pain relief measures and provide a basis for continuing or modifying the plan of care. See the accompanying Plan of Nursing Care for more information.

Evaluation

EXPECTED PATIENT OUTCOMES

Expected patient outcomes may include:

1. Achieves pain relief
   a. Rates pain at a lower intensity (on a scale of 0 to 10) after intervention
   b. Rates pain at a lower intensity for longer periods

2. Patient or family administers prescribed analgesic medications correctly
   a. States correct dose of medication
   b. Administrates correct dose using correct procedure
   c. Identifies side effects of medication
   d. Describes actions taken to prevent or correct side effects

3. Uses nonpharmacologic pain strategies as recommended
   a. Reports practice of nonpharmacologic strategies
   b. Describes expected outcomes of nonpharmacologic strategies

4. Reports minimal effects of pain and minimal side effects of interventions
   a. Participates in activities important to recovery (eg, drinking fluids, coughing, ambulating)
   b. Participates in activities important to self and to family (eg, family activities, interpersonal relationships, parenting, social interaction, recreation, work)
   c. Reports adequate sleep and absence of fatigue and constipation

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Plan of Nursing Care

Care of the Patient With Pain

<table>
<thead>
<tr>
<th>Nursing Interventions</th>
<th>Rationale</th>
<th>Expected Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing Diagnosis:</strong> Pain</td>
<td>Relief of pain or decrease in intensity of pain</td>
<td></td>
</tr>
<tr>
<td><strong>Goal:</strong> Relief of pain or decrease in intensity of pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Reassure patient that you know pain is real and will assist him or her in dealing with it.</td>
<td>Fear that pain will not be accepted as real increases tension and anxiety and decreases pain tolerance.</td>
<td>• Reports relief that pain is accepted as real and that he or she will receive assistance in pain relief</td>
</tr>
<tr>
<td>2. Use pain assessment scale to identify intensity of pain.</td>
<td>Provides baseline for assessing changes in pain level and evaluating interventions</td>
<td>• Reports lower intensity of pain and discomfort after interventions implemented</td>
</tr>
<tr>
<td>3. Assess and record pain and its characteristics: location, quality, frequency, and duration.</td>
<td>Data assist in evaluating pain and pain relief and identifying multiple sources and types of pain.</td>
<td>• Reports less disruption from pain and discomfort after use of intervention</td>
</tr>
<tr>
<td>4. Administer balanced analgesics as prescribed to promote optimal pain relief.</td>
<td>Analgesics are more effective if administered early in pain cycle. Simultaneous use of analgesics that work on different portions of the nociceptive system will provide greater pain relief with fewer side effects.</td>
<td>• Uses pain medication as prescribed</td>
</tr>
<tr>
<td>5. Readminister pain assessment scale.</td>
<td>Permits assessment of effectiveness of analgesia and identifies need for further action if ineffective.</td>
<td>• Identifies effective pain relief strategies</td>
</tr>
<tr>
<td>6. Document severity of patient’s pain on chart.</td>
<td>Assists in demonstrating need for additional analgesic or alternative approach to pain management.</td>
<td>• Demonstrates use of new strategies to relieve pain and reports their effectiveness</td>
</tr>
<tr>
<td>7. Obtain additional prescriptions as needed.</td>
<td>Inadequate pain relief results in an increased stress response, suffering, and prolonged hospitalizations.</td>
<td>• Experiences minimal side effects of analgesia without interruption to treat side effects</td>
</tr>
<tr>
<td>8. Identify and encourage patient to use strategies that have been successful with previous pain.</td>
<td>Encourages use of pain relief strategies familiar to and accepted by patient.</td>
<td>• Increases interactions with family and friends</td>
</tr>
<tr>
<td>9. Teach patient additional strategies to relieve pain and discomfort: distraction, relaxation, cutaneous stimulation, etc.</td>
<td>Use of these strategies along with analgesia may produce more effective pain relief.</td>
<td></td>
</tr>
<tr>
<td>10. Instruct patient and family about potential side effects of analgesics and their prevention and management.</td>
<td>Anticipating and preventing side effects enable the patient to continue analgesia without interruption because of side effects.</td>
<td></td>
</tr>
</tbody>
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### Critical Thinking Exercises

1. An 82-year-old woman with cancer has been admitted to a skilled care facility from her home. Her son reports that her mother has become increasingly forgetful and is now unable to manage her medication regimen. He says that she would forget when she took her antidepressant pills and OxyContin. She was so “doped up” that he couldn’t bear to see her that way. She is being treated for cancer pain. Two weeks after admission, a pain assessment reveals a pain intensity of 8 on a 0 to 10 scale; she is refusing to get out of bed. Her son is with her and does not want the nurse to give the medication hospital. Identify strategies that you would use to provide adequate pain management for this patient and the physiologic factors that need to be considered. Identify strategies that you would use to educate her son about her need for pain management. Identify the ethical issues involved in this situation.

2. A 45-year-old patient has just returned from the postanesthesia care unit (PACU) after a laparoscopic cholecystectomy. She has a history of rheumatoid arthritis for which she takes celecoxib (Celebrex) 200 mg bid. She rates her pain intensity from the recent surgery as a 6 (on a 0 to 10 scale) and is complaining of severe pain in multiple joints. Discuss the factors contributing to the pain that this patient is experiencing. What would be the best approach to manage her pain? Analyze the effect of her rheumatoid arthritis and joint pain on her postoperative pain and its management.

3. A 62-year-old man is receiving epidural infusions of an opioid for intractable pain. He will be discharged home, where his daughter will assist in his pain management. Describe the teaching required for the man and his daughter. What side effects should they observe for, and what actions should they take if they occur? How would you modify your discharge teaching plan if the patient lived alone?

4. A 35-year-old patient with a history of heroin use is admitted to the hospital with multiple stab wounds following an altercation. Two days after extensive surgery to repair his wounds, he reports severe, unrelenting pain and reports that the medication he is receiving (ie, an opioid) is ineffective in diminishing his pain. Several staff members believe that he does not have severe pain and only wants more medication because of his history of drug abuse. Describe how you would address pain relief in this patient, and provide rationale for your actions. How would you address the views of the staff members who believe that the patient should not receive additional medication?

### REFERENCES AND SELECTED READINGS

#### Books

#### Journals
- *Asterisks indicate nursing research articles.*


Kelly, A. M. (1998). Does the clinically significant difference in visual analog scale pain scores vary with gender, age, or cause of pain? *Academy of Emergency Medicine, 5*(11), 1086–1090.


RESOURCES AND WEBSITES


American Chronic Pain Association, P.O. Box 850, Rocklin, CA 95677; (800) 533-3231; http://www.theacpa.org.

American Pain Foundation, 201 N. Charles Street, Suite 710, Baltimore, MD 21201; (888) 615-7246; http://www.painfoundation.org.

American Pain Society, 4700 W. Lake Street, Glenview, IL 60025; (847) 375-4715; http://www.ampainsoc.org.

American Society of Pain Management Nurses, 7794 Grow Drive, Pensacola, FL 32514; (222) 34ASPMN; fax (850) 484-8762; http://www.aspmn.org.

International Pain Foundation, 909 NE 43rd St., Room 306, Seattle, WA 98105-6020; (206) 547-6409; fax (206) 547-1703; http://dasnet02.dokkyomed.ac.jp/IASPM/IASP.html; e-mail: IASP@locke.hs.washington.edu.


“Pain Control,” a monthly column in American Journal of Nursing.