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Contact Hours: **6**

Pain Management

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BY Judith Swan, MSN, BSN, ADN, RN; Persis Mary Hamilton, EdD, MSN, BSN, RN, PHN, PMHN

COURSE OBJECTIVE: The purpose of this course is to enable healthcare providers to better understand the experience of pain, to provide appropriate assessment and ethical interventions for pain, and to consider issues related to opioid use.

LEARNING OBJECTIVES

Upon completion of this course, you will be able to:

- Explain the experience and physiology of pain.
- Outline the elements of a comprehensive pain assessment.
- Summarize the standards and guidelines for pain management.
- Describe pharmacologic and nonpharmacologic interventions and self-management strategies.
- Discuss the roles of nursing, occupational therapy, and physical therapy in pain management.
- Discuss the issues of opioid misuse, abuse, and diversion and drug-seeking behaviors.
- Consider issues involved in pain management for end-of-life care.
- Relate ethical concerns in pain management.

INTRODUCTION

Pain comes from the Greek (*poiné*) and Latin (*poena*) words for punishment or penalty. In the time of Aristotle and other Greek philosophers, pain was believed to be visited on a person from external sources, in particular, the gods. During the Renaissance, pain was believed to arise from an internal mechanical process, and this theory of pain persisted well into the twentieth century.

Modern pain research began in the 1960s, and in recent decades, there has been a change in the perception of pain that has profoundly influenced scientific and medical pain research and treatment. Pain is no longer viewed as a symptom but rather a disease in and of itself. In 2010 the Council of the International Association for the Study of Pain issued the “Declaration of Montreal,” which asserts that access to pain management is a fundamental human right (IASP, 2015a).

A recent estimate of the prevalence of pain in the United States is that 100 million Americans are living with common chronic pain conditions. This number, however, does not include acute pain or pain experienced by children (IOM, 2012). It is difficult to arrive at an accurate picture of the prevalence of pain because there is no standardization of methods, definitions, or survey questions used in population-based studies and within agencies.

The prevalence of chronic pain in the United States is increasing and is likely to rise in the future for at least the following reasons:

- The aging of the population means more Americans will have diseases such as diabetes and arthritis that are associated with chronic pain (Cherry et al., 2010).
- The increase in obesity in the United States is associated with chronic conditions such as diabetes and orthopedic problems and is also associated with higher rates of migraine (Richettel et al., 2011).
- Progress in saving lives and helping those with serious illness survive longer may involve living with debilitating pain (IOM, 2011).
- Many surgical procedures are done on an outpatient basis, increasing the risk of undermanaged acute postsurgical pain that may evolve into chronic pain (IOM, 2011).

Despite the increased prevalence of pain and the widespread use of opiates and other modalities, there has been no safe and effective global strategy found to effectively deal with it (ACPA, 2015).

THE EXPERIENCE OF PAIN

Pain is a universal experience and an unavoidable part of being human. Pain has a protective function, motivating people to withdraw from damaging or potentially damaging situations and to avoid those same situations in the future. Pain also protects an injured body part while it heals.

Why humans feel pain, what causes pain, what is the meaning of pain, and how can it be prevented or reduced has been pondered and discussed throughout history. Pain has been regarded as a fundamental part of human existence, a powerful driver of emotions, and an effective learning tool. Pain is also the single most common reason people seek medical care (NIH, 2015a).



What Is Pain?

Traditionally, pain has been considered merely a physical symptom of illness or injury, a simple stimulus-response mechanism. Though the historic role of caregivers has been to relieve pain and suffering, there has been little understanding of the complexity of pain and only limited ways to manage it. Recent research shows pain to be a distinct disorder, with physical, emotional, and cognitive components. This view of pain has broadened our understanding of pain and given us new ways to understand its characteristics.

The task of defining pain is particularly difficult because each person's experience is unique. By way of analogy, the person who is color-blind may experience a visual sensation differently than one who is not color-blind. Each person sees the same image but experiences the color differently. For example, a person who is not color-blind has the experience of seeing a ripe tomato as red, and the person who is color-blind has the experience of seeing it as green even though they are looking at the same tomato. Neither person would be aware that the phenomenal qualities of their visual experiences differ because both have learned that the color they are experiencing is "red." This analogy could be applied to pain.

In 1979 the International Association for the Study of Pain (IASP, 2014) defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. . . . [P]ain is always subjective. . . . [I]t is unquestionably a sensation in a part or parts of the body, but it is also always unpleasant therefore also an emotional experience."

In a criticism of this definition, Wright (2011) argues that the definition "lacks the clarity and coherence necessary to provide an adequate definition of pain" and offers instead the definition that "pain is the unpleasant sensation that has evolved to motivate behavior which avoids or minimizes tissue damage or promotes recovery."

Pain alters the quality of life more than any other health-related problem. It interferes with sleep, mobility, nutrition, thought, sexual activity, emotional well-being, creativity, and self-actualization. Surprisingly, even though pain is such an important obstacle to comfort, it is one of the least understood, most undertreated, and oft-discounted problems of healthcare providers and their patients.

CONSEQUENCES OF UNTREATED/UNDERTREATED PAIN

When pain is untreated or undertreated, nerve fibers that transmit pain impulses to the brain become "trained" to be more efficient at sending those signals, and when these pain signals increase, the brain becomes more sensitive to them and the person experiences increasing intensity of pain even though illness or injury is not worsening. At this point, pain loses its significance as a signal of tissue damage or illness and is now considered chronic. Untreated pain has a major impact on a person's quality of life, affecting physical, psychological, social, and economic well-being (Stöppler, 2015).



PAIN-RELATED TERMINOLOGY**Algesia**

Sensitivity to pain

Allodynia

Pain due to a stimulus that does not normally provoke pain

Breakthrough pain

Transitory increase in pain to a level greater than the patient's well-controlled baseline level

Hyperalgesia

Excessive sensitivity to pain

Idiopathic pain

Pain for which there is no identifiable psychological or physical cause

Neuralgia

Pain in the distribution of a nerve or nerves

Noxious stimulus

A stimulus that is damaging or threatens damage to normal tissues

Pain syndrome

A group of symptoms of which pain is the critical element, such as headaches and post-herpetic neuralgia

Pain threshold

Amount of pain required before individuals feel the pain; the lower the threshold, the less pain can be endured; the higher the threshold, the more pain can be endured

Pain tolerance

Maximum amount and duration of pain a person can endure; varies widely among people and is influenced by emotions and cultural background

Paresthesia

An abnormal sensation whether spontaneous or evoked

Phantom limb pain syndrome

Mild to extreme pain felt in the area where a limb has been amputated due to nerve endings at the site of the amputation continuing to send pain signals to the brain

Radiating pain

Pain that begins at one place and extends out into nearby tissues

Referred pain

Pain that is felt at a different location than where tissue was damaged; occurs because pain fibers in the damaged area synapse near fibers from other areas of the body (for example, a myocardial infarction may create referred pain in the left shoulder)

Source: IASP, 2014.



Classifications of Pain

The classification of pain is complicated, and there are several different classification systems, many of which overlap. Among other characteristics, pain can be classified by duration and source.

BY DURATION

Pain is classified as acute or chronic.

Acute Pain

Acute pain is protective in that it motivates a person to take action immediately. Acute pain begins suddenly and is usually sharp in quality. It is temporary and subsides as healing takes place. Acute pain may be caused by such events or circumstances as:

- Surgery
- Infections
- Broken bones
- Burns, cuts, abrasions
- Labor and childbirth
- Untreated dental conditions
- Myocardial infarction

In most instances, acute pain does not last longer than six months and disappears when the underlying cause of pain has been treated or has healed. Severe acute pain activates the sympathetic nervous system, causing diaphoresis, increased respiratory and pulse rates, and elevated blood pressure. Unrelieved acute pain, however, may lead to chronic pain.

Chronic Pain

Chronic pain is pain that persists, recurs, or progresses over a long period of time and is often resistant to medical treatments. Chronic pain may be considered a disease state, serves no biologic purpose, and has no obvious end-point. If pain is associated with a disease or injury, it outlasts the normal period of healing. Chronic pain can arise from the many different conditions such as:

- Musculoskeletal disorders
- Neurologic disorders
- Urologic disorders
- Gastrointestinal disorders



- Reproductive disorders, uterine and extrauterine
- Angina
- Cancer
- Peripheral vascular disease
- Chemotherapy/radiation
- Surgical complications
- Psychological disorders

Chronic pain can also be further classified as nonmalignant/noncancerous, malignant/cancerous, and intractable.

- **Nonmalignant/noncancerous** chronic pain typically accompanies such conditions as osteoarthritis and peripheral neuropathy. The lack of purpose and uncertainty of duration of such pain may lead to depression, fatigue, insomnia, anorexia, apathy, learned helplessness, and other psychosocial consequences. If it is severe, chronic pain—like prolonged stress—activates the parasympathetic nervous system, resulting in muscle tension, decreased heart rate and blood pressure, and failure of body defenses.
- **Malignant/cancerous** chronic pain may be due to tumor progression, invasive procedures, infection, toxicities of treatment, and physical limitations. Such pain may be felt at the tumor site or some distance from it. Since patients with cancer may experience both chronic and acute pain, healthcare providers need to investigate immediately any new pain in these patients.
- **Intractable chronic pain** is intense, usually chronic and unremitting, pain from any cause that is resistant to medical, surgical, and nursing measures.

BY SOURCE

The sources (causes) of pain are divided into three main categories: nociceptor, non-nociceptor, and psychogenic.

Nociceptor Pain

Nociceptor pain results when tissue damage produces a stimulus that sends an electrical impulse across a pain receptor (nociceptor) by way of a nerve fiber to the central nervous system. Pain receptors for this type of pain are located all around the body, particularly under the skin and the internal organs. Some body tissues, such as the brain and lung, have no nociceptors, and some tissues have many. Nociceptor pain is further divided into visceral and somatic pain.

- **Visceral** pain results from stimulation of nociceptors in the abdominal cavity and thorax.



- **Somatic** pain results from injury to skin, muscle, bone, joint, and connective tissues. Pain originating in the skin or subcutaneous tissue is referred to as cutaneous pain, and pain originating in the bones, tendons, nerves, and blood vessels is referred to as deep somatic pain.

Non-nociceptor Pain

Non-nociceptor (neuropathic) pain is caused by a primary lesion or dysfunction within the nervous system itself.

Psychogenic Pain

Psychogenic pain is pain for which there is little or no physical evidence of organic disease or identified injury to tissues in the body. “Psychophysiological pain” could be a more accurate description because pain results from interaction between both physical and psychological factors.

SOURCES OF PAIN

Nociceptor: Visceral

- Physiologic structures: Organs and linings of body cavities
- Mechanism: Activation of nociceptors
- Characteristics: Poorly localized, diffuse, deep, cramping, or splitting
- Sources of acute pain: Chest tubes, abdominal drains, bladder and intestinal distention, myocardial infarction, acute appendicitis, biliary colic
- Sources of chronic pain syndromes: Pancreatitis, liver metastases, colitis

Nociceptor: Somatic

- Physiologic structures:
 - Cutaneous: skin and sub-cutaneous tissues
 - Deep somatic: blood, muscle, blood vessels, connective tissue
- Mechanism: Activation of nociceptors
- Characteristics: Well-localized, constant, achy
- Sources of acute pain: Incisional pain, insertion sites of tubes and drains, wound complications, orthopedic procedures, skeletal muscle spasms, injuries
- Sources of chronic pain syndromes: Bony metastases, osteoarthritis, rheumatoid arthritis, low-back pain, peripheral vascular disease

Non-nociceptor (neuropathic)

- Physiologic structures: Nerve fibers, spinal cord, central nervous system
- Mechanism: Injury to nervous system structures



- Characteristics: Generalized along distribution of damaged nervous structures; poorly localized (shooting, burning, fiery, shock-like, sharp, painful numbness)
- Sources of acute pain: Injuries, infections such as shingles
- Sources of chronic pain syndromes: Nervous tissue injury due to diabetes, HIV, chemotherapy, neuropathies, post-therapeutic neuralgia, trauma, surgery, exposure to toxins

Psychogenic

- Physiologic structures: No organic structures
- Mechanism: Emotional
- Characteristics: Variable, often numerous
- Sources of acute pain: Nonorganic
- Sources of chronic pain syndromes: Nonorganic psychological factors

Source: Adapted with permission from Ignatavicius et al., 1999.

THE PHYSIOLOGY OF PAIN

What we know about pain is mostly theoretical and changes through the years. Different theoretical frameworks have been developed to describe the underlying physiology of pain perception, but each theory has shortcomings and does not adequately account for the complexity of the pain system. These theories, however, have spurred many studies in this field, which have significantly advanced our understanding of the experience of pain.

Nociception

Nociception involves a complex sequence of biochemical and electrical events or processes beginning with tissue damage and followed by transduction, transmission, perception, and modulation.

TISSUE DAMAGE

When tissue is damaged, there is an immediate release of inflammatory chemicals called excitatory neurotransmitters, such as histamine and bradykinin, a powerful vasodilator. Increased blood in the area causes the injured area to swell, redden, and become tender. The bradykinin stimulates the release of prostaglandins and substance P, a potent neurotransmitter that enhances the movement of impulses across nerve synapses.

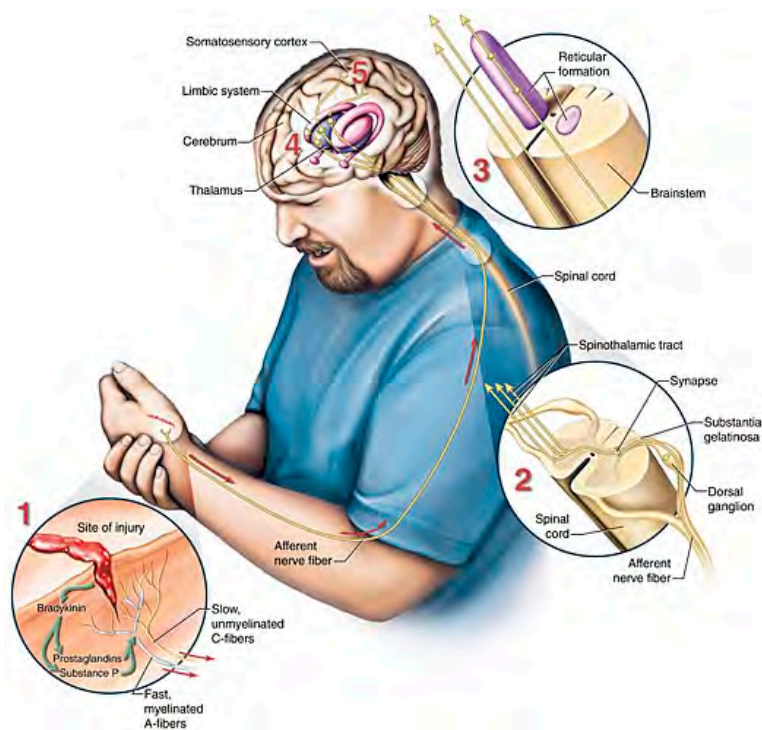


TRANSDUCTION AND TRANSMISSION

Transduction occurs as the energy of the stimulus is converted to electrical energy. Transmission of the stimulus takes place when this energy crosses into a nociceptor at the end of an afferent nerve fiber.

Two types of peripheral nerve fibers conduct painful stimuli: the fast, myelinated A-delta fibers and the very small, slow, unmyelinated C fibers. A-delta fibers send sharp, distinct sensations that localize the source of the pain and detect its intensity. C fibers relay impulses that are poorly localized, burning, and persistent. For example, after burning a finger, a person initially feels a sharp localized pain as a result of A-delta fiber transmission. Within a few seconds the pain becomes more diffuse and widespread as a result of C fiber transmission.

Pain stimuli travel quickly to the substantia gelatinosa in the dorsal horn of the spinal cord, where the “gating” mechanism (discussed below) occurs. Pain impulses then cross over to the opposite side of the spinal cord and ascend to the higher centers in the brain via the spinothalamic tracts and on to the thalamus and higher centers of the brain, including the reticular formation, limbic system, and somatosensory cortex. (See figure.)



Neurologic transmission of pain stimuli.

(Source: Jason M. Alexander. © 2005, Wild Iris Medical Education.)

PERCEPTION

When pain stimuli reach the cerebral cortex, the brain interprets the signal; processes information from experiences, knowledge, and cultural associations; and perceives pain. Thus, perception is



the awareness of pain. The somatosensory cortex identifies the location and intensity of pain, and the associated cortex determines how an individual interprets its meaning.

MODULATION

Once the brain perceives the pain, the body releases neuromodulators, such as endogenous opioids (endorphins and enkephalins), serotonin, norepinephrine, and gamma aminobutyric acid. These chemicals hinder the transmission of pain and help produce an analgesic, pain-relieving effect. This inhibition of the pain impulse is called modulation. The descending paths of the efferent fibers extend from the cortex down to the spinal cord and may influence pain impulses at the level of the spinal cord.

GATE-CONTROL THEORY

In 1965 Melzack & Wall suggested that there is a gate or control system in the dorsal horn of the spinal cord through which all information regarding pain must pass before reaching the brain. An open gate means transmission cells (t-cells) can carry signals to the brain, where pain is perceived. A closed gate stops the transmission, and no pain signal is sent to the brain.

The substantia gelatinosa (SG) in the dorsal horn of the spinal cord controls whether the gate is open or closed. The SG has both excitatory (SG+) and inhibitory (SG-) synapses with the t-cells. There are three kinds of neurons that send signals to the SG. Two of them, **A-delta fibers** and **C fibers**, are thin, small fibers with slow conduction speeds. These transmit pain signals and open the gate. The third type of neuron, **A-beta**, are large, thick, myelinated fibers with rapid conduction speeds. These fibers respond to nonpainful stimuli such as touch, inhibit the transmission of pain signals, and close the gate.

An understanding of how this gate-control theory works can be realized by considering a bump to the elbow. When the injury to the elbow occurs, the A-delta fibers are activated, followed by activation of the C fibers, and the pain signal is transmitted. By rubbing the bump, the large, fast-conducting A-beta fibers are stimulated. This stimulation is nonpainful, and the signal is transmitted faster than the A-delta and C fiber signals. The A-beta transmission reaches the SG-, closes the gate, and inhibits the further transmission of pain.

Because the perception of pain has a large cognitive component (e.g., distraction, thoughts, emotions), fast-conducting fibers from the thalamus and cerebral cortex areas of the brain can diminish pain by sending an inhibitory signal through the SG and thus close the gate.

Source: Weber, 2016.

Factors That Influence Pain

The perception of pain is influenced by both physiologic and psychosocial factors, all of which clinicians need to consider in pain management.



PHYSIOLOGIC FACTORS

Age

Aging is recognized as having a profound effect on pain perception. Pain tolerance has been shown to decrease with increasing age in both males and females. In males ages 60 years and over, pain tolerance is about three quarters that of males under 30. In females, the decrease with aging is steady but not as marked as in males. The majority of older adults experience pain on a regular basis, and this frequency more than doubles after the age of 60 (Belfer, 2013). It has been hypothesized that age-related changes could increase susceptibility to neuropathies (McMahon et al., 2013).

Gender

It seems apparent through multiple studies that women feel pain more intensely than men and are more prone to the development of chronic pain. Some studies have shown that females tend to have lower thresholds for heat-, mechanical-, inflammation-, and chemical-induced pain. Mechanisms underlying gender effects **may** include biologic factors (e.g., gonadal hormones), endogenous (opioid peptides) and exogenous (analgesic drugs) modulators of pain, psychosocial factors (e.g., gender roles), and cognitive/affective variables that have yet to be uncovered (Belfer, 2013; McMahon et al., 2013).

Fatigue

Fatigue heightens pain perception, and if it occurs along with sleeplessness, the perception of pain is even greater (Potter et al., 2015).

Genetic Makeup

Researchers have found that certain genes are involved in pain perception and now think that genes control perhaps 50% of susceptibility to chronic pain. Studies have found a mutation in a gene called SCN9A that helps the body make channels through which sodium ions flow in and out. These channels transmit messages along a nerve. Loss of function in the SCN9A gene means sodium channels that transmit messages along a nerve fail to function properly and thus do not pass on pain signals, thereby keeping the person from perceiving pain. The opposite is a gain-of-function mutation, which means sodium channels work overtime “ramping up pain signals day and night” (Weiss et al., 2011).

Another gene, called GCH1, produces an enzyme that controls production of a molecule called BH4 (sometimes informally referred to as “Big Hurt”). Those with high levels of BH4 have more pain, while those with less BH4 experience less pain (Sadhasivan & Chidambaran, 2012).



Everyone has COMT genes, but some people have either a high-activity or low-activity form of the gene. High activity means low pain and low activity means high pain. COMT works in part by making enzymes that get rid of stress hormones such as norepinephrine, which results in pain reduction. The hormone estrogen decreases COMT activity. Because lower COMT means more pain, this may partly explain why women experience more pain than men (Maixner, 2012; Sadhasivan & Chidambaran, 2012).

Stress Response

Acute psychosocial stress dramatically reduces the body's ability to control pain. Researchers have found that although pain thresholds and pain tolerance seem to be unaffected by stress, there is a significant increase in the intensity of pain and a decrease in pain inhibition capabilities. Also, chronic stress is far more damaging than acute stress, and the higher the perceived stress, the more dysfunctional the pain modulation capabilities become (Geva et al., 2014).

Neurologic Function

Any factor that interrupts or interferes with normal pain transmission affects the awareness and response of persons to pain and places them at risk for injury. Exogenous modulators include analgesics, sedatives, and alcohol, which depress the function of the central nervous system. Endogenous modulation can occur by injury to or severing of the spinal cord or with certain pathologic conditions such as diabetes. Congenital insensitivity to pain is a rare condition in which an individual cannot feel physical pain and is therefore at great risk for serious injury (Borsook, 2012).

PSYCHOSOCIAL

Psychosocial factors may include mood dysfunction (such as depression and anxiety) as well as maladaptive coping strategies (such as fear and catastrophizing). They also include a person's beliefs and knowledge about pain.

Personality and Mood

Some individuals have personalities that include an exaggerated negative orientation toward actual or anticipated pain experiences and engage in what is called "pain catastrophizing." Catastrophizing is the tendency to describe pain in more exaggerated terms (magnification) than the average person, to think on it more (rumination), and to feel more helpless in the face of pain. Catastrophizing is associated with increased pain, increased illness behavior, and physical and psychological dysfunction (Leung, 2012).

Studies have shown that chronic pain can cause depression, that depression can cause chronic pain, and that the two "exist in a mutually reinforcing relationship" (Fishman, 2012). Thinking, negatively or positively, affects mood and mood influences the pain experience. Pessimistic dispositions contribute to increased perception of pain. Optimism,



on the other hand, is associated with less intensity of pain (Goodin & Bulls, 2013; Ramirez-Maestre et al., 2012).

Pain Appraisal

Pain appraisal refers to the meaning ascribed to pain by an individual. Appraisal and beliefs about the meaning of pain can have a strong impact on an individual's emotional and behavioral responses to pain. If a pain signal is interpreted as a harmful threat, it may be perceived as more intense and more unpleasant (Fishman, 2012).

The meaning of pain can be influenced by sociocultural factors related to ethnic and/or religious background. The meaning of pain itself may be markedly different in different cultures and can influence how a person responds to pain and the amount of pain the person will tolerate. Some ethnic groups see pain as a punishment for wrongdoing. Others see pain as a test of faith. Still others view pain as a challenge to be overcome. Recent immigrants to the United States are more likely to view pain from their previous cultural roots. Ethnic effects may also interact with other important variables such as gender and age (Belfer, 2013).

Cognitive Factors

Cognitive factors involve what the person knows and understands about pain. These may include an understanding of what caused the pain, how well the person expects treatment to work, what is believed to trigger the pain, what the person knows about sources of stress that may cause pain, and what the person knows about using medicines and other therapies (Shipton, 2013; Peters, 2015).

Fear and Anxiety

The relationship between pain and fear is complex. Fear tends to increase the perception of pain, and pain increases feelings of fear and anxiety. This connection occurs in the brain because painful stimuli activate portions of the limbic system believed to control emotional reactions. People who are seriously injured or critically ill often experience both pain and heightened levels of anxiety due to their feelings of helplessness and lack of control. Persons with heightened sensitivity to anxiety experience exacerbation of fear-avoidance beliefs and the negative interpretation of bodily sensations, which in turn leads to enhanced pain experience and pain avoidance (Fishman, 2012).

PAIN ASSESSMENT

In order to ensure a comprehensive assessment of a patient's priorities and monitoring of the effectiveness of a management plan, the International Association for the Study of Pain recommends the use of an interdisciplinary team made up of medicine, nursing, occupational



therapy, pharmacy, physical therapy, psychology, and/or social work whenever possible (IASP, 2015b).

A comprehensive pain assessment therefore uses a multidimensional approach, and the **goals** of assessment are to:

- Obtain a full description of the pain
 - Determine if the pain description fits a well-known pain syndrome
 - Determine if any structural disease of the body may help explain the pain
 - Attempt to understand the mechanism (tissue damage, nerve injury, psychological processes) that maintains the pain
- (Kishner, 2014; Center for Health and Healing, 2016)

This pain assessment is critical in order to provide the most advantageous pain management interventions, and effective pain management requires careful and regular reassessment of pain. A comprehensive pain assessment includes a history of the pain, behavioral observations, a physical examination, and if necessary, diagnostic testing.

Pain History

A pain assessment begins with the history of the problem and can be obtained from written documents and from interviews with the person in pain as well as family members and other caregivers. Pain is a subjective symptom and pain assessment is, therefore, based on the patient's own perception of pain and its severity.

ASSESSMENT TOOLS

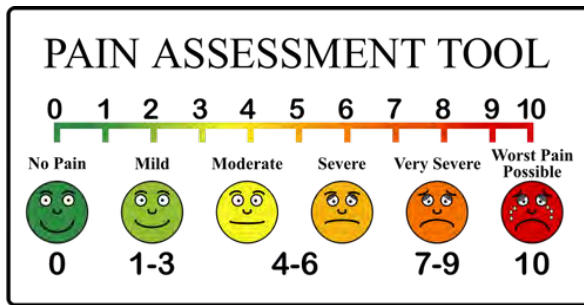
A large number of pain assessment tools are available, and their content varies. There is currently no generally accepted pain classification that exists on which to base such tools. In addition, no tools have been found to adequately address all the domains that are significant for the care of persons with pain. Those tools that assess patients' pain communication and their adherence to pain medical regimens have also been found to be lacking (Palliative Care Network, 2015).

PAIN MEASUREMENTS SCALES

Single-dimensional scales assess and measure only pain intensity. They are used for assessing acute pain or when the etiology is unknown.

- Verbal rating scales (VRS)
- Visual analogue scales (VAS)
- Numerical rating scales (NRS)
- Faces scale





Faces and numerical pain scales combined. (Source: Public domain.)

Multidimensional pain scales measure intensity, quality, and location as well as the impact pain is having on mood or activity. These scales are useful in complex or persistent acute or chronic pain. Examples include:

- Multidimensional Pain Inventory
- Short-form McGill Pain Questionnaire (SF-MPQ)
- Brief Pain Inventory Short Form (BPI-SF)

OBTAINING A PAIN DESCRIPTION

The assessment of pain remains critical to the management of pain, and pain assessment methods or tools are only as good as the clinician's ability to truly focus on each patient. This means the clinician must, to the best of his or her ability, listen empathetically, believe in, and legitimize a patient's pain and their understanding of that pain in order to learn what each patient is experiencing.

When obtaining a full description of the pain, it is important for the clinician to address the following:

- **Chronicity.** This includes the onset of pain and progression in time. It can be described as abrupt and sudden or insidious and gradual. It also includes the timing of pain—morning, later in the day, during the night, etc.
- **Severity.** Measures for determining severity of pain currently available include single-dimensional scales and multidimensional scales. The results are used as guides, not absolutes. Three of the most commonly used are verbal rating scales, numeric rating scales, and visual analogue scales (see above).
- **Quality.** Descriptions of the quality of pain include words such as sharp, dull, stabbing, burning, crushing, throbbing, nauseating, shooting, twisting or stretching. Somatic (musculoskeletal) pain is usually localized and described as dull, achy, and sore. Visceral pain is usually poorly localized and described as cramping or squeezing. Neuropathic pain is usually described as burning, shooting, or knife-like.



- **Contributing/associated factors.** What makes the pain better? What makes the pain worse?
- **Location/distribution or etiology** (if identifiable). Where is the pain located and over what extent of the body? Observe visible location of injury or tissue damage.
- **Mechanism of injury** (if applicable). What was the manner in which an injury occurred, such as a fall or deceleration of a vehicle?
- **Life changes.** What changes have occurred in the person’s life because of the pain?
- **Barriers to assessment.** These may include patients who are nonverbal or have communication difficulties; pediatric patients; and patients who exaggerate symptoms for secondary gain, including patients who abuse prescription opioids.
- **Past treatment.** What were any prior treatment successes or failures?

Behavioral Observations

Most people who are experiencing pain usually show it either by verbal complaint or nonverbal behaviors. It is important, however, to remember that people in pain may or may not display behaviors that are considered an indication of “being in pain,” and making judgments about their honesty is inappropriate. The following table lists some typical behaviors healthcare providers may observe when assessing people in pain.

NONVERBAL BEHAVIORS INDICATING PAIN	
Facial expressions	<ul style="list-style-type: none"> • Sad or frightened look • Clenched teeth or jaw • Wrinkled forehead • Biting lips • Grimacing, wincing • Rapid blinking or closing eyes tightly • Widely opened eyes or mouth
Vocalizations	<ul style="list-style-type: none"> • Sighing • Crying • Moaning • Gasping • Groaning • Grunting • Whining • Calling out



	<ul style="list-style-type: none"> • Screaming • Chanting • “Ooh”-ing and “aah”-ing
Body movements	<ul style="list-style-type: none"> • Restlessness • Fidgeting • Muscle tension • Immobility • Pacing • Rhythmic movement
Activity/routine changes	<ul style="list-style-type: none"> • Loss of appetite • Alterations in sleep patterns • Changes in ambulation • Becoming aggressive or combative • Resisting care
Social interaction	<ul style="list-style-type: none"> • Silence • Withdrawal from social activity • Reduced attention span • Focus on pain relief measures
Protective movements	<ul style="list-style-type: none"> • Guarding or splinting a body part • Rubbing or massaging a body part • Holding an affected area during movement
Mental status changes	<ul style="list-style-type: none"> • Disorientation • Confusion • Irritability • Depression

Past Medical History

A past history should include any medical problems that could relate to the patient’s complaint of pain (e.g., diabetes), any recent medication changes associated with the onset of pain, or present contraindications for certain medications or procedures. Of significance is whether or not the patient has a history of or currently has a substance abuse problem (Richeimer, 2013). (See also “Pain Management and Opioid Misuse, Abuse, and Diversion” later in this course.)



Medications

A complete list of current medications and usage, including over-the-counter medications, should be obtained, as well as the patient's report of their effectiveness. Evaluation of physiologic tolerance (diminished response) related to chronic use of some medications and use of alcohol and illicit drugs should also be included.

Physical Examination

A physical examination is most fruitful when the pain history interview and behavioral observations are conducted at the same time. Because pain may be referred from some other area of the body, the examination should include a full scan from head to toe and:

- **Mental status examination.** This includes cognitive function, mood and affect, thought process and content, judgment, and insight.
- **Vital signs.** These may be elevated when a patient is experiencing acute pain. Elevated temperature may signal an infectious cause for pain.
- **General inspection.** This begins when the clinician first encounters the patient and notes any obvious sign of pain, such as limping, unusual posture of the body, splinting or guarding, facial expression, and vocalizations. The examiner looks at skin color and pigment changes, which may indicate inflammation, sympathetic dysfunction, or a prior herpes zoster eruption. Atrophy may indicate guarding and lack of use or denervation. Poor healing indicates poor perfusion possibly associated with ischemic injuries, diabetic neuropathy, or sympathetic dysfunction.
- **Auscultation** of the lungs, heart and bowel sounds. This should be done as part of a routine examination, and especially if pertinent to the complaint.
- **Palpation.** Touch is used to gather information such as skin temperature, pulses, internal masses, tenderness, or rigidity. A musculoskeletal examination relies on both inspection and palpation to assess range of motion, functional limitations, swelling and tenderness of the joints, temperature and color changes, crepitation, and deformity.
- **Neurologic examination.** This involves observation of the individual's gait, coordination, and balance; assessment for sensory impairment and motor strength; and testing for abnormal reflexes.

(Richeimer, 2013)

Diagnostic Testing

Although there are no diagnostic tests available as yet to determine how much pain a person is experiencing, and no test that can measure the intensity or location of pain, there are a number of tests that can be done to determine the cause or source of pain.



LABORATORY TESTS

- **Complete blood count (CBC)** to detect the presence of an infection and some kinds of cancer
- **Comprehensive metabolic panel (CMP)** to give a picture of a person's general health
- **Erythrocyte sedimentation rate (ESR)** to assess for inflammation
- **Vitamin B₁₂ and folate** levels to assess for deficiencies that cause neurologic symptoms
- **Fasting blood sugar (FBS)** and glycosylated hemoglobin (HbA1c) to test for diabetes or to monitor control of diabetes
- **Rheumatoid factor (RF)** to rule out rheumatoid arthritis and other autoimmune diseases (e.g., systemic lupus erythematosus) and infections (e.g., hepatitis, syphilis) (Walker, 2011)

IMAGING AND ELECTRODIAGNOSTIC TESTING

- **Plain X-ray films** to demonstrate bony pathology and some soft tissue tumors
- **Ultrasound** to help diagnose strains, sprains, tears, and other soft tissue conditions
- **Myelograms** using a contrast injected intrathecally for individuals with pain related to the spine
- **Computerized tomography (CT)** to obtain images that show more bony detail when assessing for bone or joint diseases of the spine
- **Magnetic resonance imaging (MRI)** for superior soft tissue visualization; valuable in diagnosing spinal disc disease or neural compression; best for evaluation of spinal alignment and investigation for infections or tumors
- **Bone scans** to help diagnose tumors of the bone or metastatic disease, osteomyelitis, fractures, joint disease, avascular necrosis, and Paget's disease
- **Electromyography (EMG), nerve conduction studies (NCS), and evoked potential (EP) studies** to help determine exactly which muscles or nerves are affected by weakness or pain (Richeimer, 2013)

Psychological Examination

A psychological evaluation to assess the patient's psychological state and the emotions that may be part of the pain problem should be accomplished, paying attention in particular to:

- Sleep and/or appetite disturbances
- Loss of energy



- Loss of libido
- Loss of interest in usual things
- Impaired concentration
- Suicidal ideation
- Personal relationships
- Work and finances
- Recreational pursuits

Referral for a formal psychological evaluation should be made if there is evidence of:

- Mood or anxiety disorders
- Psychotic disorder
- Cognitive impairment
- Suicidal ideation
- Prominent secondary gain
- Hostility, anger, or personality disorder
- Prolonged and extensive course of treatment failures
- Need for high dose opioids for nonmalignant pain
(Richeimer, 2013)

CASE

MEREDITH

Meredith, a 59-year-old African American woman, visited her neighborhood walk-in clinic Friday afternoon with the complaint of unexplained sharp, stabbing pains in her chest as well as her right shoulder and upper back. She reported that the pain started in the early morning and gradually worsened as the day progressed. She also complained of a nonproductive cough for the past couple of days. When asked if anything made the pain better or worse, she replied that pain increases when she takes a deep breath or when she coughs. Meredith stated that she took Tylenol for the pain with no effect.

Using a visual analogue scale, the physician asked Meredith to rate her pain from 0 to 10, with 0 being no pain and 10 being the worse possible pain. Meredith identified her pain as a 6 when breathing normally and a 9 when taking a deep breath or coughing.

Her history revealed that she has asthma and uses an albuterol inhaler as needed. She has hypertension and takes hydrochlorothiazide 25 mg every day. She has no history of heart disease and no recent history of injury to the chest. She denies a history of immune disorders or sickle cell anemia.

On examination the physician noted that Meredith was a well-nourished, well-developed female in acute distress due to pain in the chest, right upper back, and shoulder. She sat upright with tensed muscles, and her arms were wrapped across her chest in a protective manner. Her



temperature was 100.6 °F, pulse 82, respirations shallow at 16, and blood pressure 132/85. Her lungs were clear to auscultation and percussion, with a pleural friction rub heard over the right middle lobe anterolaterally. The remainder of the examination was within normal limits. Mental status, neurologic, and psychological examinations were deferred.

A chest X-ray was obtained, which showed full inflation of the lungs with no evidence of infiltrate. There was no air or fluid in the pleural space. A complete blood count was done and found to be normal. Oxygen saturation (SpO₂) was 95%.

Meredith was diagnosed with pleurisy and was sent home with a prescription for Percocet (oxycodone hydrochloride; acetaminophen) 5mg/325mg, 1 tablet every 6 hours for pain, and instructions to follow up with her primary physician.

(continues)

Barriers to Assessing Pain

Optimal comprehensive pain assessment requires removal of barriers in the healthcare system; among healthcare professionals; and in patients, family, and society.

A **healthcare system** may lack criteria or culturally sensitive instruments for pain assessment as well as institutional policies for accountability for pain assessment performance and documentation.

Among medical **professionals** it has been recognized that pain management is given a low priority in medical schools and residency training programs, leaving clinicians with gaps in knowledge and inadequate assessment skills. Among all healthcare professionals barriers may include insufficient knowledge of pain management, a failure to identify pain assessment and relief of pain as a priority for patient care, and the belief that there is inadequate time to conduct and document the results of a pain assessment. Continuity of care may be lacking as well as communication among members of the healthcare team (IOM, 2011).

Research findings suggest that a provider's expectations of the pain experience of a patient are influenced by the stereotypes he or she has about different genders, races, and ages. Healthcare providers may demonstrate differences in pain expectations based upon these demographic characteristics, which can influence pain assessment and treatment decisions (Wandner et al., 2012).

Patient barriers include psychological factors such as depression, fear, anger, and anxiety, which can all influence and complicate assessment. Patients, family members, and society need to be made aware of the importance of communicating with healthcare professionals about pain. Many factors are involved in this failure to communicate, and education by healthcare professionals is extremely important in this regard (Fink et al., 2015).



CASE**ERIN**

Erin is a recent nursing school graduate who is working on an orthopedic unit. Today she admitted a new patient from the emergency room. Diego is a young male, 16 years old, who was playing football and during the game was tackled and fell. Another player came crashing down on Diego's leg, and he sustained a nondisplaced fracture of the right tibia. In the emergency room he was given pain medication, the leg was X-rayed and casted, and he was admitted for observation.

Later in the evening, Diego's coach and teammates came to visit him in the hospital. Erin heard them laughing and talking. They seemed to be really enjoying themselves, including Diego. Finally, all his visitors left and Diego rang his call bell. He told Erin that he was having a lot of pain and needed some medication. Erin replied that she felt he was doing okay and didn't think he needed anything at that time.

Shortly thereafter, the charge nurse came to see how Erin was doing and asked about her patients. Erin told her about Diego and his request for pain medication. She said his behavior did not seem to indicate he was having any pain, and she thought he might just be drug seeking.

The charge nurse explained to Erin that just because someone does not appear to be in pain doesn't mean he is not. Erin was helped to understand that Diego's behavior with his coach and teammates may have been his way to appear "manly" and not a "sissy." She told Erin that when persons say they are in pain, they are in pain, and that she has the responsibility to accept their statements of pain and provide medications as prescribed.

Assessing Pain in Special Populations

Accurate pain assessment can be challenging in certain populations, including infants, children, and cognitively impaired individuals, due to communication barriers. Because pain is a subjective experience, being unable to obtain this subjective information can lead to a less than optimal assessment.

NEONATES, INFANTS, AND CHILDREN

Recommendations for pain assessment in neonates, infants, and younger children who are unable to self-report include observation of patient behaviors and use of behavioral pain assessment tools, proxy reporting of pain (particularly by parents), as well as a search for potential causes of pain.

Awareness of the developmental stage of a child is necessary to determine which assessment tool to use. In children older than 3 to 4 years, self-report measures may be utilized. Physiologic measures such as heart rate, blood pressure, respiration, oxygen saturation, palmar sweating, and sometimes neuro-endocrine responses (i.e., elevated levels of glucocorticoids, catecholamines, and endorphins as well as hyperglycemia, hyperlactatemia, and inhibition of insulin secretions) may be used to assess pain in neonates (Herr et al, 2011; Venable, 2015).



When assessing infants and children, it is important to be aware that an infant who is lying very still may be in pain, and a sleeping child may actually be in significant pain without crying or whimpering. Sleeping and withdrawn behavior in a child may be attempts to control pain by limiting activity and interactions. Children also may underreport pain in order to avoid future injections or other procedures meant to alleviate pain (Kishner, 2014).

PAIN ASSESSMENT TOOLS

For Infants

- NFCS (Neonatal Facial Coding System)
- PAIN (Pain Assessment Inventory for Neonates)
- CRIES (Crying, Oxygenation, Increased vital signs, Expression, Sleepless)
- FLACC (Faces, Legs, Activity, Cry, Consolability)

For Preschool-aged Children

- CFCS (Child Facial Coding System)
- Poker chips tools
- Pain thermometer
- Faces
- OUCHER poster

For School-aged Children and Adolescents

- Faces
- Facial Affective Scale
- OUCHER poster
- Numeric Rating Scale
- Word Graphic Rating Scale
- Verbal Numeric Scale

Source: Venable, 2015.

THE COGNITIVELY IMPAIRED

Many conditions can lead to cognitive impairment that can make pain assessment difficult. Dementias are the leading cause of impaired cognition in older adults. These individuals may have communication barriers and challenges when complex pain assessment tools are used. It is recommended that adequate time be taken for examination and that pain assessment tools be easy to use.



Patient self-report of pain should be attempted in mild to moderate cognitively impaired patients. Behavioral observation-based assessment is optimal in severely impaired individuals. In addition, physiologic manifestations may be evaluated (e.g., elevated vital signs, diaphoresis, and pupil dilation) (Herr et al., 2011; Venable, 2015).

PAIN ASSESSMENT TOOLS FOR THE COGNITIVELY IMPAIRED

- PACSLAC (Pain Assessment Checklist for Seniors with Limited Ability to Communicate)
- PAINAD (Pain Assessment in Advanced Dementia)
- Comprehensive Pain Assessment Form: Cognitively Impaired
- ADD (Assessment of Discomfort in Dementia)
- CNPI (Checklist of Nonverbal Pain Indicators)
- Doloplus 2
- NOPPAIN (Nursing Assistant-Administered Instruction to Assess Pain in Demented Individual)

STANDARDS AND GUIDELINES FOR PAIN MANAGEMENT

Because pain management is deemed essential to the provision of quality healthcare, many organizations have developed guidelines, standards, or principles by which professional practice is measured. Five such organizations are the Joint Commission, the Centers for Medicare and Medicaid Services, the Accreditation Association for Ambulatory Health Care, the American Academy of Pediatrics, and the International Association for the Study of Pain.

The Joint Commission (TJC)

The Joint Commission is an independent organization that accredits and certifies more than 17,000 healthcare organizations and programs in the United States. It evaluates how well these healthcare providers meet published standards of care, including their management of pain. The federal government accepts Joint Commission–accredited facilities as qualified to participate in Medicare and Medicaid reimbursement programs.

THE JOINT COMMISSION STANDARDS OF PAIN MANAGEMENT

To meet the Joint Commission standards, accredited facilities must have policies in place to fulfill the following requirements:

Standard PC.01.02.07: The hospital assesses and manages the patient’s pain.



Rationale: Identification and treatment of pain is an important component of the plan of care. Patients can expect that their healthcare providers will ask them about whether they have pain. When pain is identified, the individual is assessed based on his or her clinical presentation and in accordance with the care, treatment, and services provided by the organization.

Elements of Performance:

1. The hospital conducts a comprehensive pain assessment that is consistent with its scope of care, treatment, and services and the patient's condition.
2. The hospital uses methods to assess pain that are consistent with the patient's age, condition, and ability to understand.
3. The hospital reassesses and responds to the patient's pain based on its reassessment criteria.
4. The hospital either treats the patient's pain or refers the patient for treatment.

Source: TJC, 2013.

Centers for Medicare and Medicaid Services (CMS)

The CMS guidance under F309, Interpretive Guidelines for Selected Specific Quality of Care Issues, states the following in §483.25:

Nursing facilities must assess and address pain in all residents, including the cognitively impaired, to help a resident attain or maintain his/her highest practicable level of well-being and to prevent or manage pain to the extent possible. The facility:

1. Recognizes when the resident is experiencing pain and identifies circumstances when pain can be anticipated
2. Evaluates the existing plan and the cause(s), and
3. Manages or prevents pain consistent with the resident's goals, the comprehensive assessment and plan of care, and current clinical standards of practice (CMS, 2009)

Accreditation Association for Ambulatory Health Care (AAAHC)

AAAHC is the outpatient counterpart of the Joint Commission. It uses a similar model of standards, interpretive statements, and facility surveys to assure the quality of care delivered in other-than-hospital settings. As with TJC, AAAHC surveys can be used to qualify facilities to participate in Medicare and Medicaid reimbursement programs.



As part of a facility survey, a nurse and/or a physician surveyor will follow a patient from admission to discharge; this is called “tracer methodology.” The surveyors will note how care providers implement, among other things, the facility’s pain-related policies. To be considered in compliance with standards on pain management, AAAHC states: “The organization maintains a written policy with regards to assessment and management of acute pain” (AAAHC, 2012).

American Academy of Pediatrics (AAP)

AAP is a professional organization dedicated to the health, safety, and well-being of infants, children, adolescents, and young adults. As such, its committees develop guidelines, positions, and programs to support the mission of the organization. The AAP guidelines for pain management conclude with the strategies listed in the box below.

AAP GUIDELINES FOR PAIN MANAGEMENT

1. Expand knowledge about pediatric pain and pediatric pain management principles and techniques
2. Provide a calm environment for procedures in order to reduce distress-producing stimulation
3. Use appropriate pain assessment tools and techniques
4. Anticipate predictable painful experiences, intervene, and monitor accordingly
5. Use a multimodal (pharmacologic, cognitive behavioral, and physical) approach to pain management and use a multidisciplinary approach when possible
6. Involve families and tailor interventions to the individual child
7. Advocate for child-specific research in pain management and Food and Drug Administration evaluation of analgesics for children
8. Advocate for the effective use of pain medication for children to ensure compassionate and competent management of pain

Source: American Academy of Pediatrics, 2001 .

Standards for Occupational Therapists

The American Occupational Therapy Association (AOTA) has developed standards for delivering therapy interventions. An occupational therapist:

1. Is responsible for developing, documenting, and implementing interventions based on evaluation, patient goals, best evidence, and professional and clinical reasoning
2. Collaborates with the patient to develop and implement the intervention plan on the basis of the patient’s needs and priorities, safety, and benefits and risks



3. Coordinates interventions with interventions provided by other professionals
4. Uses professional and clinical reasoning to select the best interventions including therapeutic use of self, therapeutic use of occupations and activities, consultation, education, and advocacy
5. Modifies the intervention plan during the intervention process and documents changes in the patient's needs, goals, and performance
6. Facilitates the development of better function for daily activities at home and at work (AOTA, 2010)

The International Association for the Study of Pain (IASP) identifies the following principles that should guide occupational therapists in the management of pain. These principles include:

1. Pain is a complex phenomenon and a multidimensional experience.
2. Pain is a public health problem with social, ethical, and economic considerations.
3. People can experience pain at any stage of life and from any cause (identified or not).
4. The impact of pain on daily life and degree of impairment, developmental delay, or psychological distress are critical components of comprehensive assessment.
5. Activity analysis to explore the impact of pain on occupational performance (engagement in activities) needs to be considered from different perspectives, including factors (biological/psychological/spiritual/social/environmental) that contribute to acute (or potential) challenges in the individual's everyday life.
6. Prevention strategies need to focus on scheduling and adapting activities so that the person's energy is maintained and pain is minimized.
7. Assessment and intervention plans to manage pain need to be collaborative between patient and therapist to ensure that the patient's goals for intervention are identified and the strengths of the patient are recognized.
8. Prevention and intervention needs to be addressed at both micro (individual) and macro (socio-political) levels.
(IASP, 2015c)

Standards for Physical Therapists

The American Physical Therapy Association (APTA) has established standards of practice that state that the physical therapist:

1. Performs an initial examination and evaluation to establish a diagnosis and prognosis prior to intervention



2. Establishes a plan of care and manages the needs of the patient based on the examination, evaluation, diagnosis, prognosis, goals, and outcomes of the planned interventions
3. Involves the patient and appropriate others in the planning, implementation, and assessment of the plan of care
4. Provides, or directs and supervises, the physical therapy intervention consistent with the results of the examination, evaluation, diagnosis, prognosis, and plan of care
5. Reexamines the patient as necessary during an episode of care to evaluate progress or change in patient status and modifies the plan of care accordingly or discontinues physical therapy services
(APTA, 2012)

The International Association for the Study of Pain provides a curriculum guide for physical therapy pain management based on principles drawn from the 2010 Declaration of Montreal. These principles are:

Article 1: The right of all people to have access to pain management without discrimination

Article 2: The right of people in pain to acknowledgment of their pain and to be informed about how it can be assessed and managed

Article 3. The right of all people with pain to have access to appropriate assessment and treatment of the pain by adequately trained healthcare professionals”
(IASP, 2015d)

STRATEGIES FOR TREATING AND MANAGING PAIN

A comprehensive pain management approach includes:

- Appropriate pharmacologic and nonpharmacologic interventions
- Education of patient, family, and caregivers about the plan
- Ongoing assessment of the treatment outcomes
- Regular review of the treatment plan
- Involvement of other members of the interdisciplinary team, including:
 - Nurses
 - Pharmacists
 - Psychologists and/or social workers
 - Physical therapists
 - Occupational therapists



Pharmacologic Interventions

There are two primary groups of pain medications: nonopioids and opioids. A third group of drugs called “adjuvants” or “co-analgesics” address symptoms that often accompany pain, such as insomnia, anxiety, muscle spasm, anorexia, and depression.

NONOPIOID ANALGESICS

Nonopioid analgesics relieve pain by affecting some of the chemical changes that normally take place whenever body tissues are injured or damaged. These chemical changes at the site of injury typically result in inflammation and increased pain sensitivity. Most nonopioid analgesics act peripherally; are non-habit-forming; have analgesic, antipyretic, and anti-inflammatory effects; and have a ceiling effect (an increase in dosage does not increase analgesia but increases side effects). They are useful for mild to moderate pain and as an adjunct to opioids for moderate to severe pain.

This group of analgesics includes drugs such as acetaminophen (Tylenol) and nonsteroidal anti-inflammatory drugs (NSAIDs) such as acetylsalicylic acid (aspirin), ibuprofen (Motrin, Advil), and naproxen (Aleve). With the exception of acetaminophen, most nonopioids are potent anti-inflammatory agents.

The specific actions of these analgesics vary. Acetaminophen’s mechanism of action is still unknown, but it activates two different ion channels in the brain and spinal cord, which also respond to certain cannabinoids. It relieves pain by elevating the pain threshold, which then requires a greater amount of pain to develop before it is perceived (Drahl, 2014).

When tissue is damaged, a series of biochemical events leads to the release of prostaglandin, which causes edema, inflammation, and pain. Two isoenzymes—cyclo-oxygenase-1 (COX-1) and cyclo-oxygenase-2 (COX-2)—play an important part in this biochemical process. Most NSAIDs act as nonselective inhibitors of these enzymes, which result in a decrease in prostaglandin production and the inflammation it creates, thereby reducing pain.

The following table lists some common nonopioid analgesics.

COMMON NONOPIOID ANALGESICS		
Drug	Adult Dose	Considerations
Acetaminophen (Tylenol, Panadol)	650–975 mg every 4 hours	Used for headaches, osteoarthritis; lacks peripheral anti-inflammatory activity of NSAIDs
Aspirin (Durlaza ER)	650–975 mg every 4 hours	Used for headaches, osteoarthritis, general pain; antipyretic; inhibits platelet aggregation, causing bleeding



Ibuprofen (Motrin, Advil, Caldolor Injectable)	400 mg every 4–6 hours orally 400–800 mg every 6 hours intravenously	Used for rheumatoid arthritis; antipyretic, anti-inflammatory; may cause bleeding; available as liquid; available as injectable for mild to moderate pain and moderate to severe pain as an adjunct to opioids
Indomethacin (Indocin)	150–200 mg/day	Used for gout; anti-inflammatory, anti-rheumatic
Naproxen (Naprosyn, Aleve, Anaprox, Naprelan)	500 mg initial dose, then 250 mg every 6–8 hours	Used for gout, headaches; anti- inflammatory; anti-rheumatic; available in liquid preparation; completely inhibits COX-1 and COX-2; may cause bleeding

OPIOID ANALGESICS

Opioid (narcotic, CNS-acting) analgesics pertain to natural and synthetic chemicals with opium-like effects though they are not derived from opium. Natural examples include endorphins or enkephalins produced by body tissue, and synthetic drugs include morphine, codeine, and methadone, among others. These drugs modify the perception of pain and provide a sense of euphoria by acting on receptors located on neuronal cell membranes to inhibit neurotransmitter release throughout the nervous system. Opiate receptors have various names, denoted by the Greek letters *mu* (μ), *kappa* (κ), and *delta* (δ) (*Mosby's*, 2013).

The mu opioid receptors impart most of their analgesic effect in the central nervous system, along with many side effects such as sedation, respiratory depression, euphoria, and dependence. The delta opioid receptors are more widespread in the peripheral nervous system, where they have their analgesic effect. The kappa opioid receptors contribute to analgesia in the spine and may cause dysphoria and sedation but do not generally lead to dependence.

At the cellular level, all three types of receptors act similarly, but due to their distribution in the body and their sensitivity to specific opioid drugs, they produce very different pharmacologic reactions (Yaksh & Wallace, 2011).

Many of the currently available clinical opioid analgesics exert their effects primarily through the mu receptors. Opioid analgesics are classified as full agonists, partial agonists, and mixed agonist-antagonists. **Full agonists** bind to mu receptor sites in the brain and activate them, which gives pain relief as well as addictive effects and feelings of euphoria depending on the dose and frequency.

Examples of full agonist drugs are listed in the following table.



FULL AGONIST DRUGS		
Drug	Parenteral Dose (mg)	Oral Dose (mg)
Morphine	10	30
Codeine	130	200
Methadone	10	20
Heroin	NA	NA
Meperidine (Demerol)	75	300
Fentanyl (Duragesic) 0.1 mg patch	NA	NA
Oxycodone hydrochloride (OxyContin)	NA	20
Hydromorphone (Dilaudid)	1.5	7.5
Tramadol (Ultram) (not an opioid, but works primarily on the same receptors as opioids; is also a serotonin and norepinephrine reuptake inhibitor)	NA	120

Partial agonists also bind primarily to mu receptors and activate them, but to a much lesser extent than full agonists. Partial agonists include the drug buprenorphine (Buprenex, Belbuca, Subutex) injectable 0.3 mg/mL, and sublingual 2 mg.

Pentazocine lactate (Talwin), 30 mg IV and 50 mg oral, is a **mixed agonist-antagonist** analgesic. This drug binds to both mu and kappa receptors but does not produce physiological side effects such as respiratory depression or the potential for addiction.

An antagonist is a drug that competes with opioid receptor sites and effectively blocks them. Naloxone hydrochloride (Narcan nasal spray), naltrexone hydrochloride (Revia, Vivitrol), and methylnaltrexone bromide (Relistor) are such drugs, and are used for opioid overdoses and physical dependency.

The primary action of opioids (narcotics) is to alleviate moderate to severe pain. Many of the unwanted effects of this class of drugs are related to their actions on systems of the body other than the central nervous system (CNS), causing such effects as constipation and respiratory depression.

The following table lists some common opioid side effects and management measures.



OPIOID ADVERSE EFFECTS AND MANAGEMENT MEASURES		
Body System	Adverse Side Effects	Management
Cardiovascular	Hypotension, palpitations, flushing, myocardial infarction, heart failure	Monitor blood pressure and heart rate
CNS	Sedation, disorientation, euphoria, dysphoria, light-headedness, lower seizure threshold, tremors	Inform client that tolerance may develop over 3–5 days; administer stimulants as needed
Gastrointestinal	Constipation, nausea, vomiting, abdominal cramping, bloating, bleeding	Offer anti-emetic; change analgesic; increase fluid and fiber intake; increase exercise; administer laxatives; monitor for impaction or GI bleeding
Urinary	Urinary retention	Catheterize as needed; administer opioid antagonist; nighttime doses of muscle relaxants
Integumentary	Itching, rash, wheal formation	Apply cool packs or lotion; administer antihistamine
Respiratory	Respiratory depression; aggravation of asthma; sleep-disturbed breathing	Monitor respirations closely; administer opioid antagonist
Endocrine	Hormone and sexual dysfunction. Decreased libido and sexual function in men; decreased libido, menstrual and ovulatory abnormalities in women	May receive androgen replacement therapy
Immune	Immunosuppression	Monitor for and implement measures to reduce risk for infection
Reproductive	All opioids cross the placenta	Use with caution during labor

Source: ACPA, 2014.

Some medications combine nonopioid with opioid analgesics in one tablet to offer two different levels of pain relief—acting both on peripheral nerve endings at the injury site and at the central nervous system level. Acetaminophen with codeine is such a medication.

CASE

MEREDITH (*continued*)

Following her visit to the walk-in, Meredith's condition began to deteriorate. The pain remained severe at 9 to 10 on a pain scale, and by Sunday evening she began experiencing respiratory distress that required her to sleep semi-upright in a lounging chair. With the increase in respiratory distress, her pain level remained high, and she took the Percocet around the clock. As a result, she became severely constipated over the next two days. She called her physician Monday morning and was seen in the afternoon, when a chest X-ray revealed extensive pleural and pericardial effusions.



Meredith was admitted to the hospital. An IV was started, and she was given 4 mg of morphine IV for pain. An order was written for morphine 15 mg orally every 4 hours as needed. Because of her constipation, milk of magnesia 30 ml was ordered to be given with each dose of morphine. There was also an order for acetaminophen 650 mg every 4 hours to be given between doses of morphine. Meredith's pain was well controlled on this regimen.

Opioids and Drug Tolerance, Dependence, and Addiction

Drug tolerance is a physiologic adaptation of the body over a period of time in which one or more effects of a drug become less with repeated use at the same dose. The exact mechanism is not always known.

One mechanism may be activation of the glial cells of the central nervous system, which become activated in response to the repeated administration of morphine leading to the release of proinflammatory mediators, which oppose opioid analgesia by altering neuronal activity (Mika et al., 2013). Another mechanism is accelerated metabolism, and other possible mechanisms are a decrease in binding affinity between a drug and receptor and a decrease in the number of receptors (Hussar, 2015).

The first sign of tolerance is a decrease in the duration of the analgesic effect. This condition is followed by a decrease in total analgesic effect. Decreasing the time between doses or increasing the dosage may help overcome tolerance. Even so, drug tolerance is not the only reason drugs become less effective. They may be less effective because there is advancing tissue damage, thus greater pain.

Pseudo-tolerance is the need to increase opioid dosage for reasons other than the physical adaptation of continuous use. Such conditions include progression or exacerbation of the underlying disease, new pathology related or unrelated to the original disease, lack of treatment adherence, opioid induced hyperalgesia, increased physical activity, psychological dependence (addiction), and changes in opioid formulation (Smith & Pappagallo, 2012).

Physical dependence is a physiologic adaptation of tissues to the drug. The human body adapts physiologically to the presence of chemicals in the body, and withdrawal symptoms will occur following an abrupt reduction of the opioid dose or the administration of an opioid antagonist. These symptoms result from an autonomic nervous system response and may include excessive yawning, nausea and vomiting, hypertension, tachycardia, muscle twitching, diaphoresis, delirium, and convulsions.

When opioid analgesics are to be discontinued, physical withdrawal symptoms can be reduced or eliminated by a slow reduction of dose. It is wise to assume that physical dependence will develop after an opioid has been administered repeatedly for several days. Physical dependence is not an indicator of addiction (Smith & Pappagallo, 2012).

Addiction is defined as a chronic, relapsing brain disease characterized by drug-seeking behavior and drug use despite harmful consequences, and any type of opioid can trigger



it (SAMHSA, 2014). It is a primary, chronic neurobiologic disease that experts in addiction generally recognize results from the interaction of a drug with various hereditary, biologic, psychological, and situational factors unique to the individual. Opioids (narcotics) with an affinity for mu receptor sites produce euphoria and hallucinations and are the most frequently abused drugs.

When people take opioids to relieve pain, tolerance and physical dependence may occur, but addiction will not necessarily follow. There are four core elements to true addiction:

1. Compulsive use with a preoccupation with the drug and the supply
2. Inability to control consistently quantity used
3. A craving for the psychological effects of the drug
4. Continued use regardless of the adverse effects

(ACPA, 2014)

Pseudo-addiction is a term used to describe people who, because of severe, unrelieved pain, focus on finding relief. As a consequence, they seem preoccupied with obtaining opioids. This preoccupation is not truly “drug-seeking” but “relief-seeking.” Their quest for opioids is directly related to inadequate pain relief caused by an inappropriate opioid or inadequate doses spaced too far apart. It can be differentiated from addiction by the disappearance of these behaviors when access to analgesic medications is increased and pain control is improved (ACPA, 2014; Smith & Pappagallo, 2012).

(See also “Pain Management and Opioid Misuse, Abuse, and Diversion” later in this course.)

WORLD HEALTH ORGANIZATION PAIN MANAGEMENT LADDER

In 1986 and again in 1997 the World Health Organization (WHO) established a treatment or analgesic ladder for patients with cancer pain. The ladder is widely used today for all patients with either acute or chronic pain who require analgesics.

Because of widespread misconceptions about treatment of chronic pain and addiction, the WHO recommends a three-step pain relief ladder based on the intensity of pain.

1. **Mild pain** (intensity 1–3 on the 0–10 standard): Use nonsteroidal anti-inflammatory drugs and adjuvants. If pain persists, then . . .
2. **Mild to moderate pain** (intensity 4–6): Use combination medications such as oxycodone and acetaminophen and adjuvants. If pain persists, then . . .
3. **Moderate to severe pain** (intensity 7–10): Use potent opioids such as morphine, fentanyl, methadone, and adjuvants.



To prevent undertreatment of malignant cancer pain, some authorities recommend a different approach. They begin the treatment of malignant cancer pain with strong opioids, providing immediate relief, and then slowly reduce the type and dosage until pain relief is achieved at a lower level.

Source: WHO, 2013.

ADJUVANT ANALGESICS

Adjuvant analgesics (co-analgesics) are drugs that were developed for uses other than pain but have been found to enhance analgesic effects. These are “helper drugs,” not substitutes for analgesics. Clients in pain still need analgesics.

The following table describes some common adjuvant analgesics.

COMMON ADJUVANT (CO-ANALGESIC) DRUGS	
Class / Indications / Primary Effects	Drugs
Antidepressants: Neuropathic pain, burning sensation; improves sleep, enhances mood and analgesic effects	<ul style="list-style-type: none"> • Tricyclics: amitriptyline (Elavil) • SSRIs: paroxetine (Paxil) • NSRIs: venlafaxine (Effexor) • Others: bupropion (Wellbutrin)
Anticonvulsants: Neuralgic and neuropathic pain; sharp, prickling, shooting pain	<ul style="list-style-type: none"> • Gabapentin (Neurontin) • Carbamazepine (Tegretol) • Phenytoin (Dilantin) • Valproic acid (Depakene)
Antispasmodic: Reflex sympathetic dystrophy syndrome (a disorder of the sympathetic nervous system causing chronic, severe pain)	<ul style="list-style-type: none"> • Baclofen (Lioresal, Gablofen)
Anxiolytics: Help manage anxiety and pain by encouraging muscles to relax	<ul style="list-style-type: none"> • Diazepam (Valium) • Buspirone hydrochloride • Venlafaxine hydrochloride
Neurotoxin: Migraine headache	<ul style="list-style-type: none"> • Botulinum toxin (Myoblock)
Anesthetic/topical drugs: Neuralgic, neuropathic, and musculoskeletal pain	<ul style="list-style-type: none"> • Lidocaine (Xylocaine) • Capsaicin (Qutenza)
Corticosteroids: Inflammatory conditions, metastatic bone pain, neuropathic pain, and visceral pain	<ul style="list-style-type: none"> • Dexamethasone • Prednisone



ROUTES OF ANALGESIC ADMINISTRATION

Analgesics can be administered by many routes. Each has advantages and disadvantages as well as indications and contraindications. The overriding considerations are effectiveness and safety.

The table below lists some of the most common routes for the administration of analgesic drugs.

ANALGESIC DRUG ADMINISTRATION		
Route	Indications	Contraindications
Oral (per os = PO)	Preferred route due to lower cost and convenience; may be prepared as powders, capsules, tablets, liquids, or lozenges	Gastrointestinal irritation; inability to swallow; need for more potent analgesic
Rectal (R)	Inability to take oral drugs; can be self-administered; longer duration than oral	Anal or rectal lesions, diarrhea, thrombocytopenia, neutropenia, prior abdominoperineal resection
Sublingual (SL)	Inability to take oral drugs; rapid analgesic onset, bypasses the liver.	Hypersensitivity to the drug
Intramuscular (IM)	Acute, short-term pain relief	Need for prolonged pain relief; absorption may be poor; possible muscle or nerve damage; costly
Intravenous (IV) bolus	Offers most rapid pain relief (5–15 min) but lasts less than 60 min	Requires IV access; gives only brief pain relief when prolonged relief is needed
Continuous intravenous (IV) infusion	Gives constant opioid blood level when other methods are ineffective	Requires infusion pumps with alarms and close monitoring
Patient-controlled analgesia (PCA)	Allows predetermined IV bolus of analgesic when client desires pain relief	Requires IV access, client cooperation, close supervision; does not give continuous pain relief
Subcutaneous (SC) opioid infusion	Continuous, prolonged parenteral opioids when IV not possible; allows home use	Requires site change every 7 days of 27-gauge butterfly needle; potential site irritation
Intraspinal (neuraxial), intrathecal, epidural, subarachnoid, intraventricular	Labor contractions; also intractable pain when client cannot tolerate systemic opioids by other routes	Requires expert insertion of catheter into intended space; attached to infusion pump or implanted reservoir; high risk for infection or dislodgment



Regional nerve blocks	Continuous or single dose analgesic for acute and chronic pain; used for trauma, burns, and labor	Requires expert insertion of catheter to specific nerve root; attached to infusion pump or implanted reservoir; high risk for infection or dislodgment
Topical (cream-laden anesthetic)	Analgesic for needle sticks, venipuncture, dermatitis, and insect stings	Must be applied 30–60 min in advance of need
Transdermal skin patch	Continuous dose of opioid; allows home use	Costly; when body temperature is over 102 °F, absorption is accelerated
Nasal sprays	Alternative to IV, IM, and oral opioid administration; rapid onset of action	Nasal exudates or mucosal swelling may prevent consistent absorption

PRINCIPLES FOR THE USE OF ANALGESICS

To guide caregivers, the American Pain Society (2009) identifies thirteen principles regarding the use of analgesics to control pain:

1. Individualize the route, dosage, and schedule of analgesic medications.
2. Administer analgesics on a regular basis if pain is present most of the day.
3. Know the dose and time course of several opioid analgesic preparations:
 - Ask client about prior experience with certain drugs.
 - Give preference to long-acting, sustained-release opioids such as OxyContin, which provides up to 12 hours of analgesia; Kadian, a controlled-release morphine preparation, which provides up to 24 hours of pain relief; and transdermal fentanyl, which provides up to 3 days of pain relief.
 - Avoid the adverse effects of emesis by giving anti-emetics.
 - Rotate opioids to compensate for tolerance.
 - Use rapid-onset opioids when necessary.
 - Use concentrated dosage forms when injection volume must be minimized.
4. Give infants and children adequate opioid doses.
5. Follow clients closely, particularly when beginning or changing analgesics.
6. When changing to a new opioid or a different route, first use equianalgesic doses to estimate the new dose. Then, modify the estimate, based on the clinical situation and the specific drug.



7. Recognize and treat side effects (such as sedation, constipation, nausea, itching, respiratory depression) by doing the following:
 - Change the dose or route of the same drug to maintain constant blood levels.
 - Try different opioid analgesics.
 - Consider multi-drug and multi-modal therapy.
 - Add another drug that counteracts the adverse effects, such as a stimulant for sedation.
 - Use an administration route that minimizes drug concentrations at the site producing the side effect, such as intraspinal instead of oral when appropriate.
8. Do not use meperidine (Demerol) because of neurotoxicity risk or mixed agonist-antagonists (Talwin) because of psychotomimetic effects.
9. Do not use placebos to assess the nature of pain.
10. Monitor for the development of tolerance and treat appropriately. Increased pain may be due to progressive disease, new pathology, skipped doses, or other causes.
11. Expect physical dependence and prevent withdrawal symptoms.
12. Do not diagnose patients as “opioid addicted” solely because of opioid dependence.
13. Be alert to the psychological state of the client.

CANNABINOIDS (MEDICAL MARIJUANA)

Between 1850 and 1937 cannabis was used widely in medical practice for a range of ailments and prescribed for various conditions including labor pains, nausea, and rheumatism. It was listed in the United States Pharmacopeia from 1850 until 1942, and in 1906 the Pure Food and Drug Act required the labeling of any cannabis contained in over-the-counter remedies. However, by 1931 Congress passed the Marijuana Tax Act, which effectively criminalized marijuana (PBS, 2014; Burnett & Reiman, 2014).

The discovery in the 1990s of the endogenous cannabinoid system renewed interest in the drug and strongly stimulated new research. In 1996 California voters passed Proposition 215 allowing for the sale and medical use of marijuana for patients with AIDS, cancer, and other serious and painful diseases (PBS, 2014; Burnett & Reiman, 2014).

Under United States federal law, marijuana is defined as having no currently accepted medical use. However, in 2003 the United States Department of Health and Human Services was granted a patent titled “cannabinoids as antioxidants and neuroprotectants.” The patent (#6630507) claims exclusive rights for the use of cannabinoids for treating neurodegenerative diseases such as Alzheimer’s, Parkinson’s, and HIV dementia. The contradiction between federal marijuana law and the government’s patent is quite interesting, in that the U.S. government owns a patent



on marijuana as a medical therapy, and it also classifies it as a Schedule I drug. Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use (USPTO, 2003).

Because of vigorous enforcement of the Controlled Substance Act by the federal Drug Enforcement Administration and harsh penalties imposed on individuals who use the herb, an increasing number of states have since passed laws regulating marijuana within their borders. As of 2015, there are 23 states, the District of Columbia, and Guam that have enacted laws to legalize medical marijuana.

At the federal level, however, marijuana remains classified as a Schedule I substance under the Controlled Substances Act, making distribution a federal offense. In 2013, the U.S. Department of Justice recognized that states were expected to create strong state-based enforcement policies, and updated its stance stating it would “defer the right to challenge their legalization laws at this time,” but reserves the right to challenge the state if and when it feels necessary. Because federal law prohibits its prescription, medical marijuana “prescriptions” are more often called “recommendations” or “referrals” (NCSL, 2015).

Mechanism of Action

Like opiates, cannabinoids interact with specific receptors located mainly within the central nervous system, but researchers have also identified cannabinoid receptors in the peripheral nervous system, cardiovascular system, reproductive system, and gastrointestinal and urinary systems. Two kinds of cannabinoid receptors (CB1 and CB2) have been found, and endogenous cannabinoids along with the receptors are called the “endogenous cannabinoid system.” Endogenous cannabinoids play a role in regulating homeostasis, pleasure, memory, thinking, concentration, body movement, awareness of time, appetite, pain, and the senses. The human body produces a number of cannabinoids, including anandamide and 2-arachidonoylglycerol (2-AG).

Research has identified two main cannabinoids from the marijuana plant that are of medical interest: **tetrahydrocannabinols (THC)** and **cannabidiols (CBD)**. THC increases appetite and reduces nausea and has been FDA-approved for these purposes. THC may also decrease pain, inflammation (swelling and redness), and muscle control problems. Two FDA-approved drugs, dronabinol (Marinol) and nabilone (Cesamet), contain THC and come in pill form. CBD is a cannabinoid that does not affect the mind or behavior. It may be useful in reducing pain and inflammation, controlling epileptic seizures, and treating mental illness and addictions (NIH, 2015b).

Nothing manmade, however, appears to be as effective or as quick for pain relief as smoking the stems, leaves, buds, etc., of the cannabis plant itself. But since cannabis has a narrow therapeutic index (a small gap between symptom control and side effects), dosing by smoking is difficult. Sativex, a drug available in Canada, Great Britain, Spain, and Germany, has a wider therapeutic index. It is delivered orally via a spray in a dose that is enough to control pain without unwanted side effects. This drug and delivery system is illegal in the United States, however (Foreman, 2014).



The scientific study of the medical uses of marijuana is ongoing, and evidence suggests that cannabis has a remarkably safe profile and can be an effective treatment for chronic pain, neuropathic pain, and muscle spasms due to multiple sclerosis or paraplegia. It can provide relief from the pain itself either alone or in combination with other analgesics, and it can control the nausea associated with taking opioid drugs, as well as the nausea and vomiting that often accompany severe, prolonged pain (Thompson, 2015).

Nonpharmacologic Interventions

Nonpharmacologic interventions can be psychological and/or physical and can be used independently or in combination with other nonpharmacologic or pharmacologic methods of pain control. Nonpharmacologic interventions may or may not be as totally effective on their own as an analgesic, but their use is often of great benefit for patients. The choice of intervention is determined by the individual nature of each case, what works for a specific patient, and the skills of the clinician.

Nonpharmacologic interventions work in two basic ways: they alter pain transmission or modify pain perception.

ALTERING PAIN TRANSMISSION

Cutaneous Stimulation

Transcutaneous electrical nerve stimulation (TENS) is the most common form of electrical stimulation. TENS provides a low-voltage electrical current to the skin through electrodes applied over the area of pain. TENS machines are thought to stimulate non-pain-carrying peripheral nerves (A-beta), which close the “gate” to prevent transmission of pain signals through the spinal cord. It may also stimulate nerves to produce endorphins, which may block the perception of pain. TENS is most commonly used to treat conditions involving muscle, joint, or bone, such as osteoarthritis, fibromyalgia, bursitis, and back and neck pain.

TENS may also affect pain transmission by altering the effects of higher brain centers on synaptic transmission in the spinal cord. Although TENS may help relieve pain for some people, its effectiveness has not been proven. Research has so far been inconclusive, and the effect may vary from individual to individual, even with the same condition (Denegar et al., 2015).

Massage is the use of touch or force to areas and tissues of the patient for therapeutic purposes. Goals may include decreasing pain, increasing blood or lymph flow, increasing ranges of motion, or providing perceptive and sensory feedback. Massage reduces pain by stimulating A-beta fibers, resulting in closing of the “gate” to impulses from the periphery.



There are many types of massage:

- Acupressure applies pressure to acupuncture points.
- Deep-tissue massage reduces pain and inflammation.
- Myofascial release directs force into dysfunctional muscle and fascial tissue.
- Neuromuscular therapy applies pressure to soft tissues to balance the central nervous system and musculoskeletal system.
- Reflexology targets pressure to areas of the feet hypothesized to correspond with health in other areas of the body.
- Trigger point massage focuses on tender nodules and tight bands in muscles.
- Whirlpool massage decreases muscle tension, improves circulation, and relieves pain.
- Back rub or massage decreases muscle tension, pain, stress, and depression.
(Berman & Snyder, 2012; Lavretsky et al., 2016)

Heat deactivates pain at a molecular level in much the same way that pharmaceutical painkillers act. Heat receptors located at the site of injury stimulate sensory receptors to block the effect of chemical messengers that cause pain to be detected. Applying heat decreases muscle spasm and increases blood flow to an area, bringing more nutrients while flushing out cellular debris (organic waste from dead or damaged tissue). This helps speed up healing (Berman & Snyder, 2012).

Theories about the mechanism for pain reduction by the application of **cold** include a decreased nerve transmission in pain fibers, reduced activity of free nerve endings, raise in the pain threshold, and the release of endorphins. Cold application causes vasoconstriction, which decreases the amount of blood being delivered to an area and results in reduced swelling. By reducing edema, pressure in the tissues is decreased, resulting in pain reduction. Ice is also beneficial for reducing muscle spasms by slowing the conduction velocity of sensory and motor nerves (SportsInjuryClinic, 2014).

Many devices are available to provide heat and cold, including electric heating pads, patches, and ice packs as well as soaks and baths (Berman & Snyder, 2012).

Invasive Procedures

When noninvasive strategies are insufficient, patients may be offered various invasive options that include:

Nerve block. Peripheral nerve transmission of pain can be interrupted temporarily by the injection of a local anesthetic to numb the nerves. This is done to control acute pain, and diagnostic nerve blocks are done to determine sources of pain (Denegar et al., 2015).



Ablation. Ablation procedures are minimally invasive treatments that use extreme temperatures or sclerosing agents to damage or destroy nerves, thereby decreasing pain signals from a specific area. Ablation involves insertion through the skin of needle-like probes directed toward a small area of nerve tissue that is then damaged or destroyed using one of the following:

- Radiofrequency (an electrical current produced by a radio wave) to heat up a small area of nerve tissue
- Sclerosing agents, such as phenol or alcohol
- Cryoablation (or cryoneurolysis) using cold gases (e.g., liquid nitrogen, argon) to form a ball of ice crystals at its tip to freeze the nerve tissue (Baker, 2013; Society of Interventional Radiology, 2013)

Ablative procedures are also performed in the central nervous system. Spinal cordotomy is done to damage or destroy areas of the spinothalamic tract and interrupt pain signaling. Intracranial ablative procedures for pain may also be performed (Kanalnithi & Henderson, 2009).

Spinal cord stimulator. A device is implanted in the epidural space adjacent to nerves that innervate the affected body area. The device sends pulsed electrical signals to the spinal cord to control chronic pain in patients who have not responded to medications or other methods of pain management (Bernstein, 2015).

Acupuncture has been a part of traditional Chinese medicine for thousands of years. It is an approach that involves penetrating the skin with thin, solid, metallic needles that are then manipulated by hand or by electrical stimulation. Considerable controversy has existed regarding its value as a therapy and whether it is nothing more than a placebo, and research is ongoing.

Acupuncture is explained by Western practitioners as acting on places in the body where nerves, muscle, and connective tissue can be stimulated. This stimulation is said to increase blood flow, which at the same time triggers the activity of endogenous opioids. The FDA regulates acupuncture needles as medical devices and requires that they be sterile, nontoxic, and labeled for single use by qualified practitioners only (NIH, 2015c; Nordqvist, 2015).

Dry needling is performed by some Western physical therapy practitioners utilizing acupuncture-type needles to treat musculoskeletal and nervous system pain based on modern neuroanatomy science (in contrast to acupuncture, which is based on a system of meridians). The procedure involves the physical therapist inserting a very thin filament needle into a muscle directly at a myofascial trigger point (painful nodule or knot in the muscle), which may release the tight muscle bands and decrease pain. Dry needling is rarely a stand-alone procedure and should be part of a broader physical therapy approach (Mejuto-Vasquez et al., 2014).



Dry needling is an invasive procedure, and because California, Hawaii, New York, and Florida prohibit physical therapists from penetrating the skin, dry needling is not allowed in those states. Many states, however, have no regulations on dry needling. In the United States, as of 2015, the practice of dry needling remains controversial. Because of the dispute between physical therapists and acupuncturists over dry needling, the intervention is explicitly permitted for physical therapists' use in only about half of the states. There is no Current Procedural Terminology (CPT) code specifically for dry needling, and some payers will not reimburse for it (Ries, 2015).

MODIFYING PAIN PERCEPTION

Psychotherapy

One of the most common types of psychotherapy used in pain management is **cognitive-behavioral therapy (CBT)**, the goal of which is to motivate patients to become aware of how they think about pain and to consciously and consistently replace negative thoughts with positive ones.

CBT begins with changing attitudes by addressing the harmful thinking that is common among patients with chronic pain. Harmful thinking focuses on what the person does not like or desire. It includes judgment using negative words, visualization, self-talk, and metaphors as well as the replaying of negative memories. Behavioral therapy encourages the patient to identify behaviors that reinforce or exacerbate pain and disability, such as being overly dependent on others or using pain to manipulate others. Therapists use positive and negative reinforcement to help the patient shed old behaviors and promote new, beneficial patterns of behavior.

Another form of psychotherapy is called **acceptance and commitment therapy (ACT)**. This therapy encourages patients with pain to increase acceptance of their pain while focusing attention on other goals or activities they value. This has been shown to lead to a significant reduction in pain intensity compared with no treatment (Brannon et al., 2014).

Biofeedback

Biofeedback is a technique that trains a person to control body functions such as heart rate, blood pressure, breathing, or muscle activity. Biofeedback uses electrical sensors attached to the skin. The sensors send signals to a monitor that displays a sound, flash, light, or image that represents different body functions. This feedback allows the person to focus on making subtle changes in the body, such as lowering blood pressure and heart rate, regulating breathing, or relaxing certain muscles to achieve pain reduction (Mayo Clinic, 2013).



Relaxation

Relaxation involves the conscious relaxing of muscle groups. It is frequently done progressively, starting at the feet and moving up the body, ending with the neck and facial muscles. Initially, the clinician guides the patient verbally, slowly directing attention to the next muscle group to be relaxed. By reducing muscle tension, pain intensity is decreased. After one or two sessions, most patients are able to effectively provide their own relaxation sequence (deWit & Kumagai, 2013).

Hypnosis

Hypnosis alters pain perception. It is a state of self-induced relaxation and concentration in which cognitive thinking is bypassed, allowing the person to become more susceptible to sensory and emotional suggestions, such as reduction of pain. The patient is trained by the therapist to practice self-hypnosis at home. Several sessions may be necessary for optimum results. Hypnosis happens when the person enters a state of deep physical relaxation and enhanced mental awareness. Studies have proven that hypnotic suggestions can reach all brain areas involved in processing pain. Brain scans show that suggestions to decrease pain intensity elicit responses in some regions of the brain, and suggestions that increase acceptance of pain register in other areas (Lu, 2015).

Distraction

Distraction is about forgetting to feel the pain by diverting the attention of individuals away from painful stimuli. Distraction stimulates descending pathways that modulate the pain impulse. When people focus on something that gives pleasure, they are less likely to feel acute pain. This phenomenon occurs because the reticular activating system briefly inhibits the awareness of pain. Distraction works best for short acute pain, such as a needle stick. Such things as listening to music, watching an intense scene on television, using guided imagery, or being involved in something of special interest may temporarily distract a person from pain. Distraction is an effective intervention to use with children. Distraction, however, does not work for chronic, long-term, or severe acute pain (deWit & Kumagai, 2013).

Mindfulness meditation is the act of passively being aware of thoughts and is believed to modify the subjective pain experience by enhancing acceptance and coping. It has been found to change the manner in which noxious stimuli are experienced; however, the nature of these changes remains unclear (Zeidan et al., 2012).

Mindfulness meditation teaches a person to look at pain from a different perspective by distracting the person from judgments and negative thinking about the experience of pain and focusing attention only on the awareness of pain. The brain is easily distracted when the mind is focusing on a mentally demanding task, and the activity in the brain areas that register pain is reduced. Imaging studies show that mindfulness soothes the brain patterns underlying pain. As time passes, these changes take root and alter the structure of the



brain itself (see also “Altering Brain Structure” below). This results in a reduction in pain intensity (Penman, 2015).

A relatively new successful way to reduce the perception of pain that has not yet become widely accepted is **virtual reality**. Virtual reality treatments can “work in tandem” with pain medications to further reduce the perception of acute pain and the short-term spikes in pain intensity in chronic pain patients. Multiple studies have been done that show promising results by drawing a patient’s attention away from the pain experience and toward a virtual 3D environment (Choo et al., 2014). Virtual reality can be used for patients in any age group, but it may be especially useful for pediatric patients (Banzon et al., 2014).

Mirror Therapy

Mirror therapy is effective in conditions such as phantom limb pain, stroke, or Complex Regional Pain Syndrome (CRPS), a common form of chronic pain that usually affects an arm or a leg. Utilizing a mirror, the therapy exploits the preference of the brain to prioritize visual feedback over somatosensory or proprioceptive feedback concerning limb position. There are several hypotheses about how this works: the mirror in some way rewires the brain, dampens mismatched signals between neurons controlling vision and proprioception (position sense), or clears persistent painful memories associated with the affected limb (Physiopedia, 2015).



Using a mirror, the brain is “tricked” into seeing two limbs.

(Source: © Sköld et al., 2011.)

Brain Stimulation

Transcranial direct current stimulation (tDCS) is a noninvasive, painless brain stimulation technique that is an emerging tool for adjunctive treatment of pain syndromes that works by neuroplastic modulation of the pain matrix in the brain. tDCS is delivered through a battery-operated device that transfers electrical current of low intensity to the surface of the scalp using saline-soaked sponge electrodes. The primary mechanisms of tDCS are a sub-threshold modulation of the neuronal resting membrane potential and interaction with various neurotransmitters in the brain (Knotkova et al., 2015).



Altering Brain Structure

Chronic pain causes brain structure changes and impairments. There is a change in gray matter volume and the integrity of white matter connectivity. **Yoga** and **meditation** have been found to have the opposite effect on the brain, bulking up gray matter through neurogenesis and strengthening white matter connectivity through neuroplasticity. Both yoga and meditation have been found to significantly increase pain tolerance and pain threshold (APS, 2015; Hölzel et al., 2011).

PAIN SELF-MANAGEMENT STRATEGIES

Patients can benefit greatly by being educated in ways to self-manage their pain, and healthcare providers can offer many strategies to improve a patient's quality of life. Patients with chronic pain issues can also attend self-management programs for pain, which are offered in various settings such as senior centers, churches, libraries, hospitals, and online. The following are some ways in which a patient can gain control of and manage their own pain.

- Eat regular, nourishing, high-fiber foods and drink plenty of water to enhance the healing process, promote medication effectiveness, and avoid constipation.
- Get adequate sleep. Lack of sleep can lead to a decreased ability to cope with pain. Consider ways to enhance sleep such as establishing a quiet pre-bedtime ritual and avoiding alcohol.
- Follow one's medication routine as outlined by the healthcare provider and use medications only as prescribed.
- Avoid alcohol, which may interact with medications, interfere with restful sleep, and interfere with managing emotions.
- Avoid smoking or other use of tobacco products, which can impair healing.
- Participate in regular movement or exercise, recognizing that decreased activity due to pain can lead to increased disability.
- Use good ergonomics to minimize physical strain, maintain appropriate posture, and employ assistive devices.
- Engage in tension-relieving activities such as breathing exercises, muscle relaxation, and imagery to avoid stress and tension, which can lead to increased pain and additional stress.
- Remain socially active and involved in recreational pursuits. Isolation can increase attention on pain and lead to depression, which may increase pain intensity and lead to increased disability.
- Use distraction to change one's focus away from pain. Pain is felt more intensely when paid attention to and less so when the mind is involved in other activities.

Source: UC Davis, 2015.



The Interdisciplinary Nature of Managing Pain

ROLE OF THE NURSE

Many disciplines are involved in managing a patient's pain, and nurses play a pivotal role in the assessment, monitoring, interpretation, and evaluation of pain. Effective pain management by nurses is fundamental to quality of care and is the first responsibility of the nurse. The nurse's role includes, but is not limited to, the following.

- Establish a trusting nurse-patient relationship and educate patients and families regarding pain and expectations for pain management.
- Believe the patient's statements about his or her own pain.
- Ensure that the patient has given informed consent for the pain management plan.
- Explain all procedures, tests, and hospital routines.
- Assess pain and evaluate the patient's response to interventions using a pain management scale based on the patient's self report.
- Intervene before pain becomes severe.
- Administer pain medication if necessary around the clock with long-acting medications and PRN with "break-through" medications.
- Administer the largest dose prescribed when pain is out of control.
- Premedicate the patient in anticipation of procedures and activities that are expected to cause or increase pain.
- Maintain patient safety as routes and types of ordered medications change.
- Provide education to staff, patients, and families about the issues concerning opioid use, including tolerance, physical dependence, and addiction (see also below).
- Coordinate care and collaborate with all members of the pain management team.
- Use nonpharmacologic interventions to assist in pain reduction.
- Manipulate factors affecting pain by removing or altering additional physical stimuli or factors that affect pain tolerance:
 - Provide a quiet, clean, uncluttered environment.
 - Provide warmth or coolness as needed.
 - Provide activity as requested (TV, radio, reading material).
 - Facilitate family visits and support.
 - Frequently reposition and maintain good body alignment in the patient; use turning sheets for repositioning the patient.



- Keep linens clean, smooth, and unwrinkled.
 - Use special mattresses and/or beds (e.g., air or fluidized flotation mattress, foam overlays, adjustable beds).
 - Support limbs at joints when handling an extremity.
 - Assist with active or passive range of motion and encourage general conditioning and strengthening exercises.
 - Avoid bumping, jarring, or moving the bed suddenly.
 - Assist with hygiene and provide skin and oral care.
 - Assist with elimination needs.
 - Maintain adequate nutrition and hydration.
- Recommend referrals if appropriate.
 - Document pain assessment, intervention, and evaluation appropriately.
 - Intervene to minimize drug side effects (e.g., constipation).
 - Implement quality assurance/improvement standards to monitor the pain management program.
 - Continue education, as things are changing all the time.
(Berman & Snyder, 2012; ANA, 2016)

PATIENT EDUCATION AND OPIOID MEDICATIONS

Nurses have an important role to play in educating patients about the proper use of opioid medications. The results of a survey reported in 2015, however, revealed a pain management gap among nurses who are responsible for the care of patients receiving opioid analgesics. The study showed the gap included patient assessment, pharmacologic management, use of adjuvant medications, risk of addiction, risk of respiratory depression, and disposal and storage of opioid medications.

Only 25% of the nurses surveyed answered 50% of the survey questions correctly. Length of time as a nurse and experience working as a nurse did not influence the performance of nurses on the questionnaire, and neither did educational level. The survey found that nurses who had received opioid education as a separate class of medication answered a higher percentage of questions correctly. The results of the survey indicate that nurses' knowledge gap about opioids may interfere with their ability to provide effective medication education to their patients (Costello & Thompson, 2015).

The following information should be included in the education provided to patients who are receiving opioids as well as to their caregivers:



- Safeguard the medication supply through proper disposal of unused medications and avoiding sharing medication with others.
- Oral capsules may be opened and mixed with cool foods, but extended-release tablets may not be opened, chewed, crushed, or broken.
- Because opioids are metabolized in the liver, report nausea, vomiting, diarrhea, rash, jaundice, abdominal pain, tenderness or distension, or a change in the color of the stool.
- Monitor vital signs regularly and withhold medication and promptly report any difficulty in breathing or respirations below 10 per minute.
- Because these medications may cause urinary retention, monitor fluid intake and output and report any urinary symptoms such as dysuria, hesitancy, pain, or scanty urine output.
- Learn to recognize symptoms of allergy or anaphylactic reaction and immediately report them to the healthcare provider or go to the emergency room.
- Because opioids slow peristalsis, maintain an adequate fluid and fiber intake and use the healthcare provider's recommended stool softener or laxative if necessary.
- Because opioids can induce seizures, know how to recognize seizures and ways to ensure safety during a seizure. Report auras or visual affects, which may indicate an impending seizure, immediately to a healthcare provider.
- Because opioids can cause sensorium changes, which increase the risk for falls, request assistance when getting out of bed and avoid driving until the effects of the drugs are known.
- Understand breakthrough pain and call the healthcare provider if pain returns or increases.
- Avoid the use of any over-the-counter sleep medication containing antihistamines without consulting with one's healthcare provider.

Source: Pearson Education, 2016.

ROLE OF THE OCCUPATIONAL THERAPIST

Occupational therapy is an essential and vital element of any comprehensive pain management plan. The occupational therapist focuses on assisting patients to participate in adapting to the activities of daily living by assessing performance, identifying activities the patient values, and using evidence-based therapeutic approaches to address agreed-upon goals.

Interventions

Occupational therapy interventions for pain management may include:



Education

- Educate the patient in the neurophysiology of pain, the patient's pain diagnosis, and available therapy modalities.
- Teach and assist the patient to incorporate self-management strategies.

Goal Setting

- Actively involve the patient in identifying and establishing therapy goals that encourage motivation and participation.
- Help the patient establish and/or restore a daily structure for home and work.

Training

- Teach the patient to independently control pain in a proactive manner using pain control modalities such as heat and cold.
- Teach proper body mechanics and ergonomics.
- Offer training in the use of appropriate muscle groups using modalities such as an electromyographic feedback instrument to measure muscle activity and provide feedback information to the user.
- Teach ways to reduce muscle tension that lower pain levels.
- Teach problem-solving techniques to help plan for future challenges and problems.
- Provide training in self-pacing of activities to avoid increasing pain levels.
- Introduce adaptive equipment such as button hooks for dressing to help maintain independence.

Home Program

- Assist the patient to develop an exercise program and ways of maintaining a healthy lifestyle.
- Encourage prevention of social isolation through attendance in group activities, family events, volunteer work, or community activities.

Screening and Referral

- Screen for psychological, cognitive, emotional, and/or physical issues and make appropriate referrals.
(Rochman, 2014; Hughes, 2013a)



Modalities

Modalities occupational therapists may employ in pain management include:

- Therapeutic activities and exercises to increase strength and stamina
- Joint protection and/or energy modification
- Sensory re-education
- Mirror therapy
- Manual therapy
- Biofeedback techniques
- Taping techniques
- Relaxation and visualization activities
- Self-hypnosis, meditation, yoga

ROLE OF THE PHYSICAL THERAPIST

The physical therapist is a major component of the multidisciplinary pain management team. The goals of physical therapy include the reduction of pain, restoration of function, improved mobility, and prevention or limitation of permanent physical disabilities. Physical therapists provide conservative treatment for many conditions that can be equally effective (and less costly) than surgery and prescription drugs. Treatment plans are designed for the patient's individual goals, challenges, and needs (APTA, 2015).

Physical therapists use active approaches that include self-management, education, exercise, and sensory-motor re-education as well as passive approaches that include physical agents, electrical modalities, and manual therapies. These include:

- Education about pain and how to manage pain, working with the patient toward regaining the ability to perform normal activities of daily.
- Strengthening and flexibility exercises to improve movement with less pain. A graded exercise program may be instituted that gradually increases according to abilities. These help improve movement and coordination, reduce stress and strain on the body, and decrease pain.
- Manual therapies using hands-on techniques to manipulate or mobilize tight joint structures and soft tissues. Manual therapy increases the range of motion, improves tissue quality, and reduces pain. Such therapies include peripheral joint mobilization, myofascial mobilization, spine mobilization, soft tissue mobilization, and massage.
- Posture awareness and good body mechanics instruction to help the patient use the body more efficiently.



- Adjunct modalities, including:
 - Electrotherapeutics (TENS, iontophoresis, transdermal medication transfer)
 - Cryotherapy (cold/ice)
 - Ultrasound (high frequency sound waves)
 - Phonophoresis (combines topical drug therapy with ultrasound)
 - Hydrocollator (moist heat)
 - Paraffin (heat using paraffin wax and minerals for hands, wrists, or feet)
 - Mechanical traction
 - Dry needling
 - Mirror therapy

(Zane, 2012; Hughes, 2013b; Ries, 2015; Physiopedia, 2015)

CASE

CHANG

Chang is a 62-year-old male who, up until the past few weeks, has been very active with a local cycling club. His worsening right hip pain led him to make an appointment with his primary physician. When X-rays of the affected area showed evidence of the early stages of osteoarthritis, Chang was referred to Dr. Shaliqua Booth, a private-practice physical therapist specializing in orthopedics, for further evaluation and treatment.

On his initial visit, Chang complained of dull and achy pain in his right hip that sometimes radiated to his thigh and buttock area, as well as stiffness in the hip first thing in the morning or after prolonged sitting. Occasionally, he stated, his hip “sounds crunchy” when he rises from a sitting position or when he pedals his bicycle. He reported exacerbating factors that included getting up from beds or other low surfaces, extended walking or cycling more than 0.5 miles, and ascending/descending stairs. Chang also stated that lying on his side to sleep is most comfortable at this time.

Self-management strategies he has tried thus far have included using the hot tub at the local fitness center and taking Tylenol, both of which have provided only minimal relief. Chang expressed some frustration at not being able to participate in some of his preferred physical activities, particularly cycling, which he stated has been his primary source of social engagement since his wife passed away.

Dr. Booth’s physical examination of Chang’s complaints yielded the following:

- Lumbar spine and knee pathology ruled out with screening
- Significantly decreased active and passive range of motion (ROM) in right hip joint (particularly in hip abductors, flexors, and external rotators)
- Significantly decreased manual muscle strength in right hip abduction and extension



- Increased pain with passive ROM testing
- Slightly antalgic gait pattern, with decreased stance time and weight-bearing on right side
- Slight crepitus of hip joint when moved passively from close-packed to loose-packed positioning
- Static and dynamic standing balance grossly within age-typical limits

Dr. Booth discussed the results of her evaluation with Chang using a moveable anatomical of the hip joint to explain the biomechanics of his hip dysfunction. She then asked Chang what he would like to gain from physical therapy intervention. Chang stated that his ideal goal would be to bike ten miles with his cycling group relatively pain-free and without needing to stop for a break. Available management options were discussed and a treatment plan developed.

In order to address Chang's hip dysfunction and resultant pain, Dr. Booth employed a combination of treatments, including ice and electrotherapy for pain management; a combination of manual therapy, muscle-energy techniques, and joint mobilizations to address range of motion and joint restrictions; and a progressive program of exercises designed to maximize flexibility and strength of hip musculature. Chang was also given a progressive home exercise program (HEP) to perform on a daily basis between clinic visits.

After attending physical therapy 3x/weekly for four weeks and adhering to his prescribed HEP, Chang experienced a significant reduction in his pain as well as measurable improvements in his active and passive hip ROM and muscle strength. With continued progression of his prescribed exercise and mobility routines, Chang eventually dropped down to 1x/weekly visits with Dr. Booth and finally was discharged to an independent, long-term HEP. Four months after his initial evaluation, Chang had regained the ability to bike moderate distances with his cycling club and stated that he was satisfied with the results of his physical therapy.

Evaluating the Effectiveness of Interventions

Outcome evaluation is one of the most critical phases of pain management. If the expected outcome is pain reduction, outcome evaluation identifies its success or failure. It also identifies how much the pain has been reduced, how long it has taken, and long-term effects of the treatment.

Outcome evaluation requires gathering data from the best source of information (the patient) or the second-best source (the patient's caregivers). To be of value, the information must address the aspects of pain that were noted before the intervention, including the location, intensity, quality, and duration of the pain. In addition, data is gathered about adverse effects of an intervention, such as an allergic reaction, hypotension, or respiratory depression.

Such feedback is essential in order to revise the plan of care to make it more effective. A positive evaluation means that an intervention was successful and probably should be continued. A



negative evaluation means that an intervention was not satisfactory and should be changed. Hence the adage “negative feedback makes for change.”

OPIOID MISUSE, ABUSE, AND DIVERSION

Along with attempts to improve identification and treatment of pain, there has been an equal rise in prescription opioid addiction and abuse in the United States. Opioid misuse, abuse, and diversion are major problems, with 2.1 million people estimated to have a substance abuse problem in the United States. Serious consequences arise due to this problem.

In the past opioids were often not prescribed for a patient because of the fear of addiction. Then they became more liberally dispensed. Now practitioners have returned to the fear of addiction and become, once again, reluctant to prescribe them. Clearly there is a dilemma between the need to address opioid use disorders and overdose while continuing to ensure people with pain receive safe, effective treatment.

Scope of the Problem

In 2015 surveys were conducted among prescribing healthcare professionals and patients. The surveys found that 63% of consumer respondents had used opioids in the past, and 35% of these used opioids within the past three years. Of interest was the fact that 92% of respondents tried alternatives such as over-the-counter medication and nonpharmacologic alternatives, but only 2% said these were effective.

Most health professionals (88%) reported that they prescribe opioids to their patients, the largest amount for acute pain. When prescribing professionals were surveyed, 91% reported they discussed how and when to take opioid medications, 93% included a discussion of side effects, but only 55% discussed safe storage and proper disposal of unused opioids. Fifty-two percent of patient respondents reported they stored unused pills for future use, and only 23% reported throwing them away or returning unused opioids to a pharmacy with disposal programs, leaving a large amount of opioid medications available for misuse, abuse, and/or diversion (Anderson, 2015).

Since 1999 opioid pain reliever prescribing has quadrupled and has increased along with overdoses involving these most commonly used analgesics (9% increase in 2014) (CDC, 2016a). In 2012 healthcare providers wrote enough prescriptions for opioid pain medication to give every American adult a bottle of pills.

Opioid overdose has increased and unintended overdose death from prescription pain relievers has tripled in the past 20 years. The CDC reports more people died of overdose in the United States in 2014 than in any other year in the past and that more die every year from drug overdoses than from motor vehicle crashes. Natural and semi-synthetic opioids, which include the most commonly prescribed pain relievers oxycodone and hydrocodone, are involved in more overdose deaths than any other types of opioid.



Institutional Efforts to Address the Problem

The effort to prevent misuse, abuse, and diversion involves government and regulatory agencies, drug researchers and manufacturers, as well as healthcare institutions and individual clinicians.

CDC GUIDELINES FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

In 2016, the CDC issued new pain management guidelines for the treatment of chronic pain. Recommendations are based on a systematic review of the scientific evidence and consideration of benefits and harms, values, and preferences as well as resource allocation. These recommendations are:

- Do not use opioids as the first-line or routine therapy for chronic pain. Nonpharmacologic therapy and nonopioid pharmacologic therapy are preferred for chronic pain. If opioids are used, combine with nonpharmacologic therapy and nonopioid pharmacologic therapy.
- Establish and measure goals for pain and function, including how opioids will be discontinued if benefits do not outweigh risks. Opioid therapy should be continued only if meaningful improvement in pain and function occurs that outweighs risk to patient safety.
- Discuss benefits, risks, and responsibilities as well as availability of nonopioid therapies with patients before starting and periodically during opioid therapy.
- Prescribe immediate-release opioids when starting therapy for chronic pain. Do not use extended-release/long-acting (ER/LA) opioids.
- Initially prescribe the lowest effective dose and carefully reassess benefits and risks when justifying a decision to increase dosage.
- When opioids are used for acute pain, it must be cautioned that long-term opioid use often begins with treatment of acute pain. When used for acute pain, prescribe the lowest effective dose of immediate-release opioids and in a quantity for three days or less. More than seven days will rarely be necessary.
- Follow-up and reevaluation of risk of harm should be done within one to four weeks of starting opioid therapy for chronic pain or of dose escalation. Reassess at least every three months, and if benefits do not outweigh harms, reduce dose or taper and discontinue.
- At start of and periodically during opioid therapy, evaluate risk factors for opioid-related harms. Plan strategies to mitigate risk, including offering naloxone for increased risk for opioid overdose (history of overdose, history of substance use disorder, higher opioid dosages, or concurrent benzodiazepine use) are present.
- Check the prescription drug monitoring program (PDMP) for data about the patient's history that includes high dosages and prescriptions from other providers. Review data at



initiating of opioid therapy and during opioid therapy ranging from every prescription to every three months.

- Use urine drug testing to identify prescribed substance, other prescribed drugs, and illicit drugs at the start of opioid treatment for chronic pain and at least annually.
- Avoid prescribing opioid medication and benzodiazepines concurrently whenever possible.
- Arrange evidence-based treatment for opioid use disorder for patients, if needed. (CDC, 2016b)

CONTROLLED SUBSTANCE ACT

In 1971, in response to the growing misuse and abuse of drugs in the 1960s, Congress passed the Comprehensive Drug Abuse, Prevention, and Control Act. Known as the Controlled Substance Act, the legislation is still especially relevant to healthcare professionals concerned with the management of pain. The act created a schedule of controlled substances, ranking them according to their potential for abuse. Specifically, it identified five categories or schedules of drugs, from those with the highest abuse potential (C-I) to those with the lowest abuse potential (C-V), as shown in the table below.

CONTROLLED SUBSTANCES AND DISPENSING RESTRICTIONS		
Category/Schedule and Abuse Potential	Dispensing Restrictions	Examples
C-I High, possible severe psychological and physical dependency; no approved medical use	Only with approved protocol	Heroin, marijuana, LSD, mescaline, peyote, psilocybin, methaqualone
C-II High, possible severe physical or psychological dependency	Written prescription only signed by the practitioner, oral order permitted only in an emergency, no prescription refills, container warning label required	Combination products with less than 15 milligrams of hydrocodone per dosage unit (Vicodin), cocaine, methamphetamine, methadone, hydromorphone (Dilaudid), meperidine (Demerol), oxycodone (OxyContin), fentanyl, Dexedrine, Adderall, Ritalin
C-III Less than C-II drugs, moderate to low physical or high psychological dependency	Written or oral prescription that expires in 6 months, no more than 5 refills in 6 months, container warning label required	Products containing less than 90 milligrams of codeine per dosage unit (Tylenol with codeine), ketamine, anabolic steroids, testosterone



C-IV Less than C-III, limited physical or psychological dependency	Written or oral prescription that expires in 6 months, no more than 5 refills in 6 months, container warning label required	Xanax, Soma, Darvon, Darvocet, Valium, Ativan, Talwin, Ambien, Tramadol
C-V Less than C-IV, limited physical or psychological dependency	Written prescription or over- the-counter, varies with state law	Cough preparations with less than 200 milligrams of codeine or per 100 milliliters (Robitussin AC), Lomotil, Motofen, Lyrica, Parepectolin
Source: U.S. DEA, 2018.		

ABUSE-DETERRENT OPIOIDS

In an attempt to respond to the abuse of opioid medications, abuse-deterrent products are being formulated and approved for use by the U.S. Food and Drug Administration. Abuse-deterrent drugs have been shown to meaningfully deter abuse even if they do not prevent abuse. The science of abuse deterrence is quite new and rapidly evolving.

Abuse-deterrent formulations can be classified as a physical/chemical barrier that prevents drug release following manipulation of the drug or changes the physical form of the drug using chemicals that render it less amenable to abuse.

Agonist/antagonist combinations interfere with, reduce, or defeat the euphoria associated with abuse. The antagonist can be sequestered and released only when the product is manipulated. It is not clinically active when the drug is swallowed but becomes active when it is injected or snorted.

An **aversion** type of abuse-deterrent drug has a substance added that produces an unpleasant effect if the drug is manipulated or taken at a higher dosage than directed. It can include a substance that irritates the nasal mucosa if ground and snorted.

Delivery system methods can also offer resistance to abuse. Sustained-release depot injectable or subcutaneous implant formulations may be difficult to manipulate.

Other drugs may be classified as combinations in which two or more of the above methods could be combined to deter abuse.

Currently there are four abuse-deterrent drugs approved by the FDA:

- Hysingla ER (hydrocodone bitartrate)
- Zohydro ER (hydrocodone bitartrate)
- Embeda ER (morphine sulfate; naltrexone hydrochloride)
- Targiniq ER (oxycodone hydrochloride; naltrexone hydrochloride) (USDHHS et al., 2015)



Clinician Efforts to Reduce Opioid Abuse

Prescribing clinicians can reduce the risk of misuse, abuse, and diversion by:

- Ensuring there is only one prescriber and one pharmacy
 - Stressing proper medication storage and disposal
 - Considering the use of abuse-deterrent opioids
 - Offering office-based treatment for opioid addiction
 - Keeping prescription pads locked up or in prescriber's pocket
 - Prescribing small amounts more frequently
 - Writing tamper-proof prescriptions; always writing out numbers on prescriptions, including number of refills
 - Discussing diversion of medications with patients
- (Anderson, 2015)

It is also important to be able to identify patients with the intent to misuse or abuse opioid prescriptions.

IDENTIFYING DRUG-SEEKING PATIENTS

Most patients who complain of pain are honestly seeking relief from discomfort. Others seek drugs in order to cope with addiction or to provide income. Differentiating between the two can be very difficult. Drug seekers are experts at taking advantage of weak links in a system, and the subjectiveness of pain makes it hard to evaluate truthfulness.

Drug seekers include people of every age, gender, and socioeconomic status. Often these people initially used prescription drugs for valid medical conditions, and drug-seeking behaviors may have developed as a result of disease progression, under-treatment of pain, tolerance to the medication, or unrecognized addiction. Only a small number of drug seekers do so to divert opioids to the street for money.

There are some common characteristics that that can provide clues regarding the nature of a patient's intent:

1. Inconsistent behaviors from waiting room to treatment room
2. Assertive personality often demanding immediate action
3. Intoxicated or unkempt appearance
4. Repeated calls during and after office hours demanding refills
5. Frequent claims of lost or stolen medication
6. Unusual knowledge of controlled substances



7. Providing a medical history with textbook symptoms
8. Offering vague or evasive answers about medical history
9. Inconsistent description of an injury with the patient's current complaints
10. Unwillingness to provide information about past healthcare providers or denial of having a regular doctor
11. Requests for a specific drug and reluctance to try a different one
12. Failure to keep appointments for further diagnostic tests or to be referred for consultation
13. Evidence of mood or thought disorder or suicidality
14. Cutaneous signs of drug use such as skin tracks or scars
15. Excessively flattering after receiving a prescription for opioids
(Yasgur, 2012)

ADDRESSING DRUG-SEEKING BEHAVIORS

There are a number of strategies healthcare providers can utilize in the management of those individuals with drug-seeking behaviors. The following are suggestions made by medical risk management advisors:

- Document all medications taken by or prescribed for a patient, including medical samples dispensed, and file a copy of all written prescriptions in the patient's record.
- Request a picture I.D. or other I.D. and Social Security number. Place a photocopy of them in the patient's file.
- Confirm the patient's current address and phone number at each visit.
- Consider written refill protocols for refilling prescriptions by another provider other than a clinician with prescriptive authority.
- Write prescriptions for a limited quantity, with reevaluation as a condition for refills.
- Maintain the security of prescribers' DEA (Drug Enforcement Administration) numbers and maintain accurate counts of medications and prescription pads. Promptly report thefts to local law enforcement.
- Coordinate care with the patient's other healthcare providers. Verify history with the patient's current treating physician.
- Conduct an assessment of the patient's complaints and do not rely solely on the records of the referring physician or the patient's description of the problem.
- Consider a referral if a substance abuse problem is identified.



- Consider the use of a pain management agreement (see below) to make sure the prescribing practitioner and the patient understand the guidelines for long-term opioid therapy (Adams, 2016).

PAIN MANAGEMENT AGREEMENT

A pain management agreement documents the understanding between a prescriber and a patient regarding prescribed medications being taken for pain management. Its purpose is to prevent misunderstandings about certain medications and to help the prescriber and patient comply with laws regarding controlled substances. A typical pain management agreement:

- Requires the patient to use one pharmacy only for all prescription refills
- Identifies expected benefits of medications and the risk associated with their misuse
- Lists the possible side effects that can occur
- Requires notification when the same or similar medication is prescribed by other healthcare providers
- Lists the conditions for issuing refills or replacement prescriptions
- Requires regular evaluations of pain
- Requires random screenings for misuse of medication
- Describes the conditions under which therapy can be changed or discontinued

In addition, practitioners can consider the use of screening tools when dealing with a possibly drug-seeking individual. The Current Opioid Misuse Measure (COMM) is a 17-item measure designed to identify drug-seeking behaviors in patients with chronic pain who are receiving opioids. Another tool, the Addiction Behaviors Checklist (ABC), is a 20-item questionnaire designed to track behaviors that are characteristic of opioid addiction in chronic pain populations.

The Pain Assessment and Documentation Tool (PADT) measures “4 As” of pain treatment outcomes: analgesia, activities of daily living, adverse effects, and aberrant drug taking. This assessment tool allows a practitioner to determine whether the patient’s self-reported pain is clinically significant, the patient’s functional status has improved with the current pain medication plan, the patient is experiencing side effects, or the patient is exhibiting aberrant behaviors (Yasgur, 2012).

Confronting patients believed to be seeking drugs can be difficult. Confrontation may turn out to be therapeutic, but it can also be dangerous. It is best to avoid confronting a drug-seeking patient alone. The practitioner should consider psychiatric support, social service assistance, facility security, and in some instances, local law enforcement.



CASE**MARIE**

Bill, a registered nurse, moved from a large city to a small rural town and took a job as the night shift nurse in the emergency room of the small local hospital that served a population of about 10,000. He found that the hospital staff and physicians were very casual and worked closely with one another, which was very different from the large teaching hospital he had come from.

During Bill's first week on duty, Marie came in with the complaint of a migraine headache. Marie was a 46-year-old nursing assistant who worked on the hospital's medical floor. She told Bill that there was a standing order for her to receive Dilaudid for her headaches and the dose she was to receive. She expressed frustration and annoyance when he told her he needed to call the covering ER doctor for an order. Bill also noted that Marie displayed no behaviors that could be interpreted as indicative of pain.

When the physician returned Bill's call, he told Bill to give her the medication. Bill drew up the Dilaudid, and when he gave her the injection he noted multiple areas of induration of the buttocks and felt a grainy sensation when the needle was inserted.

After discharging Marie, Bill did an audit of her medical record and discovered she had been visiting the ER 2 to 3 times each week for the past year for opioid treatment of migraine headaches. Bill presented his documentation to the prescribing physician, who expressed surprise and said he really wasn't aware of the frequency he had been prescribing opioids for Marie.

Bill was informed a week later by the physician that he had referred Marie to both a pain management specialist and to a substance abuse specialist in the city 20 miles away. He thanked Bill and said he hoped Marie would benefit from his intervention.

Addressing Pain in Individuals with Substance Use Disorders

Pain management for individuals with substance use disorders (SUDs) is a serious concern because the drugs that relieve pain are the very ones that are misused. To better address the complex issues of pain management for people with SUDs, the American Society for Pain Management Nursing (ASPMN, 2012) published a position paper which:

- Affirms the right of every patient with pain, including those with substance use disorders, to be treated with dignity, respect, and high-quality pain assessment and management
- Recommends that adults be assessed at three levels of risk for addiction: low, moderate, or high, and that children be assessed for nonmedical opioid use or abuse
- Applies ethical principles to clinical practice



UNIVERSAL PRECAUTIONS IN PAIN MEDICINE

To guide healthcare professionals who prescribe and administer Schedule (Category) II medication (drugs with high abuse potential), the ASPMN suggests the following universal precautions:

1. Make a diagnosis of treatable causes for pain, addressing comorbid conditions including substance use disorders and psychiatric illnesses.
2. Assess psychological status, inquire into history of substance misuse, discuss urine testing, and offer substance use disorder assessment. Refusers should be considered unsuitable for pain management with controlled substances.
3. Obtain informed consent; discuss the proposed treatment plan with the patient, answering questions about anticipated benefits and foreseen risks.
4. Create a treatment agreement clearly stating the expectations and obligations of both patient and practitioner; this agreement forms the basis of the therapeutic trial, a process of finding a safe, effective pain-management strategy.
5. Assess level of pain and function before and after medication trial.
6. Individualize pharmacologic regimens of opioids and adjunctive medications on the basis of individualized subjective and objective clinical findings.
7. Reassess pain and level of function, corroborated by third parties, to document rationale to continue or modify therapeutic trial.
8. Regularly reassess the “4 As” of the use of Schedule II drugs: analgesia, activity, adverse effects, and aberrant behaviors, as well as the patient’s emotional expression.
9. Periodically review pain diagnosis and comorbid conditions, including SUD.
10. Document carefully records of the initial evaluation and each follow-up to reduce medico-legal exposure and risk of regulatory sanction.
(ASPMN, 2012)

ASSESSING RISK FOR DEVELOPING SUDs

Before introducing any opioids into a patient’s treatment regimen, it is useful to determine the risk of substance abuse. The first step is urine testing to screen for illicit drugs, a sign of potential abuse.

Other tools available for assessment include the Screener and Opioid Assessment for Patients with Pain-Revised (SOAPP-R), a patient-administered questionnaire designed to specifically determine the risk of drug abuse. Another assessment tool is the Opioid Risk Tool (ORT), which is administered by the clinician to assess risk of opioid abuse in pain patients. Risk assessment places patients into low, moderate, or high-risk categories.



Low Risk

Patients may be safely managed in primary care settings.

- No past or current history of SUD
- No family history of a SUD
- Presence of social support system

Moderate Risk

Patients may be managed in primary care settings.

- History of treated SUD
- Significant family history of SUD
- Past or concurrent psychiatric disorder
- Current pharmacotherapy for addiction
- Younger than 25 years old

High Risk

Patients pose significant risk requiring a specialist in addiction, pain management, and frequent monitoring.

- Active SUD or aberrant behaviors
- Active addiction
- Major untreated psychiatric disorder
(Kaye et al., 2015)

MANAGING PAIN RELATIVE TO RISK IN PATIENTS WITH SUDs

Providing pain control for the part of the population with a substance abuse disorder is challenging. It is important that caregivers understand that when a patient with a substance abuse disorder has pain, they are less likely to receive adequate pain management than the general population. Inadequate pain relief is a significant risk factor for the patient's relapse.

As with any patient with pain, nonopioid analgesics are first-line drugs of choice. Persons with SUDs, however, may have pain that is resistant to nonopioids yet responsive to opioids. It is crucial to treat both the substance abuse problem and the pain concurrently. It is recommended that patients be engaged in addiction treatment while being treated with opioids (Alford, 2016).

Safe treatment for a recovering substance abuser with acute pain involves:

- Making certain opioids are held and administered by a trusted other person



- Understanding that the patient may require higher-than-average doses for appropriate relief
- Administering drugs on a timed schedule rather than as needed (“PRN”)
- Converting as soon as possible to a nonopioid regimen and nonpharmacologic modalities
- Increasing recovery support during a bout with acute pain

Chronic pain is best addressed using a pain management **team approach** and includes:

- A comprehensive pain assessment
- Thorough exploration of drug use history
- Development of a pain management plan that effectively controls pain without using opioids
- A structured, written protocol to increase the patient’s sense of active participation in and control of treatment (which is also beneficial for involved family and other caregivers)
- Consideration of nonpharmacologic modalities
- Encouraging involvement in group therapy led by a therapist offering cognitive behavior techniques and supportive interventions for improving outlook and attitude
- Ensuring that comorbid psychiatric disorders are being managed
- A structured plan and clear agreement if pain is not responsive to such approaches and opioids are to be considered (should be written, reviewed by all parties, and signed by the patient and all those involved in treatment as well as participating family members)
- One physician prescribing all controlled drugs and one pharmacy filling all prescriptions (Hausotter, 2013)

TREATING PAIN IN PALLIATIVE CARE AND END-OF-LIFE

Palliative care is specialized medical and nursing care for people with serious illness that focuses on providing patients with relief from pain, symptoms, and the stress of illness. Care is provided wherever the patient’s care takes place—the patient’s own home, care facility, hospice in-patient unit, hospital, or outpatient service. Such care is provided to patients regardless of age, prognosis, or length of time the care is needed. Palliative care is also part of hospice care given at the end of life.

The presence of severe or intolerable pain in the last week of life is estimated to be between 35% and 46%. A study of children who died of cancer revealed that more than 80% experienced pain, yet only 27% were able to achieve pain relief. Undertreatment of pain has been found to be more common in patients who cannot speak for themselves, including infants, children, and the developmentally or cognitively impaired (Reynolds et al, 2013).



As life expectancy increases because of advances in medicine and technology, there are more people expected to be living longer with serious, chronic medical conditions, and many will reside in long-term care facilities where challenges for treatment of pain will include a lack of consistent assessment in persons with cognitive impairment as well as lack of recognition of the meaning of pain behaviors. This is significant, as patients consider unrelieved pain an important factor eroding dignity at the end of life.

Barriers to Effective Pain Treatment

Barriers to adequate pain management in palliative care and end-of-life include the **patient's and family's misconceptions** about pain and treatment, which may include:

- Lack of reporting of pain or denial of pain due to its link with deterioration, a sign of the progression of the disease
- The belief that pain is simply a natural part of being ill and cannot be relieved or avoided
- The fears and concerns about pain medication, side effects, substance abuse, and/or addiction

Barriers to adequate pain management by **healthcare providers** include:

- Failure to recognize pain or denial of its presence
- Lack of understanding about the global nature of pain (e.g., psychological, social, and cultural aspects)
- Fear of doing harm or causing adverse effects, including tolerance to opioid effectiveness
- Concerns about diversion or misuse of drugs by other than the patient
- Failure to request assistance from pain specialists
- Failure to include effective nonpharmacologic measures
- Lack of knowledge, skills, and time for adequate pain and symptom assessment
- Lack of knowledge about analgesics, symptom interventions, and side effects of therapies
- Low priority given to pain and symptom management
- Reimbursement issues
- Restrictive regulations designed to curb misuse of prescription drugs (e.g., caps on dosage levels, cost barriers, reclassification of pain medications to more restrictive categories, monitoring compliance, federal and state interference with medical decision-making, mandated inspection of pain management clinics, formulary restrictions, Medicare and Medicaid coverage regulations)

(Wilkie & Ezenwa, 2012; Reynolds et al., 2013)



One of the greatest barriers to adequate pain management, however, results from lack of clinician training and the fear of violating ethical, moral, and legal tenets in the administration of pain medication to a patient at the end of life. There is a fear that death will be hastened by administering opioids as well as a failure to recognize that when pain is untreated, it interferes with the patient's and family's ability to complete tasks with some positive quality of life. There is also a lack of awareness that pain management is the right of the patient and the duty of providers at the end of life (Jackson & Navati, 2015).

The concerns of clinicians are often based on misconceptions about opioid use. It is believed that opioids cause unconsciousness when given in high doses, which is considered unnatural, that it is wrong to help with pain at the cost of consciousness or length of life, and that alleviating pain to the degree of unconsciousness is legally prohibited.

Many clinicians are unsure about how aggressive pain management in palliative care differs from physician-assisted dying and euthanasia. Studies have shown that prescribing medication carries a very small risk of hastening death, but any hastening of death is not the intention of the treating provider. "The use of a medication intended to treat pain or relieve discomfort is legal in all states" (Jackson & Nabati, 2015).

Clinicians should never reduce or withhold needed medications from terminally ill patients for fear of unconsciousness or hastening death. It is necessary to recognize that discontinuing an ongoing opioid infusion in a terminal patient who slowly loses consciousness can intensify the patient's already moderate-to-severe pain (Berger & Vadivelu, 2013).

Effectively Managing Pain

Morphine is the "gold standard" of pain medication in palliative care and hospice, and the preferred route is oral and, in those who can no longer swallow, longer-acting dose suppositories (Morrow, 2014).

MANAGING BREAKTHROUGH PAIN

Patients receiving palliative care often are given pain medication around-the-clock. There are times, however, when pain occurs between the regularly scheduled doses. This is known as breakthrough pain and is common in those with advanced disease. Medications to relieve this pain are not always prescribed; and even when such medication is prescribed, patients don't always use as much medication to treat their pain as is allowed by prescription.

Breakthrough pain includes incident pain, spontaneous pain, and end-of-dose medication failure:

- **Incident pain** occurs with specific activities and can be predicted. Pain management requires a proactive approach using a quick-acting, short-term-lasting pain medication before the patient is involved in such activities. Dosage should be adjusted based on the level and duration of the activity that is expected to cause pain.



- **Spontaneous pain** is unpredictable, is not associated with any specific activity, and is more difficult to treat. A quick-acting, short-term-lasting pain medication should be given as soon as the patient feels pain. Better control of pain may result from use of adjuvant medications.
- **End-of-dose medication failure** is pain that occurs toward the end of the time frame in which the medication is intended to be effective. The treatment may involve shortening the interval between scheduled doses or increasing the dose.

Patients and/or caregivers can assist in making sure breakthrough pain is treated adequately by keeping a medication log that records time, date, pain levels, medications used, and response to the medication. This assists the clinician in determining pain management adjustments (Morrow, 2014).

PAIN MANAGEMENT GUIDELINES FOR END-OF-LIFE CARE

To provide better care for individuals who are experiencing pain at the end of life, the following guidelines for nursing are suggested:

1. Perform a basic assessment of the patient's pain and evaluate its effects on the patient's quality of life.
2. Titrate analgesics according to pain severity and assess the need for supplemental analgesics, severity of adverse side effects, measurements of functional abilities (such as interaction with others, mobility, and sleep), emotional state, and effects of pain on quality of life.
3. Use sustained-release formulations and around-the-clock dosing for continuous pain relief.
4. Treat breakthrough pain with immediate-release formulations.
5. Monitor the patient's status frequently, especially during dose titration.
6. Anticipate adverse effects and prevent or treat them as necessary.
7. Be aware of possible drug-drug and drug-disease interactions.
8. Determine what level of pain is acceptable to the patient, and reassess pain regularly. If pain is not relieved adequately, consult with colleagues or outside specialists in pain management.
9. Use sedation selectively to relieve intractable pain when other pain-relieving measures have failed and there is a do-not-resuscitate (DNR) prescription.
10. If the patient is unable to communicate verbally, consult with family members and caregivers to learn nonverbal behaviors to evaluate pain.
(Panke, 2003)



ETHICAL CONCERNS IN ASSESSING AND TREATING PAIN

Ethics is the study of morals and the nature of morality, the sense of what is right or wrong. Ethics allows each person to weigh his or her own values against socially accepted principles for behavior. Laws are rules applied to and observed by all, but ethical standards are tied to culture and can be personal, organizational, institutional, or worldwide.

Ethics forces an examination of the justifications one makes for moral stands taken when there are different opinions about what decision should be made. Ethical discussion or debate is important in healthcare because caring for vulnerable people by strangers requires an atmosphere of trust. In an ethical debate, there are no rights and wrongs (Melia, 2014).

Bioethics is the application of ethics to matters of human life. As scientific knowledge expands and healthcare providers have greater control over pain and pain relief, life and death, it is vital that caregivers address issues of right and wrong behavior.

In 2011, the Institute of Medicine stated that “effective pain management is a moral imperative, a professional responsibility, and the duty of people in the healing professions.” The following ethical principles should guide healthcare professionals when they make pain assessment and treatment decisions.

Ethical Principles

Autonomy is the individual’s right to make healthcare decisions even if a provider disagrees. When a practitioner does not honor the patient’s right to make a choice regarding pain treatment, this right is violated. It is important to understand, however, that pain may impact a person’s autonomy or a practitioner may make an assumption that the person is incompetent.

Beneficence is the act a provider takes that benefits the patient. This means that pain relief will be provided as quickly as possible and to the highest degree possible in order for an act to be considered “good” care. Healthcare providers must make the management of pain a priority, and to not do so is neglecting the principle of beneficence.

Nonmaleficence means to do no harm. Many treatments for pain have potentially harmful side effects; however, it is important to recognize that untreated pain may be more harmful to the patient than the side effects of drugs used to treat it. Withholding a medication for safety reasons can be a violation of this principle.

Justice means that treatment for pain is equitable. This principle is violated when treatment for pain is withheld or not administered solely on the basis of a person’s age, race, religion, or social or economic status, unless these factors have a distinct bearing on treatment (e.g., drug choices or doses based on a patient’s age).

Veracity means telling the truth without deception. The patient must be provided with accurate information about his or her right to effective pain relief and about the pain relief measures being



considered and undertaken. The patient also has the right to informed consent. By administering a placebo, for example, the patient is deceived and is unable to give informed consent. Such deception is a violation of this principle (Bernhofer, 2011).

Ethical Dilemmas

A dilemma in general is a perplexing problem that requires a choice between conflicting alternatives. An ethical dilemma in particular is a moral problem that requires a choice between optional actions, each of which is based on an ethical principle. For example, a caregiver weighs whether to fully disclose the risks of a proposed treatment for pain, honoring the ethical principle of veracity, or to withhold such information to reduce the client's anxiety, honoring the ethical principle of beneficence. Healthcare professionals are faced with many such dilemmas.

CASE

XIA

Xia is a 32-year-old Hmong patient diagnosed with advanced ovarian cancer with metastasis to the retroperitoneal, pelvic, and para-aortic lymph nodes. She is enrolled in hospice and has been cared for by her family at home. She has been receiving a morphine infusion, which was effectively controlling her pain. Two days ago, Xia's condition indicated that death was close at hand, and her family became concerned that they were not really prepared to have her die at home. She was, therefore, admitted to the inpatient hospice unit.

Her immediate family called members of the clan, and about 40 people arrived to support the family and to perform their culture's "soul calling" ceremony. The clan and family members became concerned that the opioids Xia was receiving would interfere with her ability to hear them call her soul back to her body. They demanded that the morphine infusion be stopped.

After consulting with the hospice team, it was determined that Xia's consent for opioids had been given prior to entering the hospital and that discontinuing them without her consent could cause her to experience increased pain and discomfort. In order to avoid conflict with the family, the infusion was discontinued and replaced with morphine boluses via indwelling saline lock around the clock while providing nursing care with the family members out of the room.

The staff understood that collective decision making is a norm in many cultures but that such decisions may clash with the American value of autonomy and an individual's right to make decisions about health and dying. Although deception was practiced with the family, the goal was to do what was of benefit to the patient and to avoid doing harm.

Ethics Committees

Ethical dilemmas in healthcare facilities arise more frequently today because of both the diversity of American society and the technological advances in modern medicine that can prolong life. To help resolve these dilemmas, many institutions appoint ethics committees made



up of healthcare professionals, ethicists, lawyers, and clergy. The underlying **goals** of ethics committees are:

- To promote patients' rights
- To promote shared decision making between patients or surrogates and their clinicians
- To promote fair policies and procedures that maximize the possibility of achieving good, patient-centered outcomes
- To enhance the ethical environment for healthcare professionals in healthcare institutions

In addition, some ethics committees that are affiliated with academic institutions and large health care system have expanded their goals to include:

- Integration of ethics throughout the healthcare institution from bedside to boardroom
- Ensuring that systems and processes contribute to or do not interfere with ethical practices
- Promotion of ethical leadership behaviors by explaining values underlying decision, stressing the importance of ethics, and promoting decision-making transparency. (University of Washington, 2015)

Codes of Ethics

Codes of ethics are formal statements that set standards of ethical behavior for groups of people. In fact, one of the hallmarks of a profession is a code of ethics to which its members subscribe. For example, the American Nurses Association, American Physical Therapy Association, and American Occupational Therapy Association all make explicit the goals and values of their professions and provide guidance for practitioners to meet those standards by publishing codes of ethics for their members.

CONCLUSION

Pain is a universal human experience, the strongest motivator for an individual to seek medical care, and one of the body's most important protective mechanisms. For the past several decades researchers have been hard at work discovering exactly what pain is and how to prevent it or alleviate it.

It is imperative that healthcare professionals understand their role in managing pain as one of their primary obligations and responsibilities. It is the duty of all involved in caring for patients in pain to do everything possible to bring them relief. To do less is to fail to provide quality patient care. In order to best carry out this responsibility, it is necessary for all professionals to continue to expand their knowledge and skills in managing this crucial healthcare issue.



RESOURCES

American Pain Society

<http://www.americanpainsociety.org>

American Society for Pain Management Nursing

<http://www.aspmn.org>

National Institutes of Health Pain Consortium

<http://www.painconsortium.nih.gov>

Opioid and pain management CMEs/CEs (National Institute on Drug Abuse)

<https://www.drugabuse.gov/opioid-pain-management-cmesces>

Pain management tools (Partners Against Pain)

http://www.partnersagainstpain.com/hcp/pain-assessment/tools.aspx#assessment_scales

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[/media/Corporate/Files/Practice/OTAs/ScopeandStandards/Standards%20of%20Practice%20for%20Occupational%20Therapy%20FINAL.pdf](https://www.aota.org/-/media/Corporate/Files/Practice/OTAs/ScopeandStandards/Standards%20of%20Practice%20for%20Occupational%20Therapy%20FINAL.pdf)

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TEST

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1. Which is **true** regarding the prevalence of pain in the United States?
 - a. The incidence of chronic pain is decreasing due to improved pain control methods.
 - b. An estimated 100 million men, women, and children are living with both acute and chronic pain.
 - c. The aging of the population and increase in obesity are factors involved in increasing chronic pain.
 - d. There are standardized methods for determining an accurate picture of the prevalence of pain.

2. Transitory increase in pain to a level greater than the patient's well-controlled baseline level is called:
 - a. Allodynia.
 - b. Hyperalgesia.
 - c. Breakthrough pain.
 - d. Neuralgia.

3. What is the name for pain that results when tissue damage produces a stimulus that sends an electrical impulse across a pain receptor?
 - a. Psychogenic
 - b. Nociceptor
 - c. Neuropathic
 - d. Non-nociceptor

4. The gate control theory states that the opening and closing of the gate in the dorsal horn of the spinal cord is controlled by the:
 - a. Substantia gelatinosa.
 - b. A-delta fibers.
 - c. Cerebral cortex.
 - d. Thalamus.

5. Which statement best describes the influence of gender on pain?
 - a. Gender roles have been proven to influence pain.
 - b. Men have lower pain thresholds.
 - c. Men are more prone to feel pain more intensely.
 - d. Women have lower pain thresholds.



6. The meaning ascribed to pain by an individual is called:
- A stress response.
 - Pain appraisal.
 - Catastrophizing.
 - A genetic response.
7. Which type of pain measurement scale measures only the intensity of acute pain or is used when etiology is unknown?
- Brief Pain Inventory Short Form (BPI-SF)
 - Multidimensional scale
 - Comprehensive assessment
 - Single-dimensional scale
8. Which is a **true** statement about observations of behavior when assessing pain?
- A patient who is polite, calm, and smiling is not experiencing pain.
 - A patient reporting a pain level of 6 to 9 but who is not showing verbal or nonverbal indications of pain is not experiencing pain.
 - Most patients who are experiencing pain usually show it by either verbal or nonverbal behaviors.
 - Disorientation and irritability always indicate the patient is experiencing pain.
9. Which diagnostic test helps determine exactly which muscles or nerves are affected by weakness or pain?
- A myelogram
 - An electromyography
 - An ultrasound
 - Magnetic resonance imaging
10. Which is a **correct** statement concerning pain assessment barriers?
- Professionals sometimes fail to identify assessment and relief of pain as a priority.
 - All healthcare systems are required to incorporate accountability mechanisms for pain assessment.
 - Provider expectation of the pain experience of a patient does not influence assessment.
 - The patient's psychological factors do not influence a pain assessment.



- 11.** The Joint Commission standards for pain management:
- Establish pain management policies in all government agencies.
 - Exclude psychiatric facilities from pain management requirements.
 - Encourage but do not mandate pain policies of accredited facilities.
 - Require pain management policies in all of its accredited facilities.
- 12.** Adjuvant drugs are prescribed to patients for:
- Symptoms secondary to pain.
 - Central nervous system pain.
 - Pain caused by primary tissue damage.
 - Addiction to prescription opioids.
- 13.** A characteristic of nonopioid analgesics is that they:
- Act only at the site of injury.
 - Can act in the central nervous system and elevate pain threshold.
 - Are all potent anti-inflammatory agents.
 - Increase prostaglandin production and inflammation.
- 14.** The opioid receptors that impart most of their analgesic effect in the central nervous systems are the:
- Delta receptors.
 - Kappa receptors.
 - Delta and mu receptors.
 - Mu receptors.
- 15.** The need to increase opioid dosage for reasons other than physical adaptation of continuous use is called:
- Pseudo-tolerance.
 - Drug tolerance.
 - Physical dependence.
 - Pseudo-addiction.
- 16.** Which is a **correct** statement regarding cannabinoids?
- They interact with receptors found only in the central nervous system.
 - They interact mainly with receptors in the peripheral nervous system.
 - Cannabidiols (CBD) do not affect the mind or behavior.
 - Three cannabinoid drugs have been approved for pain relief by the FDA.



- 17.** Which nonpharmacologic pain management intervention is believed to act by altering the transmission of pain?
- Psychotherapy
 - Hypnosis
 - Virtual reality
 - Acupuncture
- 18.** When educating patients receiving opioids, the nurse's instructions include advising patients to:
- Administer the largest dose prescribed.
 - Avoid opening any oral capsules and mixing with food.
 - Report signs of allergy within 24 hours.
 - Safeguard the medication supply.
- 19.** The occupational therapist is involved in goal setting, which includes:
- Teaching the patient about available therapy modalities.
 - Helping the patient establish a daily structure for home and work.
 - Encouraging prevention of social isolation.
 - Introducing adaptive equipment to help maintain independence.
- 20.** Which is **not** a primary goal of physical therapy management for pain?
- Preventing permanent physical disabilities
 - Restoring function
 - Overcoming any need for prescription medications
 - Improving mobility
- 21.** The purpose of evaluation after pain interventions is to inform practitioners about:
- The importance of maintaining the original plan of care.
 - Which ethical principles were followed.
 - Whether the expected outcomes were achieved.
 - The dangers inherent in opioid dependency.
- 22.** The critical issue leading to the creation of schedules of controlled substances (C-I to C-V) was the drugs':
- Pain-relieving capacity.
 - Interaction with other drugs.
 - Potential for abuse.
 - Ease of administration.



23. C-I controlled substances do **not** include:
- Heroin.
 - Marijuana.
 - LSD.
 - Morphine.
24. What is the term for an abuse-deterrent opioid containing a substance that produces an unpleasant effect if the drug is manipulated or taken at a higher dosage than directed?
- An aversion drug
 - A physical/chemical barrier drug
 - A sustained-release depot injectable drug
 - An agonist/antagonist combination drug
25. The Pain Assessment and Documentation Tool (PADT):
- Measures “4 As” of pain treatment outcomes.
 - Determines risk for substance abuse.
 - Tracks behaviors characteristic of opioid addiction.
 - Identifies drug-seeking patients.
26. A patient with a history of substance use disorder and currently receiving pharmacotherapy for addiction is at what level of risk for opioid abuse?
- No risk
 - Low risk
 - Moderate risk
 - High risk
27. When providing pain control for patients with a substance use disorder, it is important to:
- Know they may require lower-than-average doses for appropriate relief of pain.
 - Use only nonopioid and nonpharmacologic modalities for acute pain.
 - Administer drugs only as needed (prn) for chronic pain.
 - Understand they are less likely to receive adequate pain management.
28. Which statement is **true** regarding pain management at the end of life?
- Persons who are unconscious do not feel pain.
 - Pain is a natural part of being ill and cannot be relieved or avoided.
 - Low priority is often given to pain and symptom management by clinicians.
 - Prescribing pain medicine carries a high risk of hastening death.



- 29.** Breakthrough pain that occurs with specific activities and can be predicted is called:
- Incident pain.
 - Spontaneous pain.
 - Uncontrollable pain.
 - End-of-dose medication failure.
- 30.** To provide better care for persons in pain at the end of life, nurses should:
- Avoid titrating opioids to prevent hastening death.
 - Use immediate-release formulations for continuous pain relief.
 - Use sedation generously to relieve intractable pain.
 - Treat breakthrough pain with immediate-release formulations.
- 31.** When accepting a patient's decision to refuse a medication that may relieve pain, the practitioner is honoring the ethical principle of:
- Beneficence.
 - Honesty.
 - Justice.
 - Autonomy.
- 32.** Practitioners often face ethical dilemmas, which require a choice between:
- Two or more ethical principles.
 - Interpersonal conflict and religious doctrines.
 - Two or more ethical theories proposed by philosophers.
 - Ethical and illegal behaviors.
- 33.** The goals of an ethics committee include:
- Determining the right action to take.
 - Promoting shared decision making between patients, surrogates, and clinicians.
 - Avoiding disagreements between families, patients, and clinicians.
 - Allocating available resources according to patient need.
- 34.** A code of ethics for professions is defined as:
- A set of criteria for decision making.
 - A bill of patients' rights.
 - A formal statement of standards of ethical behavior.
 - A guide for practitioners of the profession.

