



**Continuing Education (CEU) course** for healthcare professionals. View the course online at [wildirismedicaleducation.com](http://wildirismedicaleducation.com) for accreditation/approval information, course availability and other details, and to take the test for CE credit. The information provided in this course is to be used for educational purposes only. It is not intended as a substitute for professional healthcare.

Contact Hours: **8**

# Pain Management Assessment and Patient Care for Nurses and Other Healthcare Professionals

COPYRIGHT © 2019, WILD IRIS MEDICAL EDUCATION, INC. ALL RIGHTS RESERVED.

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

**LEARNING OUTCOME AND OBJECTIVES:** Upon completion of this course, you will better understand the experience of pain, appropriate assessment and interventions for pain, and issues regarding opioid use. Specific learning objectives to address potential knowledge gaps include:

- Explain the experience and physiology of pain.
- Outline the elements of a comprehensive pain assessment.
- Describe pharmacologic and nonpharmacologic interventions and self-management strategies.
- Discuss the roles and guidelines for 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 palliative and end-of-life care.
- Relate ethical concerns in pain management.

## INTRODUCTION

The word *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. Its occurrence, severity, duration, response to treatment, and disabling consequences vary from person to person. Like other diseases, pain is more than a biological phenomenon; it has profound emotional and cognitive effects.

In 2010 the Council of the International Association for the Study of Pain issued the Declaration of Montreal, which asserts that “withholding of pain treatment is profoundly wrong, leading to unnecessary suffering which is harmful.” The Declaration further asserts:

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, 2018a)

To meet this obligation, effective management of pain requires an in-depth knowledge of the complexity of the pain experience, enhanced assessment skills, treatment modalities currently available, and policies that affect how these modalities may be utilized.

A study done on the global burden of chronic pain found that at least 10% of the world’s population is affected by a chronic pain condition and that every year an additional 1 in 10 people develops chronic pain (Raffaelli & Arnaudo, 2017).

In 2018 the CDC reported that an estimated 50 million Americans (20.4% of the adult population) experienced **chronic pain** and that about 20 million of them have “high-impact chronic pain” (pain severe enough that it frequently limits the person’s life or work activities). These estimates are based upon the 2016 National Health Interview Survey of over 33,000 adults, which revealed the following:

- Women, unemployed older adults, adults living in poverty, rural residents, and people without some form of public health insurance are significantly more likely to have chronic pain.
- The prevalence of chronic pain and high-impact chronic pain were significantly lower among adults with at least a bachelor’s degree compared with all other education levels.
- Non-Hispanic white adults had a significantly higher age-adjusted prevalence of chronic pain than did all other racial and ethnic subgroups, but there were no significant differences in high-impact chronic pain by race/ethnicity.



- Prevalence of chronic pain was found to be significantly higher among veterans than among nonveterans, but there were no significant differences in the prevalence of high-impact chronic pain.
- Chronic pain contributes to an estimated \$560 billion each year in direct medical costs, lost productivity and disability programs.  
(Dahlhamer et al., 2018)

## 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, the meaning of pain, and how pain can 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, 2018a).

### 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 indicates that pain is the net effect of a complex interaction of the ascending and descending nervous systems involving biochemical, physiologic, psychological, and neocortical processes (Rashid, 2017).

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, 2017) 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 and therefore also an emotional experience."

Pain is a construct of the mind, an output of the brain. Many people report pain in the absence of tissue damage or any likely pathophysiological cause, and this usually occurs for psychological



reasons. However, there is no way to distinguish this experience of pain from the experience of pain due to tissue damage based on subjective reporting. If people regard their experience as pain and report it in the same ways as pain caused by tissue damage, it should be accepted as pain. According to IASP, this understanding “avoids tying pain to the stimulus” (IASP, 2017).

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 impulses to the brain become “trained” to be more efficient at sending those signals, and when the signals increase, the brain becomes more sensitive to them and the person experiences increasing intensity of the sensation 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, 2018).

Clinical outcomes of untreated postoperative pain include an increased risk of atelectasis, respiratory infection, myocardial ischemia, infarct or cardiac failure, and thromboembolic disease. Common sequelae of untreated chronic pain include decreased mobility, impaired immunity, decreased concentration, anorexia, and sleep disturbances. In addition, researchers have found that chronic pain in older adults accelerates memory decline, increases the probability of developing dementia, and increases the risk of mortality by 29% (Whitlock et al., 2017; Smith et al., 2017).

### PAIN-RELATED TERMINOLOGY

#### Allodynia

Pain due to a stimulus that does not normally provoke pain

#### Analgesia

Absence of pain in response to stimulation which would normally be painful

#### Causalgia

A syndrome of sustained burning pain, allodynia, and hyperpathia after a traumatic nerve lesion

#### Dysesthesia

An unpleasant abnormal sensation, whether spontaneous or evoked

#### Hyperalgesia

Increased pain from a stimulus that normally provokes pain



**Hyperpathia**

A painful syndrome characterized by an abnormally painful reaction to a stimulus, especially a repetitive stimulus, as well as an increased threshold

**Hypoalgesia**

Diminished pain in response to a normally painful stimulus

**Neuralgia**

Pain in the distribution of a nerve or nerves

**Neuropathic pain**

Pain caused by a lesion or disease of the somatosensory nervous system

**Nociception pain**

Pain arising from actual or threatened damage to non-neural tissue due to the activation of nociceptors (high-threshold sensory receptors of the peripheral somatosensory nervous system)

**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 level**

Maximum intensity of a pain-producing stimulus that a subject is willing to accept in a given situation; the subjective experience of the individual

**Paresthesia**

An abnormal sensation whether spontaneous or evoked

(IASP, 2017)

**Classification 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 by duration as acute or chronic.

***Acute Pain***

Acute pain is protective in that it motivates a person to take action immediately. Acute pain is caused by noxious stimulation due to injury, a disease process, or the abnormal



function of muscle or viscera. Acute pain begins suddenly, is usually sharp in quality, and correlates with the amount of damage. It is temporary and subsides as healing takes place. In acute pain, the central nervous system is intact and acute pain is a symptom.

There are two types of acute pain:

- **Somatic** pain results from superficial injury to skin and subcutaneous tissue (e.g., burns, cut, abrasions) or deep injury to muscle, bone, joint, and connective tissues (e.g., fractures, arthritis, fibrositis, rupture of muscle belly).
- **Visceral** pain results from injury to the internal organs (e.g., peptic ulcer, angina pectoris, renal colic).

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. Psychological effects of unrelieved pain can lead to anxiety and depression, and unrelieved acute pain may lead to chronic pain (Rashid, 2017).

### **Chronic Pain**

There is overwhelming evidence that chronic pain is not just acute pain that lasts longer. It is an insidious, complex chronic condition that involves pathological changes in tissues, the nervous and immune systems, and the personality (Hunter, 2018).

Chronic pain is pain that persists, recurs, or progresses over a long period of time and is often resistant to medical treatments. Because the central nervous system may be dysfunctional, chronic pain may be considered a disease state. Chronic pain 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, and the severity does not correlate with damage.

Chronic pain may be the result of damaged tissue but very often is attributable to nerve damage. It can arise from many different conditions, such as:

- Musculoskeletal disorders
- Headaches and migraines
- Neurologic disorders
- Urologic disorders
- Cancer
- Peripheral vascular disease
- Chemotherapy/radiation
- Surgical complications



The nature of chronic pain is that it is ongoing and, in some instances, seems almost constant. This makes the person who has chronic pain more susceptible to psychological consequences, including depression and anxiety, and this psychological distress can in turn amplify the pain (Rashid, 2017).

## BY SOURCE

The sources (causes) of pain are divided into the categories of nociceptor, neuropathic, psychogenic, and idiopathic.

### ***Nociceptor Pain***

Nociceptor pain is acute pain that results when tissue damage produces a stimulus that sends an electrical impulse across a receptor (nociceptor) by way of a nerve fiber to the central nervous system. 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:

- Well-localized
- Sharp
- Worse with movement
- The result of obvious tissue injury or illness
- Caused by inflammation
- Physiological

### ***Neuropathic Pain***

Neuropathic pain is caused by a primary lesion or dysfunction within the nervous system itself. Unlike nociceptive pain, neuropathic pain is most often classified as chronic pain, which may increase in intensity over time.

Although the mechanisms underlying neuropathic pain are not completely understood, several mechanisms that influence the peripheral nervous system and central nervous system have been identified. Three primary mechanisms that may be responsible for peripheral nervous system neuropathy include unprompted firing of damaged nerves, increased sensitivity of the afferent pathways because of loss of nerve supply, and sympathetically sustained pain (pain dependent on sympathetic nervous system activity). Neuropathic pain of the central nervous system may result from sensitization at the synapses or restructuring of higher processing operations (Barbee et al., 2018).



Neuropathic pain caused by lesion or disease in the **peripheral nerves** can be due to:

- Traumatic brachial plexus injury
- Diabetes mellitus
- Carpal tunnel syndrome
- Post-herpetic neuralgia

Neuropathic pain caused by a lesion or disease of the **central nervous system** may be due to:

- Central post-stroke pain
- Spinal cord injury

Neuropathic pain:

- Is not well-localized
- May be burning or shooting
- May be a feeling of numbness
- Can be experienced as “pins and needles”
- May be due to tissue injury that is not evident
- Is pathological  
(Rashid, 2017)

### ***Psychogenic Pain***

Psychogenic pain is believed to be sustained mainly by psychological factors. It does not refer to the common idea that pain experienced by some patients is exacerbated by psychological factors, or the finding of high pain-related distress or comorbid psychiatric disease. Instead, it implies that the pain is best understood as a result of psychological processes. It is classified as a somatic symptom disorder with prominent pain, which is diagnosed on the basis of excessive thoughts, feelings, or behaviors related to pain that are distressing, impair function, and appear out of proportion to physical findings.

It must be remembered that psychogenic pain is truly experienced and is not a deception. This distinguishes it from disorders that reflect a serious mental disorder in which reports of pain may not indicate a true experience of pain, and malingering (Portenoy & Dhingra, 2019).

Characteristics of psychogenic pain include:

- Nonlocalized pains that encompass large parts of the body
- Constant discomfort despite treatment
- Difficulty describing location, quality, and depth of pain



- Worsening pain independent of any underlying medical condition

### **Idiopathic Pain**

In contrast to nociceptor and neuropathic pain, idiopathic pain exists without underlying neural or tissue damage. Idiopathic pain is heterogeneous in nature and can be described as burning, itching, stinging, irritating, stabbing, and/or sharp. Pain severity and type can vary with factors such as age, gender, culture, and economic status. Idiopathic pain is characterized by a state of pain amplification, psychological distress, and enhanced inflammation. Depression, anxiety, and anhedonia (inability to feel pleasure) are often comorbidities alongside idiopathic pain (Ciszek, 2016).

## **Physiology of Pain**

Basically, pain occurs when a noxious signal sends impulses to the spinal cord, which relays it to the brain, where it is interpreted as pain and localized. The brain determines the meaning of the signal and what should be done about it and then sends back instructions to the body about how to respond. This system is the same for everyone, but the sensitivity and efficacy of these brain circuits determines how much the person feels and how the person copes with pain.

Most of what we know about pain is theoretical. Several theoretical frameworks have been proposed to explain the physiologic basis of pain, but none as yet completely accounts for all aspects of pain perception.

Pain involves:

- Tissue damage
- Mediation (the process of causing something to happen)
- Perception
- Modulation

(Kendroud & Hanna, 2019)

### **TISSUE DAMAGE**

Pain is associated with tissue damage.

Receptors (nociceptors) located in the skin and other tissues are nerve fibers with endings that can be excited by three types of stimuli—mechanical, thermal, and chemical. Some of these nerve endings respond mainly to one type of stimulation and others can detect all types. Whenever a part of the body comes in contact with an object capable of causing harm, skin receptors send nerve impulses to the spinal cord via sensory neurons, and a response (known as the *reflex arc*) occurs before the signal even reaches the brain. This reflex is the body's way of removing the body part from the stimulus in order to prevent further tissue damage (Kendroud & Hanna, 2019).



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.

## MEDIATION

Pain is mediated (caused) by two major types of nociceptor nerve fibers (A-delta fibers and C fibers), which are the nerve endings of the first-order neurons in the pain pathway.

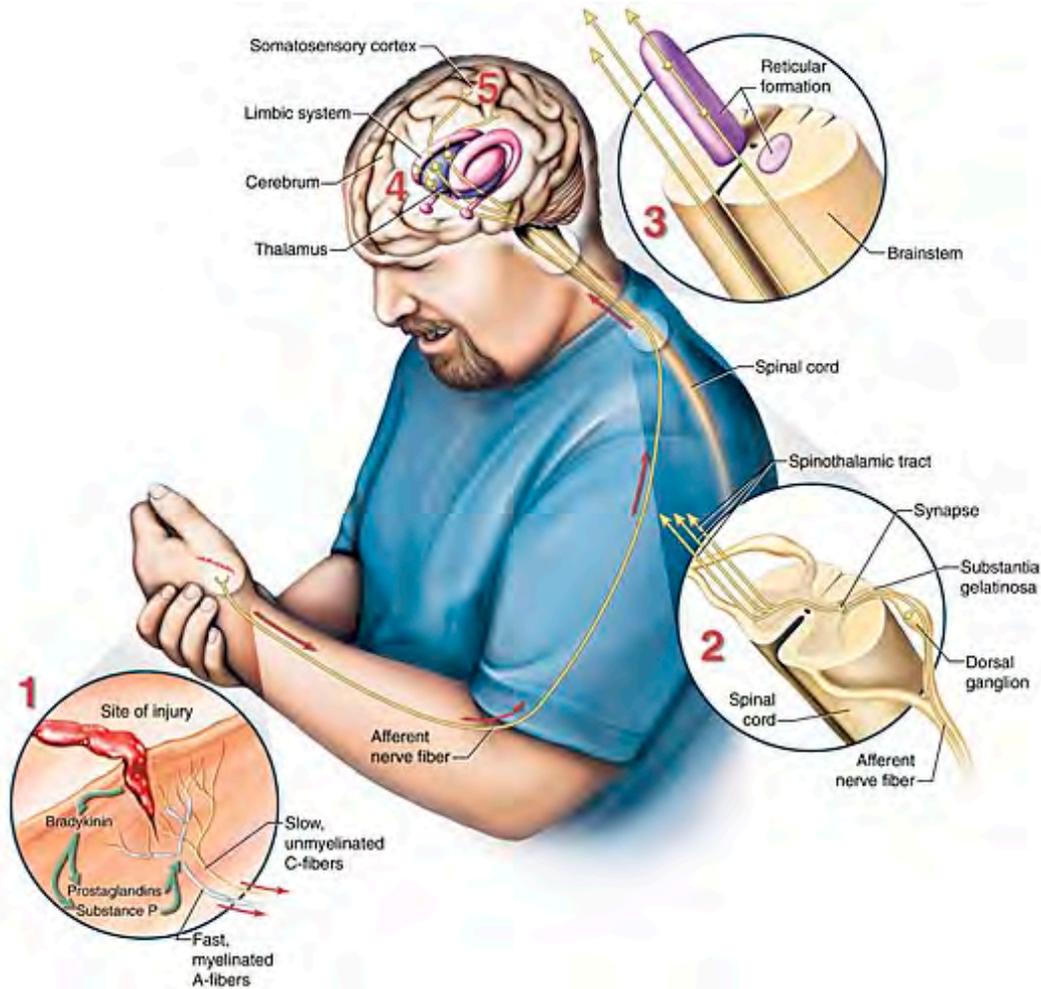
The **A-delta fibers** are the larger of the two and the most rapidly conducting (12–30 m/sec) because of their thin myelin covering. They have small receptive fields and are responsible for the sharp, well-localized pain that first is perceived. A-delta fibers are activated by mechanical and thermal stimuli.

**C fibers** are smaller, and because they are unmyelinated, impulse signals are slower (0.5 m/sec). C fibers respond to chemical, mechanical, and thermal stimuli and are associated with the longer-lasting, dull, poorly localized sensations that follow the first sensation of pain.

Impulse signals travel via the spinal nerves to the spinal cord, where they synapse with **second-order neurons** in the dorsal horn of the spinal cord. The second-order neurons then cross over to the other side of the spinal cord before ascending to the opposite side of the brain from that part of the body sending the impulse. The impulse then travels up along the spinothalamic tract to the thalamus, synapses with **third-order neurons**, and is relayed on to different parts of the brain, including the somatosensory cortex of the brain (responsible for physical sensation) and the frontal cortex (in charge of thinking).

Other second-order neurons travel along the spinoreticular tracts to the brainstem before running up to the thalamus and then to the cortex. This tract is responsible for the arousal and emotional aspects of pain (Kendroud & Hanna, 2019).



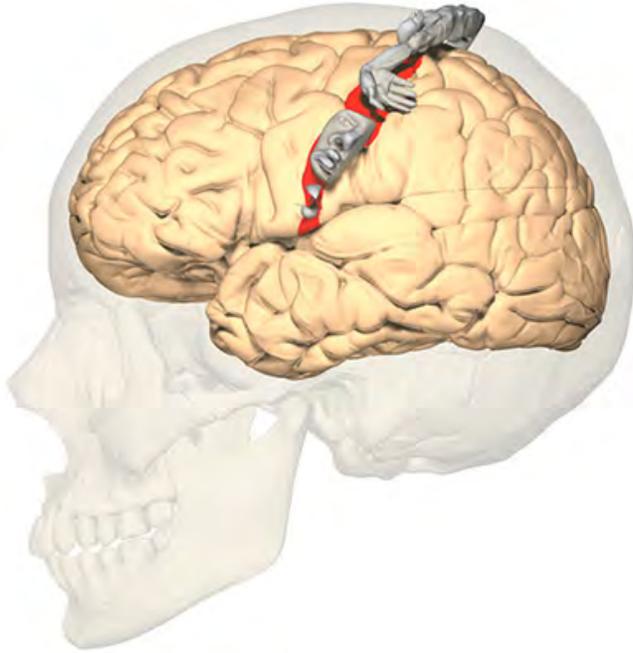


Neurologic transmission of pain stimuli. (Source: Jason M. Alexander. © 2005, Wild Iris Medical Education.)

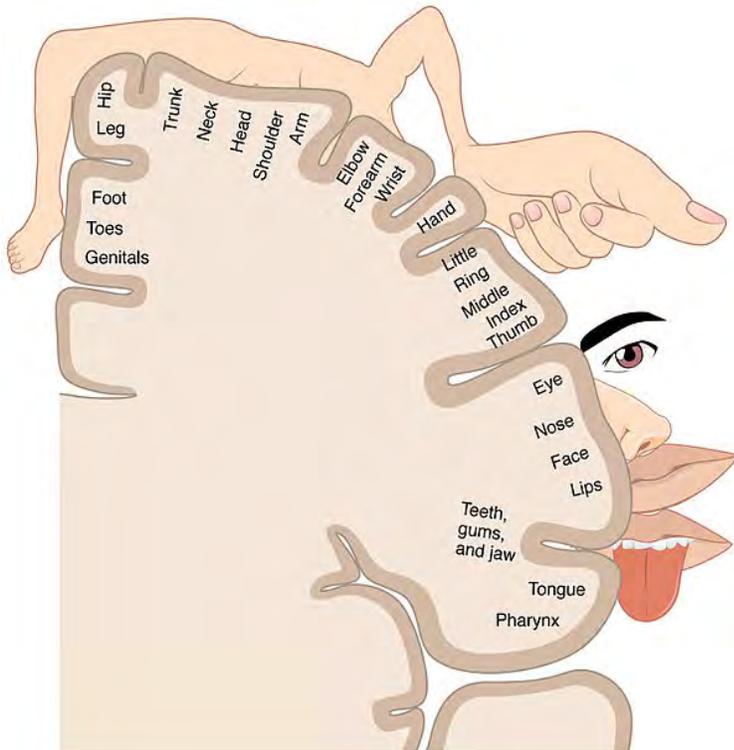
## PERCEPTION

In the cortex of the brain, a sensory strip receives the nerve impulse. This sensory strip, the **somatosensory homunculus** (Latin for “little man”), is basically a brain map of the body. Nerve impulses travel to the area in the homunculus that corresponds to the part of the body the signal is coming from. All information from each body part (e.g., the finger) end up in one specific area of the homunculus after entering the sensory strip in the cortex of the brain (Kahn Academy, 2019).





Sensory strip. (Source: BodyParts3D, © The Database Center for Life Science.)



The somatosensory homunculus (“little man”) shows a distorted image of the human body because the size of each region of the map is related to the density of sensory receptors in the body part. (Source: OpenStax College, Anatomy & Physiology.)



When the message is received in the homunculus, the brain recognizes the pain stimulus and interprets its significance. Several factors can affect how the brain interprets the pain, including:

- Emotional and psychological states
- Memories of previous pain
- Upbringing
- Expectations of and attitudes toward pain
- Beliefs and values
- Age
- Gender
- Social and cultural influences

(Wiech, 2016)

## MODULATION

Once the brain perceives the pain and determines its meaning, it sends messages downward to affect the sensitivity and behavior of nerves. 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. This system provides a necessary survival function, as it regulates fear and anxiety, allowing the pain experience to be altered according to the situation rather than having pain dominate (Winters et al., 2017).

## 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**, transmit pain signals and open the gate. The third type of neuron, **A-beta fibers**, responds to nonpainful stimuli such as touch, inhibits the transmission of pain signals, and closes 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 (Weber, 2019).

## Factors That Influence the Experience of Pain

The experience of pain is influenced by both physiologic and psychosocial factors, all of which clinicians must consider in pain management.

### PHYSIOLOGIC FACTORS

Physiological factors that influence pain include age, gender, genetic makeup, and stress response.

#### **Age**

There is growing evidence that age affects pain, but how aging affects pain perception remains unclear. Young children have been found to be more sensitive to noxious stimuli than older children and adolescents. There is a consistent positive relationship between age and the experience of chronic pain; and there is increased frequency, severity, impact, and anatomic distribution of persistent pain associated with aging. Aging, however, has no strong effect on pain tolerance.

Clear evidence exists that there is a high prevalence of chronic pain in the older adult, and this can be attributed partly to the physiologic changes of the peripheral and central pain mechanisms. Myelinated fibers tend to show more decline in density and function than unmyelinated fibers, and there is a decrease in nerve conduction velocity and structural modification in the older adult. There is also extensive degenerative alteration in the spinal dorsal horn sensory neurons as well as structural and physiologic aging-related changes of many brain regions (the prefrontal cortex being most strongly affected) involved in nociceptive processing (Eltumi & Tashani, 2019; Lautenbacher et al., 2017).

#### **Gender**

Studies have shown a significant gender-related difference in pain perception and responses, suggesting that women are more sensitive to noxious stimuli than men and experience pain more often and of higher intensity and longer duration. In addition, brain imaging has shown sex-related differences concerning the spatial distribution and magnitude of acute pain responses.



Increased sensitivity characterizes mainly women of reproductive age, but this difference is not observed in older women. Gonadal hormones may affect the peripheral and central nociceptive pathways and, consequently, the processing of nociceptive stimuli, as well as sensitivity, threshold, and tolerance to pain. Also, the function of the endogenous analgesic modulation systems differs between men and women (Staikou et al., 2017).

It has been found that the differences between males and females regarding sensitivity to pain are affected by psychological factors such as anxiety, which is more associated with pain in males. Although postsurgical pain is more intense in women than in men, men are more troubled by low and persistent levels of pain (Eltumi & Tashani, 2019).

### ***Genetic Makeup***

Genetic studies over the last 20 years have been extremely helpful in understanding individual differences in pain sensitivity and the predisposition to chronic pain. Numerous pain-related genes and their functional polymorphisms have been identified, and studies have shown that many chronic pain conditions have a 50% heritability.

Fibromyalgia has demonstrated a predominant association with COMT enzyme and serotonergic system variations. Chronic low back pain risk is increased by variants in the opioid receptor OPRM1, SOX5, CCDC26/GSDMC, and DCC genes. Gene variants are thought to be involved in the vascular etiology of migraines. Other conditions shown to be the result of genetic polymorphisms include diabetic painful peripheral neuropathy and trigeminal neuralgia (Suri et al., 2018; Knezevic et al., 2018).

### ***Stress Response***

Pain and stress are both adaptive in protecting the body. However, if either of the two processes becomes chronic, it can lead to long-term maladaptive changes in physiology and, consequently, behavior resulting in compromised well-being. The responses to stress include neural, endocrine, and behavioral changes, and there are built-in coping strategies in place to address stressors. Some people are more sensitive and reactive to stress, and others are more resilient.

Recent studies have found that stress modulates pain perception either by inducing analgesia or hyperalgesia. Decreased pain modulation occurred only among those who have a high stress responsiveness, and increased pain adaptation occurred only among those who have low stress responsiveness (Geva & Defrin, 2018; Abdallah & Geha, 2017).

## **PSYCHOSOCIAL FACTORS**

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**

It is often difficult to determine whether an individual's personality characteristics contribute to how they perceive and experience pain or, conversely, whether it is their pain condition that has affected their personality. In general, however, personality traits that include anxiety, excessive worrying, emotional instability, sensitivity, and dependency may serve to influence pain stimulus appraisal or threat of a potential pain stimulus. Such personality traits may even reduce the threshold at which pain is perceived as threatening and at which point pain elicits catastrophic thoughts (Banozic et al., 2018).

## **Pain Appraisal and Beliefs**

*Pain appraisal* refers to the meaning ascribed to pain by an individual. Primary appraisal involves evaluation of the significance of the pain as either a threat or irrelevant, and secondary appraisal involves evaluation of the controllability of pain and one's coping resources. *Beliefs* refer to assumptions about reality that shape how the person interprets events.

Appraisal and beliefs about the meaning of pain can have a strong impact on an individual's response to pain. If a pain signal is interpreted as harmful, it may be perceived as more intense or more unpleasant and evoke more escape or avoidance behaviors.

Pain appraisal and pain beliefs are also determinants of adjustment to chronic pain. Pain that is viewed as a signal of damage, leading to disability, uncontrollable, and a permanent condition has been shown to affect an individual's responses (Ballantyne et al., 2019).

## **Fear and Catastrophizing**

Pain catastrophizing is an exaggerated, negative cognitive and emotional orientation toward actual or anticipated pain experiences. Catastrophizing has been associated with an increased perception of severity and disability in both acute and chronic pain among persons with many different pain diagnoses. Catastrophizing also alters perception of noxious stimulation.

People who experience chronic pain often anticipate that specific activities will increase pain or induce further injury, and these fears may contribute to avoidance of activity and subsequently greater physical deconditioning, emotional distress, and ultimately, greater disability (Ballantyne et al., 2019).

## **Emotions**

Emotion and pain interact in several ways. Emotional distress may predispose a person to experience pain, be a cause of symptoms, be a modulating factor amplifying or inhibiting



the severity of pain, be a consequence of persistent pain, or be a perpetuating factor. Emotional distress is commonly observed in people with chronic pain.

Anxiety is common for patients with pain. Up to 45% of patients with chronic pain screen positive for an anxiety disorder. Those with chronic pain who have comorbid anxiety may have a lower pain tolerance, be more prone to medication side effects or fearful of having side effects, and be more fearful of pain itself (Ballantyne et al., 2019).

Up to 50% of patients with chronic pain experience depression, and on average, 65% of depressed individuals also report pain symptoms. There is evidence of a strong association between chronic pain and depression, but evidence is lacking as to whether chronic pain causes depression or depression causes chronic pain (Ballantyne et al., 2019).

## PAIN ASSESSMENT

A precise and systematic assessment of pain is important for making an accurate diagnosis and for the development of an effective treatment plan. Pain is a multidimensional phenomenon that produces strong emotional reactions that can affect an individual's function, quality of life, emotional state, social and vocational status, and general well-being. Therefore, it is recommended that pain be assessed using a multidimensional approach and that these various impacts be addressed and included in the diagnostic formulation.

A comprehensive pain assessment includes a history of the pain, behavioral observations, past medical history, medications, family history, 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.

### ELEMENTS OF PAIN HISTORY

A pain history addresses the following elements:

#### Onset:

- When did the pain start?
- Did the pain start suddenly or gradually?
- What were the first symptoms?



**Etiology or mechanism of injury:**

- Was there an obvious triggering event?

**Location and distribution:**

- Where is the pain felt? (Ask the patient to point to the location.)
- Does the pain move/radiate anywhere?
- Has the location changed over time?

**Quality:**

- What words does the patient use to describe the pain (e.g., achy, sharp, burning, squeezing, dull, sore, etc.)?
- Besides pain, are there any other unusual sensations, such as numbness?

**Severity:**

- Using a pain measurement scale, how much pain is the patient experiencing now?
- What is the least pain the patient has experienced in the past (24 hours, one week, month)?
- What is the worst pain the patient has experienced in the past (24 hours, one week, month)?
- How often does the patient experience severe pain (hours per days, days per week)?

**Duration:**

- How long has the pain been experienced?
- Is the pain acute or chronic?

**Course or pattern:**

- Is the pain described as constant or intermittent?
- Is there a predictable pattern (e.g., worse in the morning or in the evening)?

**Aggravating/provoking factors:**

- What makes the pain worse?

**Alleviating factors:**

- What makes the pain better?
- When was the best relief obtained?
- How much relief was obtained?
- How long does relief last?



**Associated symptoms:**

- Is there erythema, warmth, or local edema indicating inflammation?
- Are there mechanical symptoms, such as joint-locking, giving-way, popping, catching, or clicking?
- Are there preceding symptoms or aura?

**Impact:**

- How does the pain affect the patient's sleep, activity, appetite, work, relationships?
- Does the patient have signs and symptoms of depression?
- Does the patient have signs and symptoms of anxiety?

**Past responses, preferences:**

- What medications have been tried, how long was the drug taken?
- Has the patient been treated by physical or occupational therapy, and was it helpful?
- What other non-drug methods have helped in the past?

**Expectations, goals, meaning:**

- What does the patient think is causing the pain?
- What does the patient think should be done to treat the pain?
- What does the patient want to be able to do that is prevented by the pain?
- What does the patient fear about the pain (e.g., cancer)?

(Kishner, 2018; UFHealth, 2019)

**ASSESSMENT TOOLS**

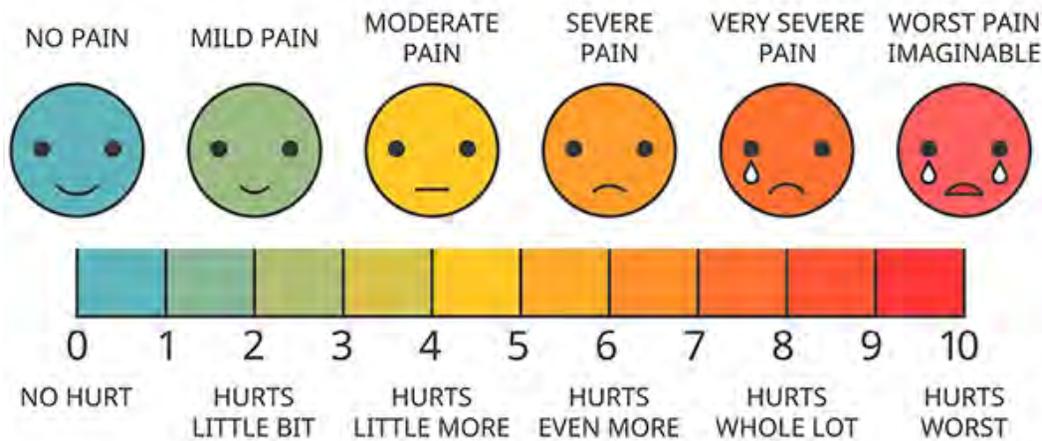
In the absence of objective measures, clinicians must depend on the patient for the report of pain and its severity. Pain scores have been accepted as the most accurate and reliable measure for assessing patients' pain and response to pain treatment. Scales have been developed to estimate and/or express the patient's pain using two methods: unidimensional and multidimensional measures.

**Unidimensional scales** assess and measure only pain intensity. They are used for assessing acute pain or when the etiology is known.

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



## PAIN MEASUREMENT SCALE



Unidimensional scale measuring pain intensity. (Source: Lukpedclub/Bigstock.com)

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

Some organizations, however, are abandoning pain-rating scales and instead assessing patients by asking how much their function is impaired and how much time they are spending in bed because of pain. This kind of assessment allows a patient to better articulate pain levels and gives the provider more insight into how the patient's pain is affecting day-to-day living, providing an ability to create a more effective treatment plan (Moore, 2018).

### Behavioral Observations

Most people who are experiencing pain usually show it either by verbal complaint or nonverbal behaviors or indicators. 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 behavioral and physiologic indicators of pain that healthcare providers may observe when completing a pain assessment.



<b>NONVERBAL INDICATORS OF PAIN</b>	
<b>Type of Indicator</b>	<b>Examples</b>
Facial expressions	<ul style="list-style-type: none"> <li>• Sad or frightened look</li> <li>• Clenched teeth or jaw</li> <li>• Wrinkled forehead</li> <li>• Biting lips</li> <li>• Grimacing, wincing</li> <li>• Rapid blinking or closing eyes tightly</li> <li>• Widely opened eyes or mouth</li> </ul>
Vocalizations	<ul style="list-style-type: none"> <li>• Sighing</li> <li>• Crying</li> <li>• Moaning</li> <li>• Gasping</li> <li>• Groaning</li> <li>• Grunting</li> <li>• Whining</li> <li>• Calling out</li> <li>• Screaming</li> <li>• Chanting</li> <li>• “Ooh”-ing and “aah”-ing</li> </ul>
Body movements	<ul style="list-style-type: none"> <li>• Restlessness</li> <li>• Fidgeting</li> <li>• Muscle tension</li> <li>• Immobility</li> <li>• Pacing</li> <li>• Rhythmic movement</li> </ul>
Activity/routine changes	<ul style="list-style-type: none"> <li>• Loss of appetite</li> <li>• Alterations in sleep patterns</li> <li>• Changes in ambulation</li> <li>• Becoming aggressive or combative</li> <li>• Resisting care</li> </ul>
Social interaction	<ul style="list-style-type: none"> <li>• Silence</li> <li>• Withdrawal from social activity</li> <li>• Reduced attention span</li> <li>• Focus on pain-relief measures</li> </ul>



Protective movements	<ul style="list-style-type: none"> <li>• Guarding or splinting a body part</li> <li>• Rubbing or massaging a body part</li> <li>• Holding an affected area during movement</li> </ul>
Mental status changes	<ul style="list-style-type: none"> <li>• Disorientation</li> <li>• Confusion</li> <li>• Irritability</li> <li>• Depression</li> </ul>
Physiologic changes	<ul style="list-style-type: none"> <li>• Diaphoresis</li> <li>• Tachycardia</li> <li>• Blood pressure changes</li> <li>• Increased respiratory rate</li> <li>• Panting</li> <li>• Nausea</li> <li>• Vomiting</li> </ul>
Source: Toney-Butler, 2019.	

## Medical History

Relevant **past medical history** includes:

- Prior medical illness (e.g., renal or hepatic insufficiency/disease, which affect choice of analgesic and dosing)
- Prior psychiatric illnesses
- Prior surgeries, scarring, repeated surgeries (may increase sensitivity to pain)
- Past injuries and accidents
- Coexisting acute or chronic illnesses
- Chemical dependence
- Prior problems with pain and treatment outcomes
- Renal or hepatic insufficiency/disease (affect choice of analgesic and dosing)

A complete list of current **medications** and usage, including over-the-counter medications, are 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 is also included.

**Family history** is important, as it may give a clue to any predisposition to pain-causing illnesses and conditions that may involve the connective tissues (e.g., kyphoscoliosis), metabolism (e.g.,



sickle cell disease), and neurological system (e.g., familial amyloid neuropathy). Other types of disorders that may cluster in families include fibromyalgia, persistent back pain, irritable bowel syndrome, and some types of arthritis (Tennant, 2017; USDHHS, 2019a).

## Psychosocial History

The psychosocial history includes inquiries into past or current developmental, marital, or vocational problems, stressors or depressive symptoms, and reinforcers of the pain (e.g., compensation/litigation issues) (Tennant, 2017).

## Physical Examination

A systematic, targeted, pain-focused 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.

- **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, vocalizations, and the presence of obesity. 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. The painful area is demarcated, with the clinician feeling for changes in pain intensity within the area, trigger points, and changes in sensory or pain processing.
- **Musculoskeletal examination** includes both inspection and palpation for abnormal movements, range of motion, functional limitations, swelling and tenderness of the joints, temperature and color changes, crepitation, and deformity. It is important to determine secondary pain, even in patients whose primary source of pain is musculoskeletal. For example, if there is a knee problem, structures that directly affect the function of the knee (such as the low back, hip, foot, ankle, and supporting structures of the knee) are evaluated.



- **Neurologic examination** evaluates level of alertness, degree of orientation, behavior and mood, intellectual function, and motor system (muscle tone and strength). A comprehensive sensory examination includes tests for light touch, pinprick, pressure vibration, joint position, and heat and cold sensation. This involves observation of the individual's gait, coordination, and balance and testing for abnormal deep tendon reflexes.
- **Abdominal, pelvic, or rectal examination** may be done to assess for suspected disease conditions that can cause pain referred to the back, such as pelvic inflammatory disease, endometriosis, or prostatitis.  
(UFHealth, 2019; Scholten, et al., 2018)

## 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

Routine blood studies are **not** indicated, but directed testing should be ordered when specific causes of pain are suggested by the patient's history of physical examination.

- **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
- **C-reactive protein (CRP)** to assess for inflammation and possible elevation due to polymyalgia rheumatica or rheumatoid arthritis
- **Vitamin B<sub>12</sub> and folate** levels to assess for deficiencies that cause neurologic symptoms
- **Fasting blood sugar (FBS)** and glycated hemoglobin (HbA1C) to test for diabetes or to monitor control of diabetes
- **Hemoglobin S (HbS or Hgb)** to test for sickle cell disease
- **HIV antibodies (ELISA or Western Bloc)** to detect HIV infection
- **HSV antibodies** to assess for herpes simplex virus infection
- **Rheumatologic tests** (rheumatoid factor, ESR, ANA) to rule out rheumatoid arthritis and other autoimmune diseases (e.g., systemic lupus erythematosus) and infections (e.g., hepatitis, syphilis)  
(Rosenquist, 2018; Clark & Galati, 2015)



## 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 to assess the spinal cord, subarachnoid space, or other structures for changes or abnormalities
- **Computerized tomography (CT)** to obtain images that give details of anatomic structures
- **Discogram** to view and assess internal structure of a disc to determine if it is the source of pain
- **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
- **Functional MRI** to provide data on metabolic and functional measurements in addition to anatomic details
- **Bone scans** to help diagnose tumors of the bone or metastatic disease, osteomyelitis, fractures, joint disease, avascular necrosis, and Paget's disease
- **Electromyography (EMG)** to detect abnormal electrical activity in many diseases and conditions
- **Nerve conduction studies (NCS)** measure changes in the peripheral sensory and motor nerves
- **Somatosensory evoked potential (SSEP)** to assess for generalized disorders of the nervous system (e.g., multiple sclerosis)  
(Agranoff, 2019; Morton et al., 2016; Kishner, 2018)

## Psychological Examination

A psychological evaluation for a patient with pain contributes to the understanding of factors that precede and perpetuate the pain. The evaluation most often includes a combination of clinical interview and standardized self-report scales or questionnaires to evaluate psychological, behavioral, and social factors.

Areas that are of concern include perceived pain-related disability, emotional distress (e.g., depression, anxiety), and sleep disturbance.

For patients experiencing chronic pain, special focus is given to suicide risk assessment. For chronic pain patients, risk factors include the presence of comorbid depression, high pain



intensity and duration, the presence of sleep-onset insomnia, high catastrophizing, and feelings of helplessness.

Due to the significant prevalence of alcohol/substance use and prescription opioid misuse among persons with chronic pain, a comprehensive screening is generally indicated. When symptom exaggeration or malingering is suspected, it is important to consider that it may occur because of psychological processes or environmental factors that shape the person's response to pain (Lerman & Haythornthwaite, 2018).

## CASE

### MEREDITH

Meredith, a 59-year-old African American woman, visited her neighborhood walk-in clinic Friday afternoon with a 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 worst 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 known allergies, 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 (SpO<sub>2</sub>) was 95%.

Meredith was diagnosed with pleurisy and was sent home with the following discharge instructions:

- Take ibuprofen (Advil, Motrin) or naproxen (Aleve) as needed to reduce pain and inflammation.



- Take OTC cough syrup for cough as needed.
- Find a comfortable position, such as lying on the affected side.
- Use pressure to prevent pain, such as a pillow.
- Return to the ER or see the primary care provider for temperature of 103 °F or higher or shortness of breath.
- Contact the primary healthcare provider if pain gets worse.

The following day Meredith called her primary healthcare provider because she was having a great deal of pain and the medications recommended were having no effect. Her physician called her pharmacy for a two-day (8 pills) prescription for Percocet (oxycodone hydrochloride; acetaminophen) 5mg/325mg, 1 tablet every 6 hours for pain, with instructions to follow up on Monday. The physician further counseled Meredith on issues pertaining to safe opioid use and the epidemic of opioid misuse and diversion.

*(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 (ASPMN, 2018).

Research findings suggest that a provider's expectations of and empathy for the pain experience of a patient are influenced by the stereotypes and biases they have 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. Healthcare professionals may also feel they are being deceived by someone who is seeking drugs, which can result in inadequate treatment of pain (ASPMN, 2018).

**Patient/family/cultural/social** barriers may include an inability to communicate, age, and/or culturally related stoicism. Patients may be reluctant to report pain or may fear not being believed. Psychological factors such as depression, fear, anger, anxiety, and malingering can all influence and complicate assessment and effective pain management (ASPMN, 2018).



**CASE****ERIN**

Erin is a recent nursing school graduate who is working in 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.

### ASSESSMENT OF PAIN IN NEONATES

Since the 1980s evidence has shown that preterm and term infants experience pain and stress in response to noxious stimuli. As general rule, anything that causes pain in adults or older children will also cause pain in neonates. Effective neonatal pain assessment is essential for optimal pain management and requires appropriately sensitive and accurate clinical pain assessment tools as well as clinical staff that is trained to detect neonatal pain using such tools.

Neonatal **pain assessment tools** rely on surrogate measure of physiologic and behavioral response to pain or noxious stimuli. Examples of scales most commonly used for acute pain assessment include:



- PIP (Premature Infant Pain Profile)
- NIPS (Neonatal Infant Pain Scale)
- NFCS (Neonatal Facial Coding System)
- BIPP (Behavioral Infant Pain Profile)

There are challenges, however, that limit the accuracy of using such tools, as they require evaluation by observers among whom there may be significant variability. These tools also require observation, mental calculation, and recording of 3 to 10 parameters in real time, all while the provider is performing a painful procedure. At this time there is no “gold standard” established for assessment of pain in the neonate (Anand, 2018).

### ASSESSMENT OF PAIN IN INFANTS AND CHILDREN

Assessment of pain severity in children is performed by self-report or by behavioral observational scales in those unable to self-report. Self-reporting relies on the cognitive ability to understand that pain severity can be measured along a continuum. Younger children (3 to 8 years) are capable of quantifying pain and translating it to a visual representation. Visual analogue pain scales based on a series of faces showing an increase in distress or pain are used for this age group. The reliability of pain assessment increases with age and cognitive ability of the child.

Assessment of pain in older children (8 to 11 years) is generally performed utilizing visual analogue tools that rate the intensity of pain on a horizontal or numeric scale. Adolescents can also rate pain using a numerical scale, and a description of pain can usually be obtained from pain history.

The following **pain-location tools** that can be used to determine location of pain in both children and adolescents. These tools use a graphic outline of the body, and the patient is asked to color in the area of the body where pain is being experienced.

- Adolescent and Pediatric Pain Tool
- Pediatric Pain Questionnaire

The following are tools used for assessing pain in infants and children who are unable to self-report. They are based on facial expressions, ability to be consoled, level of interactions, limb and trunk motor responses, and verbal responses:

- rFLACC (Revised Face, Legs, Activity, Cry, Consolability) for nonverbal children
- NCCPC-PV (Non-Communicating Children Pain Checklist–Postoperative Version) for nonverbal children
- NAPI (Nursing Assessment of Pain Intensity) for newborn to 16 years of age
- PPP (Pediatric Pain Profile) for nonverbal children



Pain can also be assessed by identifying the impact it has on participation in school activities, sports, and relationships (Hauer & Jones, 2019).

When assessing infants and children, it is important to be aware that an infant who is lying very still may be in pain and that 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, 2018).

### **ASSESSMENT OF PAIN IN THE COGNITIVELY IMPAIRED**

Many conditions can lead to cognitive impairment that can make pain assessment difficult, such as head trauma, memory deficits, unconsciousness, and delirium. 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. In these instances, behavioral observation–based assessments are optimal. Behaviors include:

- Facial expressions: frowning, grimacing, rapid blinking
- Verbalizations/vocalizations: moaning, sighing, verbal abuse
- Body movements: rigid, tense, guarding, fidgeting, inactive, pacing
- Altered interpersonal interactions: aggression, resistance to care, disruption, withdrawal
- Activity patterns: changes in appetite or sleep, cessation of regular routines
- Mental status changes: increased confusion, irritability

In addition, physiologic pain indicators may be used to assess for pain, such as elevated vital signs, diaphoresis, and pupil dilatation (Venable, 2018).

Pain assessment tools for the cognitively impaired include:

- PACSLAC (Pain Assessment Checklist for Seniors with Limited Ability to Communicate)
- PAINAD (Pain Assessment in Advanced Dementia)
- Comprehensive Pain Assessment Form: Cognitively Impaired

### **ASSESSMENT OF PAIN IN THE OLDER ADULT**

Both acute and chronic pain are common in the elderly. Pain may limit activities and mobility, and an effective assessment and pain management is vital for the individual to maintain functional independence. Several factors create barriers to an adequate assessment of pain in older adults, one of which is inadequate communication of pain. Many older adults subscribe to stoicism, the belief that pain is an essential part of aging. Multiple medical comorbidities may also lead to underreporting of pain.



Adequate pain assessment may also be hindered by decreased hearing and visual acuity, making tools that require extensive explanation or visualization more difficult and less reliable. The verbal descriptor scale may be the easiest tool for the older adult without cognitive impairment. This type of tool allows for the patient to describe what is being felt using common words rather than having to convert how they feel to a number, facial representation, or a point on a straight line.

One important factor in the assessment of pain in the older adult is the determination of the effect that pain has on day-to-day living. Although the older adult may maintain the necessary basic activities of daily living, the effect on activities such as social functions or advanced activities of daily living may depend on severity of pain (Kishner, 2018).

## 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

### Pharmacologic Interventions

Pharmacologic interventions can be broadly categorized as primary analgesic medications and adjuvant (co-analgesic, or “helper”) medications. Analgesics include nonopioid analgesics and opioid analgesics. Nonopioids are non-narcotic analgesics used to treat mild pain and also to serve as adjuvant medication for relief of moderate to severe pain. Opioids are narcotics used for moderate to severe pain. Cannabinoids are a unique class of drugs that may be used for pain and that do not fit into these categories.

### NONOPIOID ANALGESICS

Nonopioid analgesics include acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs). Many are available over the counter; some are available by prescription only.

#### *Acetaminophen*

Acetaminophen is a pain reliever and a fever-reducing agent widely used to treat both acute and chronic pain. Acetaminophen is a p-aminophenol derivative whose exact mechanism is not yet fully known. It may inhibit the nitric oxide pathway mediated by a variety of neurotransmitter receptors, resulting in elevation of the pain threshold. The antipyretic activity may result from inhibition of prostaglandin synthesis and release in



the central nervous system and prostaglandin-mediated effects on the heat-regulating center in the anterior hypothalamus.

Acetaminophen is harmless at low doses but has direct hepatotoxic potential when taken as an inadvertent overdose (e.g., patients not recognizing the presence of the drug in multiple over-the-counter and/or prescription products being taken), and can cause acute liver injury and death from acute liver failure.

In the United States, acetaminophen is sold under the brand name Tylenol and is used to treat a variety of conditions including:

- Headache
  - Minor osteoarthritis pain
  - Back pain
  - Dental pain
  - Menstrual cramps
- (NIH, 2019a)

### ***Nonsteroidal Anti-Inflammatory Drugs***

There are more than 20 different NSAIDs available over the counter or by prescription. There are two main types of NSAIDs: nonselective and selective. **Nonselective** NSAIDs include those commonly available without prescription (aspirin, ibuprofen, and naproxen). **Selective** NSAIDs, also called *COX-2 inhibitors*, are as effective in relieving pain and inflammation as nonselective NSAIDs but are less apt to cause gastrointestinal injury.

NSAIDs are inhibitors of cyclo-oxygenase, the enzyme that mediates the conversion of arachidonic acid to prostaglandins. There are two types of cyclo-oxygenase: COX-1 and COX-2. Both enzymes produce prostaglandins that promote inflammation, pain, and fever; however, only COX-1 produces prostaglandins that support platelet blood clotting function and protect the stomach lining from the effects of acid. NSAIDs work by blocking these enzymes, thereby reducing prostaglandins. This results in reduction of inflammation, pain, and fever. Because NSAIDs reduce blood clotting, they can cause stomach ulcers and promote bleeding (Solomon, 2019).

NSAIDs can be administered orally, rectally, parenterally, and topically. Side effects can include:

- Nausea
- Vomiting
- Diarrhea
- Constipation



- Decreased appetite
- Rash
- Dizziness
- Headache
- Drowsiness
- Kidney failure (primarily with chronic use)
- Liver failure
- Ulcers
- Prolonged bleeding after injury or surgery

NSAIDs (with the exception of low-dose aspirin) may increase the risk of potentially fatal heart attacks, stroke, and related conditions (Curfman, 2017).

CLASSIFICATIONS OF NSAIDs	
Classification	NSAIDs
Salicylates	<ul style="list-style-type: none"> <li>• Aspirin (Duralaza)</li> <li>• Diflunisal</li> </ul>
Acetic acids	<ul style="list-style-type: none"> <li>• Diclofenac (Cambia, Voltaren gel, Zipsor, Zorvolex)</li> <li>• Etodolac</li> <li>• Indomethacin (Indocin, Tvorbex)</li> <li>• Ketorolac (Acular, Acuvail, Omidria, sprix)</li> <li>• Nabumetone</li> <li>• Sulindac</li> <li>• Tolmetin</li> </ul>
Propionic acids	<ul style="list-style-type: none"> <li>• Ibuprofen (Motrin IB, Advil, Ibu-Tab, Neoprofen)</li> <li>• Ketoprofen</li> <li>• Naproxen (Aleve, Anaprox DS, Naprelan, Naprosyn)</li> <li>• Oxaprozin (Daypro)</li> </ul>
Fenamates	<ul style="list-style-type: none"> <li>• Meclofenamate</li> <li>• Mefenamic acid (Ponstel)</li> </ul>
Oxicam derivatives	<ul style="list-style-type: none"> <li>• Meloxicam (Mobic, Qmiz ODT, Vivlodex)</li> <li>• Piroxicam (Feldene)</li> </ul>
COX-2 inhibitor	<ul style="list-style-type: none"> <li>• Celecoxib (Celebrex)</li> </ul>

## OPIOID ANALGESICS

Opioid analgesics are human-made drugs that are chemically similar to opiates found in the seedpod of the poppy (*Papaver somniferum*). There are more than 20 opiates found in the opium



poppy seedpod, and six occur in large amounts. Of those six, four are used for medical purposes: morphine, codeine, thebaine, and papaverine.

Morphine and codeine are the most well-known opiates. Thebaine is not used as a pain medication in its natural state but is converted into other chemicals such as oxycodone or hydrocodone, which are examples of semisynthetic opioids. Diacetylmorphine, more commonly known as *heroin*, is an example of a semisynthetic opioid manufactured from morphine.

Drugs that are created in laboratories that mimic effects of opiates but are not derived from the opium poppy are synthesized drugs. Examples include methadone, fentanyl, and meperidine (McLain, 2016).

### ***Opioid Receptors and Mechanism of Action***

Opioid receptors are found in the central nervous system, pituitary gland, gastrointestinal tract, grey matter of the brain, and dorsal horn of the spinal cord. Opioid analgesics produce pain relief by acting on these central and peripheral opioid receptors to inhibit the transmission of nociceptive input and the perception of pain. There are four types of opioid receptors, which produce the following effects:

<b>TYPES OF OPIOID RECEPTORS AND EFFECTS</b>	
<b>Type</b>	<b>Effects</b>
Mu-1	<ul style="list-style-type: none"> <li>• Supraspinal analgesia</li> <li>• Bradycardia</li> <li>• Sedation</li> </ul>
Mu-2	<ul style="list-style-type: none"> <li>• Respiratory depression</li> <li>• Euphoria</li> <li>• Physical dependence</li> </ul>
Delta	<ul style="list-style-type: none"> <li>• Spinal analgesia</li> <li>• Respiratory depression</li> </ul>
Kappa	<ul style="list-style-type: none"> <li>• Spinal analgesia</li> <li>• Respiratory depression</li> <li>• Sedation</li> <li>• Psychomimetic effects (anxiety, strange thoughts, nightmares, hallucinations)</li> </ul>

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 (McLain, 2016; Alford et al., 2017).

### ***Opioid Classifications***

Opioids are classified by the effect (intrinsic activity) they have on the mu receptors and include full agonists, partial agonists, and antagonists.

**Full agonists** are opioid drugs that bind to mu opioid receptors and cause them to produce endorphins, which provide pain relief, and depending on the dose and frequency, addictive effects and feelings of euphoria. Examples of full agonists are oxycodone, methadone, codeine, heroin, and morphine.

**Partial agonists** are drugs that bind primarily to mu opioid receptors and cause them to produce endorphins but to a much lesser extent than full agonists. When the dosage of a partial agonist is increased, there is only a small increase, if any, in the production of endorphins. Buprenorphine, Suboxone, and Subutex are partial agonists.

**Antagonists** are drugs that bind to the mu opioid receptors but have no intrinsic activity and prevent other opioids from stimulating the mu receptors and producing endorphins. Naloxone and naltrexone are opioid antagonists (McLain, 2016).

<b>COMMON OPIOID MEDICATIONS</b>	
<b>Generic</b>	<b>Brand Name(s)</b>
Fentanyl	<ul style="list-style-type: none"> <li>• Actiq</li> <li>• Duragesic</li> <li>• Fentora</li> <li>• Abstral</li> <li>• Onsolis</li> </ul>
Hydrocodone	<ul style="list-style-type: none"> <li>• Hysingla</li> <li>• Zohydro ER</li> </ul>
Hydrocodone/ acetaminophen	<ul style="list-style-type: none"> <li>• Lorcet</li> <li>• Lortab</li> <li>• Norco</li> <li>• Vicodin</li> </ul>
Meperidine	<ul style="list-style-type: none"> <li>• Demerol</li> </ul>
Methadone	<ul style="list-style-type: none"> <li>• Dolophine</li> <li>• Methadose</li> </ul>



Morphine	<ul style="list-style-type: none"> <li>• Kadian</li> <li>• MS Contin</li> <li>• Morphabond</li> </ul>
Oxycodone	<ul style="list-style-type: none"> <li>• Oxycontin</li> <li>• Oxaydo</li> </ul>
Oxycodone/ acetaminophen	<ul style="list-style-type: none"> <li>• Percocet</li> <li>• Roxicet</li> </ul>
Oxycodone/naloxone	<ul style="list-style-type: none"> <li>• Targiniq ER</li> </ul>
Benzhydrocodone/ acetaminophen	<ul style="list-style-type: none"> <li>• Apadaz</li> </ul>

### ***Adverse Effects of Opioid Analgesics***

Both short- and long-term use of opioids is associated with a high rate of adverse effects involving multiple body systems. Such adverse effects can occur at all dose ranges (see table).

<b>ADVERSE EFFECTS OF OPIOIDS</b>	
<b>Body System</b>	<b>Effects</b>
Central Nervous System	<ul style="list-style-type: none"> <li>• Sedation</li> <li>• Euphoria</li> <li>• Dysphoria</li> <li>• Changes in mood</li> <li>• Mental clouding</li> <li>• Myoclonus (uncontrollable spasms of certain muscle groups)</li> </ul>
Neuroendocrine	<ul style="list-style-type: none"> <li>• Increased levels of prolactin</li> <li>• Decreased levels of sex hormones</li> <li>• Rarely, secondary adrenal insufficiency</li> </ul>
Respiratory	<ul style="list-style-type: none"> <li>• Decreased brainstem responsiveness to carbon dioxide</li> <li>• Increased respiratory depression</li> <li>• Depressed cough reflex in the medulla</li> </ul>
Cardiovascular	<ul style="list-style-type: none"> <li>• Peripheral vasodilation due to release of histamine</li> <li>• Decreased peripheral resistance</li> <li>• Inhibition of baroreceptor reflexes</li> <li>• Methadone associated with torsade de pointes (a distinctive form of polymorphic ventricular tachycardia)</li> </ul>



Gastrointestinal	<ul style="list-style-type: none"> <li>• Nausea and vomiting</li> <li>• Constipation, leading to ileus, fecal impaction, obstruction</li> </ul>
Genitourinary	<ul style="list-style-type: none"> <li>• Bladder spasms and urgency</li> <li>• Difficult urination and urinary retention</li> </ul>
Biliary	<ul style="list-style-type: none"> <li>• Decreased pancreatic and biliary secretions</li> <li>• Biliary spasm</li> </ul>
Skin and Eye	<ul style="list-style-type: none"> <li>• Flushing of face and neck due to dilated blood vessels</li> <li>• Pruritus due to histamine release</li> <li>• Miosis (excessive constriction of the pupils)</li> </ul>
Immune System	<ul style="list-style-type: none"> <li>• Reduced natural killer cell cytotoxicity and impaired neutrophil chemotaxis, which increases risk for infection</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Weight gain</li> <li>• Abnormal glycemic control</li> <li>• Opioid hyperalgesia</li> </ul>
Sources: Portenoy et al., 2018; McLain, 2016.	

## CASE

### **MEREDITH** (*continued*)

Following her visit to the walk-in clinic, Meredith's condition began to deteriorate. Her pain remained severe at 9 to 10 on a 10-point pain scale. 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 Managing Breakthrough Pain***

Most patients with chronic pain due to advanced disease report having episodic pain referred to as *breakthrough pain*. Breakthrough pain is a transitory, severe, acute pain that occurs in patients with chronic pain that has been adequately controlled by an opioid regimen.



Breakthrough pain includes the following:

- **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 those activities. Dosage should be adjusted based on the level and duration of the activity that is expected to cause pain.
- **Spontaneous pain** is unpredictable, not associated with any specific activity, and 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 timeframe in which the medication is intended to be effective. The treatment may involve shortening the interval between scheduled doses or increasing the dose.

Breakthrough pain episodes are typically managed with a short-acting oral opioid drug referred to as a *rescue dose* taken on an as needed basis in conjunction with the fixed-schedule, long-acting medication. A typical dose for rescue is 5% to 15% of the basal daily requirement of opioid.

Breakthrough pain may also be treated with one of the newer rapid-onset, transmucosal fentanyl formations. There are several formulations available in the United States:

- Actiq (oral transmucosal fentanyl lozenge)
- Abstral (immediate-release transmucosal tablet)
- Fentora (effervescent fentanyl buccal tablet)
- Lazanda (nasal spray)
- Subsys (sublingual spray)

To prescribe any of these drugs, clinicians must complete online education. In addition, each patient treated requires registrations of the patient, the prescribing clinician, and the pharmacist. Because of the cost and limited experience, the transmucosal drugs are generally considered only after a patient has demonstrated a poor response to an oral rescue dose (Portenoy et al., 2019).

### ***Opioids and Drug Tolerance, Dependence, and Addiction***

When an opioid drug is used on a regular basis, generally after more than two weeks, the same dose of the drug has less of an effect. This is referred to as ***tolerance***. A person who is developing tolerance may require larger amounts of the drug to get the same effect. Tolerance levels vary between individuals and occur when parts of the body affected by the drug begin to respond less to repeated stimulation. The body may also get better and faster at breaking down the drug (NIH, 2019b).



With repeated use of opioids, **dependence** occurs. Dependence is characterized by the symptoms of tolerance and withdrawal. The brain adapts to repeated exposure to the drug and can only function normally in the presence of the drug. When the drug is withdrawn, physiological reactions occur, which can be mild or even life-threatening. Withdrawal symptoms include:

- Diaphoresis
- Nausea or vomiting
- Chills
- Diarrhea
- Shaking
- Pain
- Depression
- Insomnia
- Fatigue

**Addiction** occurs when neither the body nor mind can function without the drug. The biological basis of addiction is damage to the prefrontal cortex. Brain imaging studies show decreased activity in this region of the brain, which is involved in essential decision-making. When this area fails to function properly, the person is unable to make a decision to stop taking the drug. Teens are especially vulnerable to addiction since their brains have not yet fully developed, particularly the frontal regions involved with impulse control and risk assessment.

It is not yet understood why some people become addicted while others do not. Addiction tends to run in families, and certain genes have been linked to different forms of addiction. Other factors that increasing the risk of addiction include:

- History of substance abuse
- Depression or other psychiatric disorders
- Childhood abuse or neglect
- Certain personality traits, including impulsivity and sensation-seeking
- Living in poverty and in rural areas
- Associating with others who abuse opioids or other substances
- Having easy access to prescription or illegal opioids  
(NIH, 2019b; USDHHS, 2019b)



### **Opioid Overdose**

Due to their pharmacological effects, opioids in high doses can cause respiratory depression and death. Most drug-related deaths worldwide are attributable to opioids. An opioid overdose can be identified by a combination of three signs and symptoms, referred to as the *opioid overdose triad*, which include:

- Pinpoint pupils
- Unconsciousness
- Respiratory depression

Combining opioids with alcohol and sedative medication increases the risk of respiratory depression, and combinations of opioids, alcohol, and sedatives are often present in fatal drug overdoses (WHO, 2018).

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

### **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.

<b>COMMON ADJUVANT (CO-ANALGESIC) DRUGS</b>	
<b>Class / Indications / Primary Effects</b>	<b>Drugs</b>
<b>Antidepressants:</b> Neuropathic pain, burning sensation; improves sleep, enhances mood and analgesic effects	<ul style="list-style-type: none"> <li>• Tricyclics: amitriptyline (Elavil)</li> <li>• SSRIs: paroxetine (Paxil)</li> <li>• SNRIs: venlafaxine (Effexor XR)</li> <li>• Others: bupropion (Wellbutrin XR)</li> </ul>
<b>Anticonvulsants:</b> Neuralgic and neuropathic pain; sharp, prickling, shooting pain	<ul style="list-style-type: none"> <li>• Gabapentin (Neurontin)</li> <li>• Carbamazepine (Tegretol)</li> <li>• Phenytoin (Dilantin)</li> <li>• Valproic acid (Depakene)</li> </ul>
<b>Antispasmodic:</b> Reflex sympathetic dystrophy syndrome (a disorder of the sympathetic nervous system causing chronic, severe pain)	<ul style="list-style-type: none"> <li>• Baclofen (Lioresal, Gablofen)</li> <li>• Clonazepam (Klonopin)</li> </ul>
<b>Anxiolytics:</b> Help manage anxiety and pain by encouraging muscles to relax	<ul style="list-style-type: none"> <li>• Diazepam (Valium)</li> <li>• Buspirone hydrochloride</li> <li>• Venlafaxine hydrochloride</li> </ul>



<b>Neurotoxin:</b> Migraine headache	<ul style="list-style-type: none"> <li>• Botulinum toxin (Myoblock)</li> </ul>
<b>Topical anesthetics:</b> Neuralgic, neuropathic, and musculoskeletal pain	<ul style="list-style-type: none"> <li>• Lidocaine (Xylocaine)</li> <li>• Capsaicin (Qutenza)</li> </ul>
<b>Corticosteroids:</b> Inflammatory conditions, metastatic bone pain, neuropathic pain, and visceral pain	<ul style="list-style-type: none"> <li>• Dexamethasone</li> <li>• Prednisone</li> </ul>
<b>Anesthetic drugs:</b> Neuropathic pain, phantom leg pain	<ul style="list-style-type: none"> <li>• Ketamine</li> <li>• Amantadine (Osmolex ER)</li> </ul>
Source: Portenoy et al., 2019.	

### WORLD HEALTH ORGANIZATION PAIN MANAGEMENT LADDER

Over 30 years ago, the World Health Organization (WHO) established a treatment, or analgesic, ladder for adult patients with cancer pain that continues to be widely used today for all patients with either acute or chronic pain who require analgesics. The ladder has three steps:

**Step 1:** For mild pain, use a nonopioid with or without adjuvant analgesic.

**Step 2:** For mild to moderate pain, use a mild or weak opioid (e.g., codeine) plus a nonopioid medication with or without adjuvant analgesic.

**Step 3:** For moderate to severe pain, use a strong opioid (e.g., morphine) plus nonopioid with or without adjuvant analgesic.

To maintain freedom from pain, drugs should be given “by the clock.” This is every 3 to 6 hours, rather than “on demand.” This three-step approach of administering the right drug in the right dose at the right time is inexpensive and 80% to 90% effective. Surgical intervention on appropriate nerves may provide further pain relief if drugs are not wholly effective.

The WHO also provides guidelines on the pharmacologic treatment of persisting pain in children with medical illness (WHO, 2019). (*See also “Resources” at the end of this course.*)

### 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.



<b>ANALGESIC DRUG ADMINISTRATION</b>		
<b>Route</b>	<b>Advantages</b>	<b>Disadvantages</b>
Oral (per os = PO)	<ul style="list-style-type: none"> <li>• Preferred route due to lower cost and convenience</li> <li>• May be prepared as powders, capsules, tablets, liquids, or lozenges</li> <li>• Drug levels peak in 1 to 2 hours</li> <li>• Relatively steady blood levels produced</li> </ul>	<ul style="list-style-type: none"> <li>• Slow onset</li> <li>• Long-acting opioids cannot be crushed, broken, or chewed</li> <li>• Requires a functional GI system</li> <li>• Cannot be used if patient is NPO or cannot swallow</li> </ul>
Rectal (R)	<ul style="list-style-type: none"> <li>• Can be used when patient is unable to take oral drugs</li> <li>• Can be self-administered</li> <li>• Longer duration than oral</li> <li>• Any opioid can be compounded for rectal route</li> </ul>	<ul style="list-style-type: none"> <li>• May be more expensive and difficult to obtain from pharmacy</li> <li>• Contraindicated in those with anal or rectal lesions, diarrhea, thrombocytopenia, neutropenia, prior abdominoperineal resection, hemorrhoids</li> <li>• May be culturally unacceptable</li> </ul>
Sublingual (SL) and buccal	<ul style="list-style-type: none"> <li>• Can be used when patient is unable to take oral drugs</li> <li>• Rapid analgesic onset</li> <li>• Bypasses the liver</li> </ul>	<ul style="list-style-type: none"> <li>• Hypersensitivity to the drug</li> <li>• Eating, drinking, smoking can affect absorption</li> </ul>
Intramuscular (IM)	<ul style="list-style-type: none"> <li>• Acute, short-term pain relief</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid peak effect, short duration, and rapid fall-off</li> <li>• Inconsistent blood levels due to poor absorption</li> <li>• Painful</li> <li>• Requires others to administer to patient</li> <li>• Contraindicated for emaciated patients or with decreased muscle mass</li> <li>• Risk of fibrosis and sterile abscesses</li> </ul>



<p>Intravenous (IV) bolus</p>	<ul style="list-style-type: none"> <li>• Offers most rapid pain relief (5–15 min) but lasts less than 60 min</li> <li>• Dependable with reproducible effects</li> <li>• Reaches system immediately</li> <li>• Can titrate accurately</li> </ul>	<ul style="list-style-type: none"> <li>• Requires IV access</li> <li>• Gives only brief pain relief when prolonged relief is needed</li> <li>• More expensive and labor intensive</li> <li>• Risk of infection at cannula site</li> <li>• Drugs may cause local reactions</li> </ul>
<p>Continuous intravenous (IV) infusion</p>	<ul style="list-style-type: none"> <li>• Gives constant opioid blood level when other methods are ineffective</li> </ul>	<ul style="list-style-type: none"> <li>• Requires infusion pumps with alarms and close monitoring</li> </ul>
<p>Patient-controlled analgesia (PCA)</p>	<ul style="list-style-type: none"> <li>• Allows predetermined IV bolus of analgesic when patient desires pain relief</li> </ul>	<ul style="list-style-type: none"> <li>• Requires IV access, patient cooperation, close supervision</li> <li>• Does not give continuous pain relief</li> </ul>
<p>Subcutaneous (SC) opioid infusion</p>	<ul style="list-style-type: none"> <li>• Continuous, prolonged parenteral opioids when IV not possible</li> <li>• Allows for home use</li> </ul>	<ul style="list-style-type: none"> <li>• Requires site change every 7 days</li> <li>• Risk for site irritation and infection</li> </ul>
<p>Intraspinal (neuraxial), intrathecal, epidural, subarachnoid, intraventricular</p>	<ul style="list-style-type: none"> <li>• Management of labor pain</li> <li>• Effective for intractable cancer pain</li> </ul>	<ul style="list-style-type: none"> <li>• Requires insertion of catheter into intended space with attached infusion pump or implanted reservoir</li> <li>• High risk for infection or dislodgment</li> <li>• High incidence of adverse effects with long-term use</li> <li>• Risk of neurologic injury</li> <li>• Post-LP headache</li> </ul>
<p>Regional nerve blocks</p>	<ul style="list-style-type: none"> <li>• Continuous or single dose analgesic for acute and chronic pain</li> <li>• Better pain control than intravenous route</li> <li>• Earlier recovery of bowel function</li> <li>• Less need for systemic opioids</li> </ul>	<ul style="list-style-type: none"> <li>• Requires insertion of catheter to specific nerve root attached to infusion pump or implanted reservoir</li> <li>• High risk for infection or dislodgment</li> <li>• Risk of injection into a vein</li> <li>• Rare pneumothorax</li> <li>• Risk of bruising, bleeding, or hematoma</li> </ul>
<p>Topical (cream-laden anesthetic)</p>	<ul style="list-style-type: none"> <li>• Easy to apply</li> <li>• Noninvasive</li> </ul>	<ul style="list-style-type: none"> <li>• Very slow absorption</li> <li>• Must be applied 30–60 min in advance of need</li> </ul>



<p>Transdermal skin patch</p>	<ul style="list-style-type: none"> <li>• Continuous dose of opioid</li> <li>• Allows home use</li> <li>• May improve adherence to drug regimen</li> <li>• Noninvasive, convenient</li> <li>• Lower risk of addiction</li> <li>• Avoids first pass effect through the liver</li> </ul>	<ul style="list-style-type: none"> <li>• May require short-acting analgesics for first 12 to 24 hours</li> <li>• Difficult to adjust dose</li> <li>• Febrile patients absorb medication quickly</li> <li>• Less useful in those with generalized edema</li> <li>• Possible lack of adherence with diaphoresis</li> </ul>
<p>Nasal sprays</p>	<ul style="list-style-type: none"> <li>• Alternative to IV, IM, and oral opioid routes</li> <li>• Rapid onset of action</li> <li>• Little danger of delayed absorption</li> </ul>	<ul style="list-style-type: none"> <li>• Nasal exudates or mucosal swelling may prevent consistent absorption</li> <li>• Suitable only for drugs effective at low concentration</li> </ul>
<p>Sources: AAP, 2019; Bourne, 2014; Chandane, 2014; Doctors.net/uk, n.d.; Gilani, 2012; Merck Manual, 2019; Quora, n.d.; Zamliana, 2016.</p>		

### CANNABIS (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 (WGBH, 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 (WGBH, 2014; Burnett & Reiman, 2014).

At the close of 2018, 33 states and the District of Columbia had also passed laws broadly legalizing medical marijuana in some form. Twenty-seven of those states and the District of Columbia had fully legalized marijuana, and nine states and the District of Columbia had decriminalized it. Some medical marijuana laws are broader than others, with types of medical conditions that allow for treatment varying from state to state. Some states allow only for cannabis-infused products such as oils or pills. Other states have passed narrow laws allowing residents to possess cannabis only if they suffer from select medical illnesses.

Despite these new laws, cannabis is still illegal under federal law, and the government regulates it through the Controlled Substances Act (CSA), which does not recognize the difference between medical and recreational use of cannabis. The federal laws, however, are generally applied only against those who possess, cultivate, or distribute large quantities of cannabis.



Under the CSA, cannabis is classified as a Schedule 1 drug. This means that the federal government views cannabis as highly addictive and that it has no medical value. Doctors may not prescribe cannabis for medical use under federal law, although they can “recommend” its use under the First Amendment (ASA, 2019).

Recent studies have found that prescriptions filled for all opioids decreased in those states with medical marijuana laws, and other studies have found a reduction in overdose deaths from opioid pain relievers. At this point, research into the effects of cannabis on opioid use in pain patients is mixed, but cumulatively, studies suggest that medical marijuana products may play a role in reducing the use of opioids needed to control pain (NIH, 2018b).

### ***Mechanism of Action***

Marijuana is a greenish-gray mixture of the dried flowers of the plant *Cannabis sativa*. The main psychoactive chemical in marijuana responsible for the intoxicating effects people experience is **delta-9-tetrahydrocannabinol (THC)**. THC’s chemical structure is similar to anandamide, an endogenous cannabinoid, and because of this similarity, it is able to attach to and activate cannabinoid receptors in brain areas that influence pleasure, memory, thinking, and concentration (hippocampus and orbitofrontal cortex); and balance, posture, coordination, and reaction time (cerebellum and basal ganglia). THC, acting through the cannabinoid receptors, also activates the brain’s reward system to release dopamine at levels higher in response to pleasurable behaviors than those in response to other stimuli.

The other chemical from the marijuana plant that is of medical importance is **cannabidiol (CBD)**, thought to be useful in reducing pain and inflammation and in controlling epileptic seizures. CBD, however, does not cause intoxication or euphoria (the “high”) that comes from THC because it does not affect the same receptors as THC. CBD influences the body to use its own endocannabinoids more effectively by inhibiting absorption by the body of the endogenous cannabinoid anandamide, which is associated with regulating pain. Increased levels of anandamide in the blood may reduce the amount of pain a person experiences (NIH, 2018b; FDA, 2018a).

CBD is also used for the treatment of epilepsy; however, the exact mechanism in which CBD creates anticonvulsant effects is not known. Data suggests that it does not create the anticonvulsant effects through interaction with cannabinoid receptors (Drug Development Technology, 2019).

### ***FDA-Approved Medical Marijuana Formulations***

The U.S. Food and Drug Administration (FDA) has approved the following THC-based pill-form medications for the treatment of nausea in patients undergoing cancer chemotherapy and to stimulate appetite in patients with wasting syndrome due to AIDS:

- Dronabinol (Marinol, Syndros)
- Nabilone (Cesamet)



In 2018 the FDA approved the first CBD-based medication. Epidiolex (cannabidiol) is a liquid medication for the treatment of two forms of severe childhood epilepsy (Dravet syndrome and Lennox-Gastaut syndrome) in those 2 years of age and older (FDA, 2018a).

Additionally, several other marijuana-based medications have been undergoing clinical trials. Sativex (nabiximols), a combined THC and CBD drug, is a mouth spray available in the United Kingdom, Canada, and several European countries for treating the spasticity and neuropathic pain that may accompany multiple sclerosis (NIH, 2018b).

(See also “Pharmacologic Pain Management” under “Treating Pain in Palliative Care and End-of-Life Care” later in this course.)

## Nonpharmacologic Interventions

Evidence-based nonpharmacologic therapies are safe when correctly administered and can be effective components of comprehensive pain management that can reduce the need for opioids. Nonpharmacologic therapies can be the sole intervention, or they can be combined with other treatments. Nonpharmacologic interventions include physical, psychological, and mind-body modalities.

### PHYSICAL MODALITIES

Physical modalities for relief of pain refer to any therapeutic medium that uses the transmission to or through the patient of thermal, electrical, acoustic, radiant, or mechanical energy.

#### *Thermal Modalities (Heat and Cold)*

**Cold (cryotherapy)** is often the first treatment applied to new injuries. Cold causes vasoconstriction, which slows blood flow and leakage of fluid from capillaries into surrounding tissue spaces and reduces bruising, swelling, inflammation, and muscle spasms. Cold slows down the pain messages transmitted to the brain and numbs tissue, acting as a local anesthetic. Cold therapy can be cold compresses, chemical cold packs, immersion or soaking in cold water, massaging the area with an ice cube or an ice pack, cold air and vapocoolant sprays, and manual and electric cold compression units (Physiopedia, 2019).

Thermal modalities include superficial and deep heat. Heat may facilitate tissue healing, relax skeletal muscles, and decrease spasms and pain. **Heat therapy** speeds up nerve impulses, dilates blood vessels, and helps eliminate buildup of lactic acid waste. The effect of heat on pain is mediated by generating action potentials in calcium channels that are sensitive to heat. Once activated, they can inhibit the activity of purine pain receptors located in the peripheral small nerve endings. Heat can directly inhibit pain in peripheral tissues; however, when pain originates from deep tissue, heat stimulates peripheral pain receptors, which can alter gating in the spinal cord and reduce deep pain.



Heat is effective for mostly dull and persistent pain associated with stiffness, cramping, and neuropathic sensitivity. Muscle pain responds well to heat, which also promotes relaxation and comfort. Superficial heat can be applied using electric heating pads, hot water bottles, wet or dry hot packs, heat wraps, hot baths, saunas, steam baths/rooms, sunlight, or heated paraffin wax treatment.

**Deep heat** includes shortwave diathermy (SWD) and microwave diathermy (MWD). SWD and MWD convert electromagnetic energy to thermal energy and are commonly used to heat large areas of deep tissue and within the joints. MWD has more superficial heat penetration compared to SWD (Safer Pain Relief.org, 2019; Physiopedia, 2019; Klein, 2017). (See also “Acoustic Modalities” below.)

### ***Manual Modalities (Massage)***

**Massage** is the use of touch or force to areas and tissues for therapeutic purposes. Therapeutic massage involves the application of hands or elbows with the intention of solving a physical problem. Research supports the benefits of massage therapy for pain management, decreasing anxiety and depression, and reducing pain intensity in patients undergoing surgical procedures. Massage reduces pain by stimulating A-beta fibers, resulting in closing of the “gate” to impulses from the periphery, and also stimulates the release of endorphins.

Types of massage include:

- Acupressure: Application of pressure to acupuncture points
- Deep-tissue: massage to reduce pain and inflammation
- Rolfing and myofascial release: more aggressive techniques that direct force into dysfunctional muscle and fascial tissue
- Neuromuscular therapy: a technique that releases trigger points within tight muscles
- Reflexology: based on a system of points on the hands, feet and ears that correspond to other parts of the body; similar in theory to acupressure, applying pressure to these points to stimulate the flow of energy, thus helping to release pain or blockages throughout the body
- Reiki: use of light touch designed to work with the body’s energy
- Whirlpool: water massage to decrease muscle tension, improve circulation, and relieve pain
- Swedish: the most common type of massage, to decrease muscle tension, pain, stress, and depression  
(Madore, 2019; AMTA, 2018)



**Manipulation therapy** is an evidence-based practice involving the application of pressure to the spine or other parts of the body to adjust and correct alignment for the treatment of musculoskeletal pain. Such techniques are commonly used to improve pain and function by osteopathic physicians, chiropractors, and physical therapists. Spinal manipulation, for example, is often recommended for acute, subacute, and chronic low back pain as well as osteoarthritis. It has also been found beneficial for neck pain, cervicogenic headache, and prophylaxis of migraine (Tick et al., 2017; APTA, 2018b).

### ***Acupuncture***

Acupuncture involves placing thin needles into targeted areas of the body to ease chronic pain. According to traditional Chinese medicine, the body has patterns of energy (chi) flow. Fine needles are positioned at specific locations on the body to correct or maintain this flow. Modern medicine emphasizes how acupuncture needles stimulate nerve and muscle cells, reducing the sensation of pain and releasing the body's endorphins. Acupuncture needles can be moved or turned once they are in place, and mild electrical pulses are sometimes used between two needles (electro-acupuncture) to expand the area of pain relief (Mayo Clinic, 2018; Ahn, 2019).

### ***Electro-Physical Agents***

Electrotherapy is used to treat a range of chronic pain conditions using mild electric current to underlying structures.

**Transcutaneous electrical nerve stimulation (TENS)** is a commonly used device designed specifically for pain relief. TENS provides a low-voltage electrical current through the skin to sensory nerve fibers, producing numbness or tingling sensations that “mask” or “override” sensations of pain. The impulses from TENS fill the nerve pathways and prevent the transmission of pain signals to the brain. 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.

Although TENS may help relieve pain for some people, its effectiveness has not been proven. Many studies have been done on TENS, but most have been small or not well designed. For this reason, some experts claim TENS can give short-term pain relief; however, long-term relief has not been proven (URMC, 2019).

**Interferential stimulation** is more complex than TENS. It uses dual-frequency stimulation to create circuits that cross over each other to produce maximum pain signal interference at the treatment target site.

**Percutaneous electric nerve stimulation (PENS)** therapy uses thin needle electrodes that pierce the skin and get closer to nerve endings or muscle than does TENS therapy. It is often used if TENS therapy is unsuccessful and to treat diabetic peripheral neuropathy.



**Pulse electromagnetic field stimulation (PEMF)** therapy uses short bursts of low-level electromagnetic fields that can relieve continuing leg or back pain following back surgery. It has also shown promise in treating fibromyalgia and osteoarthritis (Lisi et al., 2019).

**Iontophoresis** allows medication to be delivered into and through the skin to a painful area without having to be injected or taken orally. Liquid medication is placed on a patch that is then applied to the painful area. A device, similar to a battery, is then attached to the patch, and the medication is delivered by a mild electrical current. Iontophoresis has been used successfully to anesthetize an area of skin with lidocaine and to treat bursitis or tendonitis with anti-inflammatory drugs (NIH, 2018c).

### ***Acoustic Modalities***

Therapeutic **ultrasound** is a form of mechanical energy. The ultrasound device converts electrical energy to high-frequency sound waves that penetrate deeply into muscle, nerve, bone, and connective tissues. The waves vibrate cell molecules and cause friction, which creates heat. This heat is deeper in the tissues than heat packs or any other heating modality can reach. Its effects are the same as those of superficial heat, and it also decreases nerve sensitivity by sedating nerve endings. Ultrasound is used to treat chronic inflammation, soft tissue injury, nerve root irritation, nonacute bursitis, and adhesive capsulitis (Watson, 2019; Physiopedia, 2019).

**Shortwave diathermy (SWD)** and **microwave diathermy (MWD)** convert electromagnetic energy to thermal energy. Diathermy heats more deeply than hot packs and can heat a larger area than ultrasound. SWD produces deep heating and can be either pulsed or continuous. Pulsed shortwave diathermy is used for patients with some acute and subacute conditions, and it prevents tissue temperature from increasing too quickly or too high. Continuous shortwave diathermy increases subcutaneous tissue temperature, and its use is generally limited to chronic conditions. It is usually applied for 20 minutes at the maximum tolerable dose and is used most commonly for treating musculoskeletal disorders. SWD penetrates bone and does not pose a risk of periosteal burning. MWD does not penetrate as deeply as shortwave diathermy and can create hotspots. It is useful in the treatment of traumatic and rheumatic conditions affecting superficial muscles, ligaments, and small superficial joints (AAPM&R, 2019).

**Phonophoresis** uses ultrasound's high-frequency sound wave to drive a medication into the tissues. A topical anti-inflammatory agent is blended into the ultrasound gel and applied to the skin over the treatment area, and the ultrasound waves carry it into the tissues to reduce inflammation and also provide the benefits of therapeutic heat and vibration (Hoenig & Cary, 2018).

### ***Light Therapy***

**Low-level laser therapy (LLLT)** is a form of light therapy that triggers biochemical changes within cells. Photons are absorbed by cellular photoreceptors, triggering



chemical alterations and potential biochemical benefits. LLLT has been used in pain management for years and is also known as *cold laser therapy*. Based on recent research, the utilization of LLLT may be a complementary option for providing symptom management in patients with osteoarthritis and chronic pain (Dima et al., 2017).

### ***Interventional Pain Modalities***

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

- **Injection therapies**
  - **Soft tissue and joint injections** may be used for conditions such as bursitis, tendonitis, arthritis, osteoarthritic, and carpal tunnel syndrome. Trigger point injections are used for musculoskeletal pain. Anti-inflammatory medications (corticosteroids) are the most common drugs to use in injections and often are combined with pain relievers such as lidocaine.
  - **Nerve blocks** provide temporary pain relief by injecting a local anesthetic to temporarily interrupt peripheral nerve transmission of pain. Nerve blocks may be given in the facet joints of the spine, hip joint, sacroiliac joint, coccyx, shoulder, elbow, hand, knee, ankle, foot, occipital, saphenous, and pudendal nerves.
  - **Neurolytic blocks** produce analgesia by destroying afferent neural pathways or sympathetic structures involved in pain transmission by injecting a material that damages the nerve (e.g., water, hypertonic saline, phenol, or alcohol).
  - **Epidural steroid injections** send steroids directly to an inflamed nerve root and require two or three injections for maximum relief.
- **Radiofrequency ablation** involves using X-ray guidance to insert a needle with an electrode at the tip, which is then heated in order to temporarily turn off a nerve's ability to transmit pain signals to the brain. Other names are *radiofrequency rhizotomy* and *neuroablation*.
- **Cryotherapy ablation** uses medical-grade nitrous oxide to generate extremely cold temperatures to selectively destroy nerve tissue and prevent transmission of the pain signal to the brain.
- **Intrathecal pump implants** provide potent medications directly to the source of pain. This is a type of neuromodulation that interrupts pain signals to the brain. It involves a small pump implanted under the skin which is programmed to deliver a specific amount of medication. The pump requires refilling every few months.
- **Spinal cord stimulator.** A device is implanted under the skin and sends a mild electric current to the spinal cord. Thin wires carry current from a pulse generator



to the nerve fibers of the spinal cord. When turned on, nerves in the area where the pain is felt are stimulated. Pain is reduced because the electrical pulses modify and mask the pain signal.

- **Intradiscal electrothermal therapy (IDET)** is a minimally invasive technique for treating discogenic low back pain. It involves the percutaneous threading of a flexible catheter into a disc under fluoroscopic guidance. The catheter heats the posterior annulus of the disc, causing contraction of collagen fibers and destruction of afferent nociceptors. Studies indicate it may bring relief in about 70% of those with chronic, unremitting low back pain.
- **Dry needling** is a physical therapy technique (where allowed by state law) that is part of a larger treatment plan for musculoskeletal pain. Dry needling involves penetrating the skin with a thin filiform needle and stimulating underlying myofascial trigger points and muscular connective tissues. The goal is to release or inactivate trigger points to relieve pain or improve range of motion. Dry needling is found to be more effective than no treatment, sham dry needling, and other treatments for reducing pain and improving pressure pain threshold, but evidence of long-term benefit is currently lacking. (PPM, 2018; Portenoy & Copenhaver, 2017; Thiyagarajah, 2018; APTA, 2019a; Gattie et al., 2017)

## PSYCHOLOGICAL MODALITIES

### ***Cognitive-Behavioral Therapy (CBT)***

One of the most common types of psychotherapy used in pain management is cognitive-behavioral therapy. The role of CBT is to help patients recognize the emotional and psychological factors that influence pain perception and the behaviors associated with having pain. Cognitive strategies challenge the patient's beliefs and thoughts about pain, and then, using cognitive restructuring, the patient learns to modify negative thinking and to use positive coping self-statements. The goals of CBT are to:

- Reduce the impact pain has on the patient's daily life
- Learn skills for better coping with pain
- Improve physical and emotional functioning
- Reduce pain and the reliance on pain medication (Yasgur & Barclay, 2018)

### ***Acceptance and Commitment Therapy (ACT)***

The basic premise of acceptance and commitment therapy is for patients to shift their primary focus from reducing or eliminating pain to fully engaging in their lives. The goal of the therapy is to help patients accept whatever discomfort exists, both physical and emotional, while continuing to live their lives according to their values. ACT applies six



core treatment processes to create psychological flexibility. These six treatment processes are:

1. **Acceptance:** Developing and enhancing a person's willingness to have and accept experiences
2. **Defusion:** Helping a person notice their language processes as they unfold and watch thoughts come and go from the perspective of a neutral observer
3. **Being present:** Equated to mindfulness
4. **Self-as-context:** Working to let go of attachment to a conceptualized self
5. **Values:** Learning to choose willingness to experience difficult thoughts and feelings in order to engage in valued behavior
6. **Committed action:** Helping a person to see that choosing a valued direction is not a permanent thing and that choice must be made again and again  
(Cosio & Lin, 2017)

## MIND-BODY TECHNIQUES

### *Biofeedback*

Biofeedback is the use of instrumentation to mirror psychophysiological processes of which an individual normally is unaware and which may be brought under voluntary control. Types of biofeedback devices include:

- Electromyogram (EMG): measures muscles activity and tension
- Thermal: measures skin temperature
- Neurofeedback or electroencephalography (EEG): measures brain waves
- Electrodermal activity (ADA): measures sweating
- Heart rate variability (HRA): measures heart rate

There are three stages that occur during biofeedback training:

1. Awareness of physical response is gained.
2. The patient uses the signals from the biofeedback to control physical responses.
3. The patient transfers control from the biofeedback equipment to the self.  
(Cosio & Lin, 2019)



## ***Relaxation Therapies***

Relaxation therapies have been found helpful in the management of chronic headaches and other types of chronic pain in children and adolescents. Relaxation encourages reduction in muscle tension, resulting in a decrease in pain intensity. There are a number of practices—such as progressive relaxation, guided imagery, self-hypnosis and deep-breathing exercises—and the goal is similar for all: to produce the body’s natural relaxation response, characterized by slower breathing, lower blood pressure, and a feeling of increased well-being (NIH, 2018d).

## ***Hypnosis***

Hypnosis is a procedure involving cognitive processes in which the patient is guided by a health professional to respond to suggestions for changes in perceptions, sensations, thoughts, feelings, and behaviors. It involves learning how to use the mind and thoughts in order to manage emotional distress, unpleasant physical symptoms, and certain habits or behaviors. Patients can be trained in self-hypnosis, in which they learn to guide themselves through a hypnotic procedure. Hypnosis is often combined with biofeedback and other forms of relaxation therapies (Cosio & Lin, 2019).

## ***Distraction***

Distraction is shifting attention away from pain or painful stimuli to something more engaging or enjoyable. Distraction for acute pain can be:

- Internal (e.g., imagery)
- External to the individual, such as audio (e.g., music), visual (e.g., book), or audiovisual (e.g., movies)
- Require passive or interactive engagement
- Involve others (healthcare providers, parent)

There are several theories about the mechanism underlying distraction, but despite extensive research, understanding is limited as to what, when, how, and for whom distraction is effective.

Research supports the use of distraction for acute pain among infants and children, with less consistent evidence for adolescents and adults. For infants and small children, using colorful, moving objects, singing songs, telling stories, or looking at books or videos can be used. Older children and adults find watching TV or listening to music helpful (Stanford Health Care, 2019; Birnie et al., 2017).



### ***Mindfulness-Based Interventions***

Mindfulness-based interventions (e.g., meditation) have been found to have significant effects on chronic pain, yet the mechanisms underlying these effects are not well understood. Meditation does not use one of the body's primary pain modulatory systems, such as the endogenous opioid system, for pain relief. But studies have seen a decrease in cortisol and epinephrine levels and an increase in serotonin and gamma-aminobutyric acid levels, which are linked to relaxation and antidepressant effects. Study results also suggest that mindfulness practice may have a buffering effect on chronic pain by attenuating the tendency to enable the pain experience.

The goal of mindfulness meditation is not to eliminate pain or anxiety but rather to get patients to focus on breathing and relaxation techniques (focused awareness). Patients are taught to achieve nonjudgmental self-acceptance and to focus the mind on the present moment (Zeidan et al., 2016; Reiner et al., 2018).

### ***Virtual Reality***

Virtual reality (VR) therapies have been shown to effectively distract patients who suffer from chronic and acute pain. Virtual reality is a computer-generated world that simulates real-life experiences through senses and perception. An individual using VR equipment is able to look around the artificial world, move around in it, and interact with virtual features or even thoughts. This world is commonly created by using a VR headset that consists of a head-mounted display with a small screen positioned in front of the eyes.

Functional MRI studies have found that VR has the ability to reduce activation in certain areas of the brain and may help the brain change and adapt to computer-generated experiences that would be painful or otherwise difficult in ordinary physical reality (Pourmand et al., 2018).

Virtual reality has also been shown to benefit children by reducing the fear and anxiety they experience before a procedure. Children tend to be more cooperative when engaged in VR, with less movement, less fear, and lower pain scores. These effects can also last beyond the immediacy of a procedure, which may impact postprocedure behaviors (Stanford Medicine, 2017).

### ***Mirror Therapy***

Mirror therapy is a rehabilitation therapy in which a mirror is placed between the arms or legs so that the image of a moving, nonaffected limb gives the illusion of normal movement in the affected limb. Using this setup, different brain regions for movement, sensation, and pain are stimulated. However, the precise working mechanisms of mirror therapy are still unclear. Mirror therapy has been used to manage phantom leg pain, reduce pain following a stroke, and for patients with a complex regional pain syndrome (Thieme et al., 2018).





Using a mirror, the brain is “tricked” into seeing two limbs. (Source: © Sköld et al., 2011.)

### **Yoga**

Yoga is a mind-body and exercise practice that helps relieve chronic pain. Yoga has many of the same benefits as mindfulness practice due to the common focus on breath, body, and present-moment awareness. There are different types of yoga, with the most evidence of benefit being shown through Iyengar yoga, hatha yoga, and Viniyoga.

It is not fully understood how yoga helps with pain, but emerging evidence suggests it might help people more effectively control how they think and feel, both mentally and physically. It may also work by improving muscle flexibility, promoting relaxation, reducing inflammation, or increasing the release of pain-relieving endorphins.

The effects of yoga have been found roughly equivalent to cognitive behavioral therapy. A meta-analysis of 17 studies concluded that yoga can improve daily function among people with fibromyalgia, migraine, low back pain, and many other types of chronic pain conditions. It is recommended by the American Pain Society for people with low back pain who do not improve with other self-care strategies (Mathersul et al., 2018; DHWA, 2019).

### **Tai Chi and Qigong**

Tai chi and qigong are centuries-old mind-body practices. Within the framework of traditional Chinese medicine, they involve the cultivation of and unhindered flow of energy (chi). Contemporarily, they are considered to be complex interventions integrating concepts of mind and body with physical, emotional, and spiritual aspects.

Tai chi is often referred to as *moving meditation*. It is a series of slow, gentle motions combining mindfulness, breathing, relaxation, range-of-motion exercises, muscle relaxation, balance exercises, and stretching. Tai chi results in similar or greater improvement in symptoms than aerobic exercise for patients with fibromyalgia, and it is



an approach for the prevention, treatment of functional limitation, and pain associated with osteoarthritis and rheumatoid arthritis.

Qigong (also spelled *chi gong*) is often referred to as the “internal” portion of tai chi. It is characterized by stationary movements that are repeated a certain number of times (3, 6, or 9). This repetition stimulates muscle, bone, heart, respiration, and other functions in the body. Traditional qigong theory states that practitioners can focus on a feeling, emotion, part of the body, concept, or goal, and that the energy goes where the mind sends it. Studies have found qigong to result in pain reduction and feelings of improved well-being (Sierpina, 2016; Wang et al., 2018; Sawynok, 2018; NIH, 2016; Holmberg et al., 2016).

## 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.”

### THE JOINT COMMISSION PAIN MANAGEMENT STANDARDS

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. In 2018, TJC implemented new and revised pain assessment and management standards for accredited hospitals. These standards require development of policies and procedures that provide for assessment of pain, treatment or referral for treatment, and reassessment of pain for patients. These policies and procedures state that hospitals:

- Establish a clinical leadership team
- Actively engage medical staff and hospital leadership in improving pain assessment and management, including strategies to decrease opioid use and minimize risks associated with opioid use



- Provide at least one nonpharmacologic pain treatment modality
- Facilitate access to prescription drug monitoring programs
- Improve pain assessment by concentrating more on how pain is affecting patients' physical function
- Engage patients in treatment decisions about their pain management
- Address patient education and engagement, including storage and disposal of opioids to prevent these medications from being stolen or misused by others
- Facilitate referral of patients addicted to opioids to treatment programs (TCJ, 2018)

## THE INTERDISCIPLINARY NATURE OF MANAGING PAIN

The most important member of the interdisciplinary team is the person with pain—the patient. Other team members can include:

- Significant others (family, friends, etc.)
- Physicians, physician assistants, and nurse practitioners
- Nurses
- Psychologists
- Physical therapists
- Occupational therapists
- Recreational therapists
- Vocational counselors
- Pharmacists
- Nutritionists/dietitians
- Social workers
- Support staff
- Volunteers



## 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.

### NURSING STANDARDS OF CARE

Standards of care for nurses in the management of pain include, but are not limited to:

- Acknowledging and accepting the patient's pain
  - Identifying the most likely source of the pain
  - Assessing pain at regular intervals, including each new complaint of pain, utilizing a pain assessment tool
  - Assessing barriers to effective pain management
  - Reporting the patient's level of pain and developing a plan of care that includes interdisciplinary input
  - Aggressively treating side effects such as nausea, vomiting, constipation, etc.
  - Advocating for the patient and family for effective pain management
  - Educating patient, family and significant others on:
    - Their role in pain management plan and expected outcomes
    - Detrimental effects of unrelieved pain
    - Overcoming barriers to effective pain management
- (Kibret, 2019)

### PATIENT EDUCATION AND OPIOID MEDICATIONS

Nurses have an important role to play in educating patients about the proper use of opioid medications. The following information should be included in the education provided to patients who are receiving opioids as well as to their caregivers:

- Never take opioids in greater amounts or more often than prescribed.
- Never sell or share prescription opioids with others.
- Follow instructions for stopping the medication.
- Store prescription opioids in a secure place and out of reach of others.
- Safely dispose of unused prescription opioids:



- Find a community drug take-back program or pharmacy mail-back program.
- When take-back options are not available, dispose by flushing down the toilet or the sink any medications FDA-approved for flushing (see box below)
- 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, 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 effects, which may indicate an impending seizure, immediately to a healthcare provider.
- Because opioids can cause sensorium changes, which increases 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 the healthcare provider.  
(Pearson Education, 2016)

**FDA-APPROVED MEDICATIONS FOR DISPOSAL BY FLUSHING**

- Benzohydrocodone/acetaminophen
- Buprenorphine
- Fentanyl
- Diazepam
- Hydrocodone
- Hydromorphone



- Meperidine
- Methadone
- Methylphenidate
- Morphine
- Oxycodone
- Oxymorphone
- Tapentadol
- Sodium oxybate  
(FDA, 2018b)

### **ANA POSITION STATEMENT ON PAIN MANAGEMENT**

The American Nurses Association Position Statement (2018) on the nurse's role and ethical responsibility in the management of pain states that:

- Nurses have an ethical responsibility to provide clinically excellent care to relieve pain. Clinically excellent pain management considers clinical indications, mutual identification of goals for pain management, and ongoing reassessment with the patient of the effectiveness of pain control efforts.
- Nurses use the nursing process to guide actions to improve pain management and should ensure that each patient experiencing pain has an individualized pain management plan with appropriate monitoring to avoid undertreatment, overtreatment, or addiction.
- Nurses provide respectful, individualized nursing interventions to all patients experiencing pain regardless of the person's personal characteristics, values, or beliefs.
- Nurses consider that multimodal and interprofessional approaches are necessary to achieve effective pain relief.
- Nurses use pain management modalities that are evidence-based. Lack of knowledge and understanding of best practices for assessing and optimally managing pain constrain the nurse's ability to effectively minimize pain.
- Nurses have an obligation to assess and address factors within themselves and their practice environments that constrain ability and willingness to relieve pain and the suffering it causes.
- Nurses advocate for policies to assure access to all effective modalities. Nurses have a duty to advocate for improved parity in coverage for all effective pain relief modalities

[e.g., nurse-authored legislation in Minnesota proposing mandatory insurance coverage for acupuncture (Minnesota Legislature, 2017)].

- Nurses engage in research to:
  - Identify modalities and strategies to prevent, assess and treat pain
  - Minimize disparities in accessing healthcare
  - Promote societal awareness regarding pain as a public health issue
  - Identify effective educational strategies for nurses, healthcare professionals, and the public
  - Explore the cultural meanings of pain
  - Examine the consequences of undertreating pain

#### **PAIN MANAGEMENT GUIDELINES FOR NURSING FACILITIES**

The Centers for Medicare and Medicaid Services guidance under F697, 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. Facilities must ensure that pain management is provided to residents who require such services, and in order to help a resident attain or maintain his or her highest practicable level of well-being and to prevent or manage pain, the facility, to the extent possible:

- Recognizes when the resident is experiencing pain and identifies circumstances when pain can be anticipated
- Evaluates the existing pain and the causes(s)
- Manages or prevents pain consistent with the comprehensive assessment and plan of care, current professional standards of practice, and the resident's goals and preferences.

(CMS, 2017)



## Role of the Occupational Therapist

Occupational therapy is an essential and vital element of any comprehensive pain management plan. Occupational therapy translates medical diagnoses and treatment expectations into the consequences for everyday living. It is a person-centered approach with the primary goal of enabling people to participate in activities of daily living (ADLs). An occupational therapist achieves this by working with patients to enhance their ability to engage in the activities they want, need, or are expected to do by improving their physical capacity or by modifying the activity or the environment.

Occupational therapists are aware of the psychological, behavioral, social, and spiritual components of the pain experience and their relationship to ADLs. They are trained to understand the economic and educational factors, work environments, ethnic and cultural factors, and sex and gender influences involved in the experience of pain and its management. The OT accepts that the attitudes and belief systems of the patient have a strong and powerful impact on self-image and ability to cope.

An occupational therapist will assess the impact of pain on a patient's quality of life and ADLs, including:

- Activity patterns
- Fulfillment of goals
- Changes in routines, habits, roles, and self-image
- Skills the person has related to self-actualization

With the patient, the therapist collaborates in setting goals that take into consideration the patient's self-efficacy and personal autonomy. The patient is assisted in the modification of the physical and psychosocial factors that contribute to the loss of function related to pain and its negative effects on daily living. This may involve the active or passive participation of family members and significant others.

Occupational therapy provides patients with individual or group experiences for pain education and support and teaches skills for navigating the healthcare system. Cognitive-behavioral interventions are incorporated into the patient's occupations and activities as well as distraction, relaxation, visual imagery, and mindfulness-based strategies.

Patient and therapist work together to develop a self-management program that uses occupations and activities that are meaningful to the patient as well as a plan for reintegration into work based on the patient's goals. The patient is taught activity tolerance, energy conservation and pacing, and sleep promotion. Issues involving intimacy and sexuality may also be addressed.

The therapist uses evidence-based pain reduction strategies and modalities relevant to each patient's situation, as well as assistive devices, adaptive equipment, and splinting (Hofmann, 2019; IASP, 2018d).



## GENERAL 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 occupational therapy modalities used to manage pain.
- Teach and assist the patient to incorporate self-management strategies.

### Functional 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, with opportunities to practice and receive feedback.
- 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, which calms the mind and allows the patient to feel in control of his or her body, thereby lowering pain levels.
- Teach communication skills to assist clients in managing their disability and to experience less conflict and frustration.
- Teach proactive problem-solving techniques to help plan for future challenges and problems.
- Provide training in self-pacing of activities, such as taking breaks, changing the way an activity is done, or asking for help, to avoid increasing pain levels.
- Introduce adaptive equipment (e.g., button hooks for dressing) to help maintain independence.

### Home Program

- Assist the patient to actively maintain a healthy lifestyle, including a home exercise program specifically tailored to the patient and involving physical movement, daily relaxation or meditation practice, and proactive use of pain control.



- 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.  
(AOTA, 2019)

### CHRONIC PAIN MANAGEMENT STRATEGIES

Strategies for management of chronic pain may include pain-cycle education, pacing, and pain-flare planning.

- **Pain-cycle education** includes clarification of the relationships between physical pain, functional limitation, and emotional distress. Therapists provide patients with strategies to gain control over the pain and to focus on what they can do, not on the pain.
- **Pacing** includes learning to pace the performance of activities in accordance with tolerance, rather than time. Because most people expect to complete tasks efficiently in a short period of time, learning to pace activities can be difficult, requiring encouragement and education about grading strategies.
- **Pain flares** may occur for several reasons, including an increase in activity or overexertion. Patients are taught to plan for them so that stress is reduced, enabling them to gain control over such flares.  
(Driscoll & Baker, 2016)

### MODALITIES

Modalities occupational therapists may employ in pain management include:

- Physical agents:
  - Superficial thermal modalities
  - Deep thermal modalities
  - Electrotherapeutic modalities
- 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  
(AOTA, 2018)

## PRINCIPLES FOR OCCUPATIONAL THERAPISTS

The International Association for the Study of Pain 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.
4. The impact of pain on daily life needs to be considered in terms not only of physical limitations but also emotional and social influences on health and patient-defined well-being.
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/sociopolitical/environmental) that contribute to acute (or potential) challenges in the individual's everyday life.
6. Cultural aspects relevant to pain expression and the pain experience need to be considered with all patients.
7. Self-management strategies need to focus on scheduling and adapting activities so that the person's energy is maintained and pain is minimized.
8. 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.
9. Occupational therapy assessment and management must be based on best available research evidence.
10. Prevention and intervention need to be addressed at both micro (individual) and macro (sociopolitical) levels.  
(IASP, 2018b)



## Role of the Physical Therapist

Physical therapy is one of the most important nonpharmacologic measures to be considered in the management of pain. In 2016, the CDC indicated in its guidelines for prescribing opioids for chronic pain that nonpharmacologic therapy and nonopioid pharmacologic therapies are preferred for chronic pain, and that treatments provided by physical therapists are especially effective in reducing pain and improving function in cases of low back pain, fibromyalgia, and hip and knee osteoarthritis.

Additionally, studies have shown physical therapy interventions to be effective in preventing, minimizing, and in some cases, eliminating pain in postsurgical patients and in patients with cancer. Research also validates that early access to physical therapy can prevent acute pain from becoming chronic pain (APTA, 2016).

The goals of physical therapy include the reduction of pain, restoration of function, improved mobility, prevention or limitation of permanent physical disabilities, and encouragement of self-management through the use of physical, cognitive, and behavioral approaches to help reduce the impact of pain and disability.

### INTERVENTIONS

When physical therapists work with patients who are experiencing pain, tests and measures are utilized to determine the causes of pain and to assess its intensity, quality, physical characteristics, and progression. Patients are also evaluated for risk factors for pain in order to prevent future pain issues. These factors may include disease history, cognitive and psychological factors, negative beliefs, and sedentary lifestyle.

Once contributors to the pain are identified, the therapist works with the patient to design an evidence-based management program with goals that are specific, measurable, achievable, relevant, and time-framed.

The physical therapist then implements the management program, which includes active approaches and passive approaches as indicated. These approaches include:

- Education about pain and how to manage pain, working with the patient toward regaining the ability to perform normal activities of daily living.
- Strengthening and flexibility exercises to improve movement with less pain. A graded exercise program may be instituted that gradually increases according to abilities. Exercises help to 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.
- Physical agents and electrotherapies.

The therapist educates and supports the patient to adopt active rather than solely passive pain-management strategies that are meaningful to the patient and achievable, using motivational strategies and adherence techniques to support compliance.

Physical therapists include cognitive and behavioral approaches that support improved functional movement and pain outcomes, along with self-management strategies as a key component of the management plan (IASP, 2018c).

## MODALITIES

Modalities physical therapists may employ in pain management include:

- **Thermotherapy**
  - Dry heat
  - Hot packs
  - Paraffin baths
- **Manual therapies**
  - Massage
    - Connective tissue massage
    - Therapeutic massage
  - Manipulation/mobilization
    - Dry needling
    - Soft tissue mobilization
    - Spinal and peripheral joints
    - Neural tissue mobilization
  - Passive range of motion
- **Electric stimulation**
  - Electric stimulation for tissue repair (ESTR)
  - Functional electrical stimulation (FES)
  - High-voltage pulsed current (HVPC)
  - Neuromuscular electrical stimulation (NMES)
  - Transcutaneous electrical nerve stimulation (TENS)



- Electrotherapeutic delivery of medications
    - Iontophoresis
  - Hydrotherapy
    - Contrast bath
    - Pools
    - Pulsatile lavage
    - Whirlpool tanks
  - Acoustic
    - Ultrasound
    - Phonophoresis
  - Traction devices
    - Intermittent
    - Positional
    - Sustained
  - Light therapy
    - Laser
    - Ultraviolet
    - Infrared and near infrared
    - Cold laser therapy
- (APTA, 2019b)

## PRINCIPLES FOR PHYSICAL THERAPISTS

The International Association for the Study of Pain identifies the following principles to guide physical therapists in the management of pain. These principles include:

1. Pain is a dynamic and complex experience involving interaction of biological, physical, psychological, social, and environmental factors specific to each individual.
2. Pain may be acute, acute on chronic, recurrent, chronic/persistent, and occur at any stage across the lifespan.
3. Pain assessment, treatment, and management are influenced by cultural, institutional, social, and regulatory factors.



4. Pain must be assessed in a comprehensive, safe, ethical, and consistent manner using valid and reliable assessment tools and outcome measures that help inform prognosis-making with consideration of risks, benefits, costs, and limitations of interventions.
5. Physical therapists should demonstrate empathic and compassionate patient communication when establishing person-centered pain-related goals and supporting self-management strategies.
6. Comprehensive pain management should be supported by sound theoretical models and empirical evidence and facilitate active patient involvement in developing lifelong healthy pain behaviors.
7. The physical therapist is an essential member of the pain-management team and advocates for an individualized pain-management plan that integrates the perspectives of patients, social support systems, and team members.  
(IASP, 2018c)

## 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 model 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 physical therapy appointments 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.

## 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 abuse and overdose while continuing to ensure people with pain receive safe, effective treatment.

## Scope of the Problem

The National Institutes of Health reports that more than 130 people in the United States die every day after overdosing on opioids. The misuse of and addiction to opioids—including prescription pain relievers, heroin, and synthetic opioids such as fentanyl—is a serious national crisis that affects public health as well as social and economic welfare.

- Approximately 21% to 29% of patients who have been prescribed opioids for chronic pain misuse them.
- Between 9% and 23% of those who have been prescribed opioids for pain develop an opioid use disorder.
- An estimated 4% to 6% who misuse prescription opioids transition to heroin.
- About 80% of people who use heroin first misused prescription opioids.

The reasons for the high prevalence vary by age, gender, and other factors, but likely include ease of access. Other contributors to the problem include misinformation about the addictive properties of prescription opioids and the perception that prescription drugs are less harmful than illicit drugs (NIH, 2018e, 2019c).

Drug diversion can be defined as any act or deviation that removes a prescription drug from its intended path from the manufacturer to the patient and can occur anywhere along the continuum: manufacturer, wholesale distributor, retail pharmacy, hospitals and other healthcare organizations, prescribers, healthcare professionals who administer the medication, or the patient for whom the medication is prescribed (Bostic, 2018).

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

The CDC offers the following guidelines for prescribing opioids in the treatment of pain for patients 18 years and older in primary care settings:

- Recognize that opioids are not first-line or routine therapy for chronic pain.
- Establish and measure goals for pain and function.



- Discuss the benefits and risks, as well the availability of nonopioid therapies with the patient.
- Use immediate-release opioids when starting.
- Start at the lowest possible dose and increase slowly.
- When opioids are needed for acute pain, prescribe no more than needed.
- Do not prescribe extended-release or long-acting opioids for acute pain.
- Follow-up and re-evaluate risk of harm; reduce dose, taper, and discontinue, if necessary.
- Evaluate risk factors for opioid-related harms.
- Check the state prescription drug monitoring program for high dosages and prescriptions from other providers.
- Use urine drug testing to identify prescribed substances and undisclosed use.
- Avoid concurrent benzodiazepine and opioid prescribing.
- Arrange treatment for opioid use disorder if needed.  
(CDC, 2017)

## Legislative Efforts

Legislation limiting opioid prescriptions began early in 2016, and by October of 2018, 33 states had enacted legislation with some type of limit, guidance, or requirement related to opioid prescribing.

Most legislation limits first-time opioid prescriptions to a certain number of days' supply, and in a few cases, states also set dosage limits. Nearly half the states with limits specify that they apply to treating acute pain, and most states set exceptions for chronic pain treatment.

In addition to exceptions for chronic pain, most laws also exempt treatment for cancer and palliative care from prescription limits. Many also allow exceptions for the treatment of substance use disorder or medication-assisted treatment, or for the professional judgment of the clinician prescribing the opioid. Many laws stipulate that any exceptions must be documented in the patient's medical record (NCSL, 2018).

Passed by Congress in 1971 in response to the growing misuse and abuse of drugs in the 1960s, the Comprehensive Drug Abuse, Prevention, and Control Act 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.



<b>CONTROLLED SUBSTANCES AND DISPENSING RESTRICTIONS</b>		
<b>Category/Schedule and Abuse Potential</b>	<b>Dispensing Restrictions</b>	<b>Examples</b>
<b>C-I</b> High, possible severe psychological and physical dependency; no approved medical use	Only with approved protocol	Heroin, marijuana, LSD, mescaline, peyote, psilocybin, methaqualone
<b>C-II</b> 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, morphine, codeine
<b>C-III</b> 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
<b>C-IV</b> 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
<b>C-V</b> 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: USDEA, 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 FDA. Abuse-deterrent drugs have been shown to meaningfully discourage use and deter abuse. However, these medications do not obstruct the use of opioids and 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.

Opioids with FDA-approved labeling describing abuse-deterrent properties include:

- Oxycontin
- Targiniq ER
- Embeda
- Hysingla ER
- MorphBond ER
- Xtampza ER
- Arymo ER
- RoyBond

There are no generic opioids with FDA-approved abuse-deterrent labeling (FDA, 2018c).

## Clinician Efforts to Reduce Opioid Abuse

Clinicians have an important role to play in the detection and prevention of prescription drug misuse and abuse. It is critical that prescribers employ risk-reduction strategies when prescribing opioid medications. Before prescribing opioids, clinicians should become familiar with the CDC guidelines for prescribing opioids for chronic pain and utilize the prescription monitoring program to check for frequent or overlapping narcotic prescriptions. These programs are often state-run databases that collect pharmacy data on controlled substances that are dispensed.

There are a number of validated **screening tools** available for use to aid clinicians in early detection of problematic substance use. The Screener and Opioid Assessment for Patients with



Pain (SOAPP-R) is one of several such tools used for screening, brief intervention, and referral to treatment.

An **informed consent** should be considered for patients who are beginning long-term therapy with opioid analgesics to help ensure they understand the side effects, risks, conditions, and purpose of their treatment. This document can clearly define treatment expectations and resolve any questions or concerns patients may have before treatment is initiated.

Clinicians **monitor patients** taking opioids for behaviors that may indicate prescription medication abuse or addiction and behaviors that may appear aberrant but are likely to be part of the normal process of stabilizing a patient's pain condition. Such behaviors may include demanding more medication, increasing medication dosing without instructions to do so from the provider, and reluctance to decrease opioid dosing once stable.

Patients receiving long-term opioid therapy are monitored for the three components of addiction:

- Loss of control
- Craving and preoccupation with use
- Use despite negative consequence

Clinicians must be aware of **indications of opioid use disorder**, which include:

- Inconsistent healthcare use patterns
- Missed appointments
- Lack of engagement with nonmedication treatments
- Lack of follow-through with recommendations
- Illicit drug use
- Problematic medication (e.g., escalating doses, early refills)
- Family concerns about use
- Decreased function and loss of roles
- Extreme difficulty with even a slow opioid taper
- Signs/symptoms of drug use (e.g., intoxication, overdose, track marks)

Should the clinician determine substance use disorder may exist, the patient is provided with information about local inpatient detoxification services, methadone maintenance programs, or buprenorphine treatment.

It is important that clinicians recognize when to taper and/or transition a patient off of opioid-based medications and document why opioid treatment can no longer be prescribed (NIH, 2019d; Schepis, 2018; Weimer, 2017).



## 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 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, undertreatment of pain, tolerance to the medication, or unrecognized addiction. Only a small number of drug seekers do so to divert opioids for illicit sale.

There are some common characteristics that can provide clues regarding the nature of a patient's intent. The patient who is drug seeking may:

- Have seen many doctors in a short period of time
- Present with specific complaints that are often subjective (back pain, headache)
- Bring old medical records they have been carrying around to many different doctors to get a pain prescription
- Use multiple pharmacies
- Claim an allergy to all pain medications except the one they are seeking as well as do diagnostic test contrast medium to avoid tests
- Suggest the medication, dose, and quantity being sought
- Claim extraordinarily rapid relief from injectable medications and instruct staff where to place injections
- Be unwilling to consider any other treatments and does not want to listen to anything the clinician has to say
- Call or show up requesting a prescription at off hours, when the office is closing or right before the weekend/holiday when it is less likely their usual care provider(s) can be reached
- Lie or their story does not make sense (it is imperative to take a detailed history to look for inconsistencies in a made-up story)
- Exaggerate symptoms, with inconsistent behavior from waiting room to treatment room
- Become aggressive when different medications are suggested
- Give false information, such as a fake address or a disconnected phone number
- Be on multiple controlled substances, such as opioids and benzodiazepines



- Be excessively talkative, friendly, or helpful

However, drug-seeking patients with addictions are not the only ones who may engage in these behaviors. Over time, patients with true chronic pain can elicit some of these same behaviors (Girgis, 2017; Jakucs, 2018).

## ADDRESSING DRUG-SEEKING BEHAVIORS

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

- Involve the entire team when evaluating a patient, noting any inconsistencies or suspicious actions.
- Look for consistency throughout the physical examination: posture, point tenderness, percussion tenderness, passive range of motion, as well as active resistance. All findings should tell the same story.
- 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 ID or other ID and Social Security number and place a photocopy 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 re-evaluation 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; Jakucs, 2018)



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 clinician should consider involving psychiatric support, social service assistance, facility security, and in some instances, local law enforcement.

### **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

## **Drug Diversion and Addiction among Healthcare Professionals**

Because healthcare professionals are trusted with our well-being, they are not often suspected of drug addiction; however, they are just as likely as anyone else to become addicted and are at a higher risk for addictive behaviors involving opioids because of their increased access to them.

### **ADDRESSING DRUG DIVERSION IN HEALTHCARE WORKERS**

It is a legal and ethical responsibility for healthcare professionals to uphold the law and to help protect society from drug abuse, and it is a professional responsibility to prescribe and dispense controlled substances appropriately, guarding against abuse while ensuring that patients have medication available when it is needed. Each healthcare professional also has a personal responsibility to protect their practice from becoming an easy target for drug diversion and must be aware of the potential situations where it can occur and the safeguards that can be utilized to prevent such diversion.

Healthcare professionals often avoid dealing with drug impairment in their colleagues. It is natural to be reluctant about approaching such colleagues for fear of their anger since it may result in retribution. Another concern is fear for the colleague's loss of professional practice. As



a result, employers or coworkers can become enablers of those colleagues whose professional competence is being impaired by drug abuse, and thereby are being protected from the consequences of their behavior. Some **enabling behaviors** include:

- Ignoring poor performance
- Lightening or changing the colleague's patient assignment
- Accepting excuses
- Allowing oneself to be manipulated
- Being fearful of confronting a colleague if patient safety is in jeopardy

When the signs and symptoms of drug abuse are evident in a colleague, it is time to become concerned and involved, taking the following steps:

- Check the agency's written drug and alcohol policy and follow recommendations.
- Document suspicions regarding the colleague, including any complaints, concerns, behavior patterns, or witnesses to behaviors.
- Bring concerns to management.

If it is known that drugs are being sold or stolen, it is important not to intervene alone and to contact security or notify the police. If a DEA registrant becomes aware of a theft or significant loss involving controlled substances, it must also immediately be reported to the nearest DEA office, the healthcare worker's state licensing board, as well as the local police department (USDEA, 2019).

## INDICATORS OF DRUG ADDICTION

The following signs and symptoms may indicate a drug-related problem in a healthcare professional:

- Recurring absences or tardiness
- Frequent disappearances from the work site, such as long trips to the bathroom or stockroom where drugs are kept
- Excessive amounts of time spent near a drug supply
- Volunteering for overtime and being at work when not scheduled to be there
- Unreliability in keeping appointments and meeting deadlines
- Work performance that alternates between high and low productivity
- Mistakes made due to inattention, poor judgment, and bad decisions
- Confusion, memory loss, and difficulty concentrating or recalling details and instructions



- Ordinary tasks requiring greater effort and consuming more time
- Deterioration in interpersonal relations with colleagues, staff, and patients
- Rarely admitting errors or accepting blame for errors or oversights
- Sloppy recordkeeping, suspect ledger entries, and drug shortages
- Inappropriate prescriptions for large narcotic doses
- Insistence on personally administering injectable narcotics to patients
- Progressive deterioration in personal appearance and hygiene
- Uncharacteristic deterioration of handwriting and charting
- Wearing long sleeves when inappropriate
- Personality changes, mood swings, anxiety, depression, lack of impulse control
- Suicidal thoughts or gestures
- Patient and staff complaints about healthcare provider's changing attitude/behavior
- Increasing personal and professional isolation  
(USDEA, 2019)

### **RED FLAGS FOR DRUG DIVERSION**

#### **Prescribers**

- Cash-only patients and/or no acceptance of worker's compensation or private insurance
- Prescribing of the same combination of highly abused drugs
- Prescribing the same, typically high, quantities of pain drugs to most or every patient
- High number of prescriptions issued per day
- Out-of-area patient population

#### **Dispensers**

- Dispensing a high percentage of controlled to noncontrolled drugs
- Dispensing high volumes of controlled substances generally
- Dispensing the same drugs and quantities prescribed by the same prescriber
- Dispensing to out-of-area or out-of-state patients
- Dispensing to multiple patients with the same last name or address



- Sequential prescription numbers for highly diverted drugs from the same prescriber
- Dispensing for patients of controlled substances from multiple practitioners
- Dispensing for patients seeking early prescription refills  
(WVEPMP, 2019)

## 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 two to three 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

When offering pain management to an individual with substance use disorder, following several general principles leads to improved treatment.

- Create a supportive, nonjudgmental environment; listen to and engage the patient with the awareness that:



- The patient's past experiences can shape treatment choices.
- Perceptions and expectations of treatment efficacy can impact treatment outcomes.
- The patient's investment in a treatment plan facilitates cooperation.
- Engagement in self-management is critical to chronic pain treatment.
- Treat pain safely and effectively by:
  - Resolving or reducing underlying causes of pain whenever possible
  - Providing appropriate pain relief using nonmedication approaches when effective, easily available, and acceptable to the patient
  - Providing less-rewarding medications when safe and effective
  - Using potentially rewarding medications when needed with appropriate limitation on use
  - Changing from parenteral to oral formulations of opioids as soon as possible
  - Planning treatment when pain is anticipated (e.g., for elective procedures or surgery)
- Address pain facilitators common in those with acute or chronic pain, including:
  - Anxiety
  - Posttraumatic stress disorder
  - Sleep disturbance
  - Substance withdrawal
  - Depression
  - Functional losses
- Address opioid use disorder with the patient by:
  - Acknowledging the challenge
  - Assuring that it is not an obstacle to working for analgesia
  - Encouraging and supporting recovery by:
    - Discussing what has been valuable in the past for the patient
    - Identifying or intensifying psychosocial support, which may include counselors, self-help groups, a sponsor, or faith-based interventions
  - Continuing to offer pharmacologic support such as methadone or buprenorphine
  - Assuring safety by providing limited access to opioids, if prescribed
- Treat withdrawal as appropriate, recognizing that if withdrawal is not treated safely and effectively, pain will not be treated.



- Anticipate opioid tolerance in opioid-dependent individuals.  
(Weimer, 2017; Quinlan & Cox, 2017)

### THE NEUROBIOLOGY OF PAIN AND ADDICTION

A body of evidence suggests that there is a substantial overlap between brain regions that are engaged by ongoing pain and addictive analgesic drugs. Research has found that both pain and substance use disorders activate the same neurobiological pathways in the brain. Both substance use disorder and pain relief-seeking behaviors activate and overstress the reward system. Both types of stimuli are associated with massive dopaminergic surges in reward, motivation, and learning centers. In both substance use disorder and pain, when the reward system is over-activated, anti-reward neurotransmitters in the limbic system are enhanced, causing stress, negative affect, and impulsivity, inducing compulsive behaviors to alleviate the discomfort.

Because pain and addiction may share a common neurological foundation, if the effects of pain and addictive drugs tend to sensitize over time, then cross-sensitization may occur as well. If this happens, exposure to addictive drugs could increase susceptibility to the development of pain and vice versa. The addicted brain may amplify pain to justify a substance it craves, and intoxication and withdrawal can physiologically drive pain through sympathetic and psychomotor activation.

(Elman & Borsook, 2016; Weimer, 2017)

### ASSESSING RISK FOR DEVELOPING SUBSTANCE USE DISORDERS

Before introducing any opioids into a patient's treatment regimen, an assessment is done to determine the patient's risk for developing a substance abuse disorder (SUD).

**Screening tools** available to clinicians include:

- Opioid Risk Tool (ORT)
- Drug Abuse Screen Test (DAST-10 and DAST-20 for adolescents)
- Screener and Opioid Assessment for Patient with Pain-Revised (SOAPP-R)

These tools, however, commonly result in inaccurate findings and misinterpretations. For instance, since screening tools often rely on a patient's self-report, a patient may falsify responses on questionnaires to avoid detection as a high-risk patient.

Other recommendations include **drug testing**, primarily urine screening. Drug testing offers a critical adjunct to clinical assessment of SUD risk. However, due to the ease with which samples can be adulterated, providers must carefully review their collection protocols and sample validation procedures to ensure optimal accuracy, which may require observed collection (NIH, 2018f; Hadland & Levy, 2017).



## UNIVERSAL PRECAUTIONS IN PAIN MEDICINE

The following “10-step universal precautions” are recommended as a guide for all healthcare professionals who prescribe Schedule (Class) II medications for the treatment of chronic medical problems, including pain. Application of the recommendations can improve patient care and reduce stigma and overall risk.

1. **Make a diagnosis with appropriate differential** of treatable causes for pain, addressing comorbid conditions, including substance use disorders and psychiatric illnesses.
2. **Assess psychological status**, inquiring into the history of personal and family substance misuse. Urine drug testing should be discussed with all patients regardless of medications they are currently taking. Those who refuse drug testing should be considered unsuitable for pain management with a controlled substance. Patients found to be using illicit or unprescribed licit drugs should be offered further assessment.
3. **Obtain informed consent**, discussing the proposed treatment plan with the patient and 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, which will help clarify set boundary limits making possible early identification and intervention around aberrant behaviors.
5. **Pre- or post-intervention assessment** of pain level and function before and after medication trial to assess success. Ongoing assessment supports continuation of any mode of therapy. Failure to meet goals will necessitate reevaluation and possible change in the treatment plan.
6. **Appropriate trial of opioid therapy with or without adjunctive medications.** 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 pain medicine** (analgesia, activity, adverse effects, and aberrant behaviors) as well as the patient’s emotional expression.
9. **Periodically review** pain diagnosis and comorbid conditions, including substance use disorder, as underlying illnesses evolve, as treatment focus may need to change over time.
10. **Document** carefully records of the initial evaluation and each follow-up to reduce medico-legal exposure and risk of regulatory sanction.

(Gourlay & Heit, 2019)



## TREATING PAIN IN PALLIATIVE CARE AND END-OF-LIFE CARE

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 inpatient 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.

As life expectancy increases because of advances in medicine and technology, there are more people expected to live 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, since patients consider unrelieved pain an important factor eroding dignity at the end of life.

A study of patients enrolled in hospice found the prevalence of pain was close to 60%, with one third of all of the patients in the study rating their pain as moderate or severe. In cancer patients who can no longer benefit from curative or palliative chemotherapy, the prevalence of pain increased to 75%. Interviews with family members or friends of patients who had died indicated that more than 25% of patients experienced an unmet need for pain management. Management of pain and other symptoms has been identified as one of the essential end-of-life care domains (Coyne et al., 2018).

Clinicians should assess pain frequently to avoid undertreatment and should maintain a low threshold for the conclusion that pain exists. Undertreatment of pain is more common for patients unable to speak for themselves. These include infants, children, and those who are developmentally or cognitively impaired. Other groups at risk for undertreatment are older adults, those with a past history of substance use disorder, those with limited social and economic resources, and those who do not speak the same language as their caregivers.

### **Pharmacologic Pain Management**

Pharmacology is the primary approach for pain management at the end of life, with opioid analgesics as the main treatment for moderate to severe pain. Large surveys have found that opioids can provide adequate relief to over three quarters of patients with cancer pain when administered optimally. For patients with advanced illness, chronic pain has been found to be best treated using morphine, fentanyl, oxycodone, hydromorphone, oxymorphone, and methadone.

Drug selection is based on the clinician's judgment and factors such as the availability of a parenteral formulation. Clinicians may switch from one drug to another ("opioid rotation") to manage the pain of a patient who is not responding well to a particular opioid regimen. Guidelines for opioid therapy often focus on selecting the route of administration, dosing, drug rotation, and treatment of expected side effects (Broglio & Portenoy, 2018).



When considering analgesic therapy for pain, goals that are normally considered important, such as the desire to be alert or to ambulate, may change in the context of an advanced illness. The clinician must explore the willingness of the patient for tolerance to side effects or function reduction in order to achieve pain relief (Broglia & Portenoy, 2018).

## **Palliative Sedation**

In most patients, pain can be effectively and adequately relieved with opioids, but for some patients with advanced illness who have refractory pain, palliative sedation may be offered. Palliative sedation is a therapeutic intervention defined as the intentional use of sedating medication (typically a short-acting benzodiazepine) to reduce consciousness with the goal of eliminating suffering. It is a last resort aimed at inducing a state of decreased or absent awareness.

Palliative sedation may be utilized in both adults and children with terminal illness. It is most commonly used in the treatment of refractory pain, severe terminal dyspnea, agitated delirium, and convulsions.

When considering palliative sedation, the care team should also recognize the potential for family and staff distress. This is particularly true if there is concern regarding the effects and ethics of palliative sedation, disagreement regarding the treatment plan among providers, and in situations where the process is prolonged. All participating staff members must understand the rationale for sedation and the goals of care (Cherny, 2017).

Family members must be informed that uncontrolled suffering at the end of life is a critical situation and that palliative sedation constitutes a proportionate and effective response that is within accepted medical guidelines. This form of care, following informed consent by the patient or surrogate, or by advance directives, poses no ethical problems (Cherny, 2017).

## **Barriers to Effective Pain Treatment at End of Life**

Although clinicians have an ethical obligation to reduce pain and suffering, barriers remain regarding appropriate and adequate pain in palliative and end-of-life care. Such barriers may include:

### **Patient and family issues:**

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



**Clinician issues:**

- Lack of knowledge, skills, and time for adequate pain and symptom assessment
- Not utilizing an assessment scale for the special needs of each patient
- Lack of understanding about the global nature of pain (e.g., psychological, social, spiritual, and cultural aspects)
- Denial of the presence of pain
- Fear of doing harm or causing adverse effects, including tolerance to opioid effectiveness
- Fear of the patient becoming addicted
- Concerns about diversion or misuse of drugs by other than the patient
- Failure to include effective nonpharmacologic measures
- Fear of legal issues
- Prescriber hubris when choosing not to request assistance from pain or palliative care specialists

**Healthcare system issues:**

- Restrictive formularies, limited access to opioids, or cost prohibitions that prevent appropriate treatment
- Limited insurance coverage for many effective nonpharmacologic treatments
- Lack of availability of adequate pain education and resources for challenging pain cases (Coyne et al., 2018)

**CLINICIAN MISCONCEPTIONS ABOUT OPIOID USE AT END OF LIFE**

One of the greatest barriers to adequate pain management 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. The concerns of clinicians are often based on misconceptions about opioid use:

- 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
- That alleviating pain to the degree of unconsciousness is legally prohibited
- That death will be hastened by administering opioids



Studies have found no evidence that initiation of treatment or increases in dose of opioids or sedatives is associated with precipitation of death. Instead, effective pain and symptom management at the end of life increases quality of life and may prolong life rather than accelerate death. The small risk of respiratory depression that opioids carry when used appropriately does not justify withholding their use in treatment of pain and other intractable symptoms at the end of life (Jackson & Nabat, 2017).

## ETHICAL CONCERNS IN ASSESSING AND TREATING PAIN

There is a universal agreement that patients have a right to adequate pain management and clinicians have a duty to provide it. There is evidence, however, that patients often experience uncontrolled and unnecessary pain. Results from studies on untreated and undertreated pain have found that:

- 80% of surgical patients experience acute postoperative pain reported to be moderate, severe, or extreme.
  - Among nursing home residents who experience pain daily, as many as 25% receive no intervention for pain relief.
  - At the end of life, nearly 1 of 2 patients with cancer pain is undertreated.
  - There is disparity in adequate treatment, with odds of undertreatment in a minority patient being twice as high.
  - Fear of unrelieved pain at the end of life is believed to be a driving force for public support of euthanasia or physician-assisted suicide.
- (Carvalho et al., 2018)

### Ethical Principles and Pain Management

Adherence to ethical principles by clinicians is critical in effectively managing pain.

**Autonomy** is the individual's right to make healthcare decisions based on their own beliefs and values, even if a clinician disagrees. If a patient chooses not to receive a treatment that could potentially provide a benefit, the healthcare provider must respect that choice. 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 that a practitioner may make an assumption that the person is incompetent.

**Beneficence** is the act a provider takes that benefits the patient, minimizes harm, and promotes the good. 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. This principle is likely the most difficult to uphold.

**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).

## Ethical Dilemmas in Pain Management

An ethical dilemma requires a choice between conflicting alternatives, each of which is based on an ethical principle. For example, clinicians may be faced with an ethical dilemma when there is no advance directive and families or other surrogates refuse to consent to pain medications for the patient or insist on lower doses than medically appropriate despite obvious signs of pain in the patient.

In such an instance, without the explicit direction from the patient, an ethical assumption must be made that the patient would want relief from pain and suffering. The provision of pain medication is assumed as part of basic care for the patient in accordance with the principle of nonmaleficence (Horner, 2016).

### 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 extended family, and about 40 people arrived to support the family and to perform their culture's "soul calling" ceremony. Extended 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 ethical 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.

## 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>

Guidelines on the pharmacological treatment of persisting pain in children with medical illnesses (WHO)  
[http://apps.who.int/iris/bitstream/handle/10665/44540/9789241548120\\_Guidelines.pdf](http://apps.who.int/iris/bitstream/handle/10665/44540/9789241548120_Guidelines.pdf)

National Institutes of Health Pain Consortium  
<http://www.painconsortium.nih.gov>



## REFERENCES

- Abdallah C & Geha P. (2017). Chronic pain and chronic stress: two sides of the same coin? *Chronic Stress*.  
<https://doi.org/10.1177/2470547017704763>
- Adams J. (2016). Medical risk management advisor. Retrieved from  
<https://www.proassurance.com/newsletter/default.aspx?f=a&k=49>
- Agranoff A. (2019). Electrodiagnosis. *Medscape*. Retrieved from <https://emedicine.medscape.com/article/307096-overview>
- Ahn A. (2019). Acupuncture. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/acupuncture>
- Alford D, Webster L, & Weimer M. (2017). Opioid pharmacology and dosing management. Retrieved from  
<https://pcssnow.org/?s=Opiod+Pharmacology+amd+Dosing+Management>
- American Academy of Pediatrics (AAP). (2019). Alternate routes of drug administration—advantages and disadvantages (subject review). Retrieved from <https://pediatrics.aappublications.org/content/100/1/143>
- American Academy of Physical Medicine and Rehabilitation (AAPM&R). (2019). Therapeutic modalities. Retrieved from <https://now.aapmr.org/therapeutic-modalities/>
- American Massage Therapy Association (AMTA). (2018). Types of massage. Retrieved from  
[https://www.amtamassage.org/findamassage/massage\\_type.html](https://www.amtamassage.org/findamassage/massage_type.html)
- American Nurses Association (ANA), Center for Ethics and Human Rights. (2018). The ethical responsibility to manage pain and the suffering it causes. Retrieved from  
<https://www.nursingworld.org/~495e9b/globalassets/docs/ana/ethics/theethicalresponsibilitytomanagepainandthesufferingitcauses2018.pdf>
- American Occupational Therapy Association (AOTA). (2019). Occupational therapy and pain rehabilitation. Retrieved from <https://www.aota.org/About-Occupational-Therapy/Professionals/HW/Pain%20Rehabilitation.aspx>
- American Occupational Therapy Association (AOTA). (2018). Physical agent modalities. *Physical Therapy in Sport*, 13(3), 180–8. <https://doi.org/10.1016/j.ptsp.2011.11.003>
- American Occupational Therapy Association (AOTA). (2015). Standards of practice for occupational therapy. *Am J Occup Ther*, 69(Suppl 3), 1–6. doi:10.5014/ajot.2015.696S06
- American Physical Therapy Association (APTA). (2019a). Dry needling by a physical therapist: what you should know. Retrieved from <https://www.moveforwardpt.com/resources/detail/dry-needling-by-physical-therapist-what-you-should-know>
- American Physical Therapy Association (APTA). (2019b). Guide to physical therapist practice 3.0., chap. 3: what types of interventions do physical therapists provide? Retrieved from  
[http://guidetoptpractice.apta.org/site/misc/guide\\_chapter\\_3\\_interventions.pdf](http://guidetoptpractice.apta.org/site/misc/guide_chapter_3_interventions.pdf)
- American Physical Therapy Association (APTA). (2018a). Core documents: criteria for standards of practice for physical therapy. Retrieved from <http://www.apta.org/Policies/CoreDocuments/>
- American Physical Therapy Association (APTA). (2018b). Manipulation/mobilization. Retrieved from  
<https://www.apta.org/StateIssues/Manipulation/>



- American Physical Therapy Association (APTA). (2016). CDC: physical therapy, other non-drug, non-opioid approaches should be first-line treatment for chronic pain. Retrieved from [https://www.apta.org/PTinMotion/News/CDC\\_2016/3/16/CDCFinalOpioidGuidelines/](https://www.apta.org/PTinMotion/News/CDC_2016/3/16/CDCFinalOpioidGuidelines/)
- American Society for Pain Management Nursing (ASPMN). (2018). *Core curriculum for pain management nursing* (3rd ed.). Philadelphia: Elsevier.
- Americans for Safe Access (ASA). (2019). Federal marijuana law. Retrieved from [https://www.safeaccessnow.org/federal\\_marijuana\\_law0.cv%20vvvz](https://www.safeaccessnow.org/federal_marijuana_law0.cv%20vvvz)
- Anand K. (2018). Assessment of neonatal pain. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/assessment-of-neonatal-pain>
- Ballantyne J, Fishman S, & Rathmell J (Eds.). (2019). *Bonica's management of pain* (5th ed.). Philadelphia: Wolters Kluwer.
- Banozic A, Miljkovic A, Bras M, Puljak L, Kolcic I, et al. (2018). Neuroticism and pain catastrophizing aggravate response to pain in healthy adults: an experimental study. *Korean J Pain*, 31(1), 16–26. doi:10.3344/kjp.2018.31.1.16
- Barbee J, Savoie M, Kew C, & Smith A. (2018). Neuropathic pain: a glimpse inside the unabating affliction. *Pharmacy Times*. Retrieved from <https://www.pharmacytimes.com/publications/health-system-edition/2018/march2018/neuropathic-pain-a-glimpse-inside-the-unabating-affliction>
- Birnie K, Chambers C, & Spellman C. (2017). Mechanisms of distraction in acute pain perception and modulation. *Pain*, 158(6), 1012–3.
- Bostic L. (2018). Prescription drug abuse. *Wild Iris Medical Education*. Retrieved from <https://wildirismedicaleducation.com/courses/prescription-drug-abuse-nursing-ceu>
- Bourne D. (2014). PHAR 7633, chapter 7, routes of drug administration. Retrieved from <https://www.boomer.org/c/p4/c07/c07.pdf>
- Broglio K & Portenoy R. (2018). Pain assessment and management in the last weeks of life. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/pain-assessment-and-management-in-the-last-weeks-of-life>
- Burnett M & Reiman A. (2014). How did marijuana become illegal in the first place? Retrieved from <http://www.drugpolicy.org/blog/how-did-marijuana-become-illegal-first-place>
- Carvalho A, Pereira S, Jácomo A, Magalhães S, et al. (2018). Ethical decision-making in pain management: a conceptual framework. *J Pain Res*, 11, 967–76. doi:10.2147/JPR.S162926
- Center for Medicare and Medicaid Services (CMS). (2017). CMS state operations manual. Retrieved from [https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap\\_pp\\_guidelines\\_tcf.pdf](https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_tcf.pdf)
- Centers for Disease Control and Prevention (CDC). (2017). CDC guideline for prescribing opioids for chronic pain. Retrieved from <https://www.cdc.gov/drugoverdose/prescribing/guideline.htm>
- Chandane R. (2014). Routes of drug administration. Retrieved from <https://www.slideshare.net/drchandane/dr-routes-of-administration-pharmacology>



- Cherny N. (2017). Palliative sedation. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/palliative-sedation>
- Ciszek B. (2016). Unraveling the complexities of idiopathic pain disorders: from mouse to man. Retrieved from <https://cdr.lib.unc.edu/indexablecontent/uuid:c1e9fe3d-27f8-4880-b366-4341374f2947>
- Clark M & Galati S. (2015). Guide to chronic pain assessment tools. *Practical pain management* 12(1), 1–3.
- Cosio D & Lin E. (2019). Hypnosis and biofeedback. Retrieved from <https://www.practicalpainmanagement.com/patient/treatments/alternative/hypnosis-biofeedback>
- Cosio D & Lin E. (2017). Behavioral medicine: how to incorporate into pain management. *PPM*, 16(7), 1–3.
- Coyne P, Mulvenon C, & Paice J. (2018). American Society for Pain Management Nursing and Hospice and Palliative Nurses Association position statement: pain management at the end of life. *Pain management nursing*, 19(1), 3–7. <https://doi.org/10.1186/s12916-017-0860-2>
- Curfman G. (2017). FDA strengthens warning that NSAIDs increase heart attack and stroke risk. Retrieved from <https://www.health.harvard.edu/blog/fda-strengthens-warning-that-nsaids-increase-heart-attack-and-stroke-risk-201507138138>
- Dahlhamer J, Lucas J, Zelaya C, Nahin R, et al. (2018). Prevalence of chronic pain and high-impact chronic pain among adults—United States, 2016. *MMWR*, 67(36), 10016. Retrieved from <https://www.cdc.gov/mmwr/volumes/67/wr/mm6736a2.htm>
- Department of Health, Western Australia (DHWA). (2019). Yoga and pain. Retrieved from <https://painhealth.csse.uwa.edu.au/pain-module/yoga/>
- Dima R, Tieppo Francio V, Towery C, & Davani S. (2017). Review of literature on low-level laser therapy benefits for nonpharmacological pain control in chronic pain and osteoarthritis. *Altern Ther Health Med*, 5, 8–10. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/28987080>
- Doctors.net/uk. (n.d.). Table 1: pros and cons of different routes of drug administration. Retrieved from [https://www.doctors.net.uk/\\_datastore/ecme/mod1227/Drug\\_dosage\\_Table1.pdf](https://www.doctors.net.uk/_datastore/ecme/mod1227/Drug_dosage_Table1.pdf)
- Driscoll M & Baker N. (2016). Breaking the cycle: occupational therapy’s role in chronic pain management. *OT Practice*, 21(19), 8–14.
- Drug Development Technology. (2019). Epidiolex (cannabidiol) for seizures associated with Lennox-Gastaut and Dravet syndromes. Retrieved from <https://www.drugdevelopment-technology.com/projects/epidiolex-cannabidiol-treatment-seizures-associated-lennox-gastaut-syndrome-dravet-syndrome/>
- Elman I & Borsook D. (2016). Common brain mechanisms of chronic pain and addiction *Neron*, 89(6), 11–36. <https://doi.org/10.1016/j.neuron.2015.11.027>
- Eltumi H & Tashani O. (2019). Effect of age, sex, and gender on pain sensitivity: a narrative review. *The Open Pain Journal*, 10, 44–55. doi:10.2174/1876386301710010044
- Gattie E, Cleland J, & Snodgrass S. (2017). The effectiveness of trigger point dry needling for musculoskeletal conditions by physical therapists: a systematic review and meta-analysis. *Journal of Orthopaedic & Sports Physical Therapy*, 47(3), 133–49. doi:10.2519/jospt.2017.7096



- Geva N & Defrin R. (2018). Opposite effects of stress on pain modulation depend on the magnitude of individual stress response. *The Journal of Pain*, 19(4), 360–71. <https://doi.org/10.1016/j.jpain.2017.11.011>
- Gilani A. (2012). Routes of drug administration. Retrieved from [https://www.slideshare.net/ankit\\_2408/routes-of-drug-administration-1](https://www.slideshare.net/ankit_2408/routes-of-drug-administration-1)
- Girgis L. (2017). 13 red flags your pain patient is a drug seeker. Retrieved from <https://www.physicianspractice.com/difficult-patients/13-red-flags-your-pain-patient-drug-seeker>
- Gourlay D & Heit H. (2019). Universal precautions in pain medicine: the treatment of chronic pain with or without the disease of addiction. *Medscape*. Retrieved from <https://www.medscape.org/viewarticle/503596>
- Hadland S & Levy S. (2017). Objective testing—urine and other drug tests. *Child Adolesc Psychiatr Clin N Am*, 25(3), 549–65. doi:10.1016/j.chc.2016.02.005.
- Hauer J & Jones B. (2019). Evaluation and management of pain in children. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/evaluation-and-management-of-pain-in-children>
- Hoenig H & Cary M. (2018). Overview of geriatric rehabilitation: program components and settings for rehabilitation. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/overview-of-geriatric-rehabilitation-program-components-and-settings-for-rehabilitation>
- Hofmann A. (2019). Living life to its fullest: managing chronic pain with occupational therapy. Retrieved from <https://www.aota.org/About-Occupational-Therapy/Professionals/HW/Articles/Chronic-Pain.aspx>
- Holmberg C, Farahani Z, & Witt C. (2016). How do patients with chronic neck pain experience the effects of qigong and exercise therapy? A qualitative interview study. *Evidence-Based Complementary and Alternative Medicine*, Article ID 8010891, 8 pages. <http://dx.doi.org/10.1155/2016/8010891>
- Horner C. (2016). Pain relief is an ethical issue. Retrieved from <http://www.amc.edu/BioethicsBlog/post.cfm/pain-relief-is-an-ethical-issue>
- Hunter J. (2018). Clinician’s commentary on Wideman et al. *Physiother Can*, 70(1), 34–5.
- International Association for the Study of Pain (IASP). (2018a). The declaration of Montreal. Retrieved from <http://www.iasp-pain.org/DeclarationofMontreal?navItemNumber=582>
- International Association for the Study of Pain (IASP). (2018b). IASP curriculum outline on pain for occupational therapy. Retrieved from <https://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=7069>
- International Association for the Study of Pain (IASP). (2018c). IASP curriculum outline on pain for physical therapy. Retrieved from <https://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2055>
- International Association for the Study of Pain (IASP). (2017). IASP terminology. Retrieved from <https://www.iasp-pain.org/terminology?navItemNumber=576>
- Jackson V & Nabati L. (2017). Ethical considerations in effective pain management at the end of life. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/ethical-considerations-in-effective-pain-management-at-the-end-of-life#H4>
- Jakucs C. (2018). Drug-seeking behavior is a challenge for any ED. Retrieved from <https://resources.nurse.com/drug-seeking-behavior-is-a-challenge-for-any-ed>



- Kahn Academy. (2019). Somatosensory homunculus. Retrieved from <https://www.khanacademy.org/science/health-and-medicine/nervous-system-and-sensory-infor/somatosensation-topic/v/somatosensory-homunculus>
- Kendroud S & Hanna A. (2019). Physiology, nociceptive pathways. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK470255/>
- Kibret H. (2019). Pain management nursing role/core competency a guide for nurses. Retrieved from [https://www.academia.edu/34933542/Pain\\_Management\\_Nursing\\_Role\\_Core\\_Competency\\_A\\_Guide\\_for\\_Nurses?email\\_work\\_card=view-paper](https://www.academia.edu/34933542/Pain_Management_Nursing_Role_Core_Competency_A_Guide_for_Nurses?email_work_card=view-paper)
- Kishner S. (2018). Pain assessment. *Medscape*. Retrieved from <https://emedicine.medscape.com/article/1948069-overview>
- Klein M. (2017). Deep heat technique. *Medscape*. Retrieved from <https://emedicine.medscape.com/article/1829233-technique>
- Knezevic N, Tverdohleb T, Knezevic I, & Candido K. (2018). The role of genetic polymorphisms in chronic pain patients. *International Journal of Molecular Sciences*, 19(6), 1707. doi:10.3390/ijms19061707
- Lautenbacher S, Peters J, Heesen M, Scheel J, et al. (2017). Age changes in pain perception: a systematic-review and meta-analysis of age effects on pain and tolerance thresholds. *Neuroscience Biobehavioral Reviews*, 75, 104–13. <https://doi.org/10.1016/j.neubiorev.2017.01.039>
- Lerman S & Haythornthwaite J. (2018). Psychological evaluation and testing. Ch. 6 in Benson H, Raja S, Fishman S, Liu S & Cohen S (Eds.), *Essential of pain medicine* (4th ed.), Philadelphia: Elsevier.
- Lisi A, Scheinowitz, Saporito R, & Onorato A. (2019). A pulsed electromagnetic field therapy device for non-specific low back pain: a pilot randomized controlled trial. *Pain and Therapy*, 1–8. <https://doi.org/10.1007/s40122-019-0119-z>
- Madore A. (2019). Therapeutic massage for pain relief. Retrieved from <https://brighamhealthhub.org/spine/therapeutic-massage-therapy-for-pain-relief>
- Mathersul D, Mahoney L, & Bayley P. (2018). Tel-yoga for chronic pain: current status and future directions. *Global Advances in Health and Medicine*, 7, 1–7. <https://doi.org/10.1177/2164956118766011>
- Mayo Clinic. (2018). Acupuncture. Retrieved from <https://www.mayoclinic.org/tests-procedures/acupuncture/about/pac-20392763>
- McLain K. (2016). Review of opioid pharmacology and emerging options for opioid dependence. Retrieved from <http://ispan.org/convention/files/2016/presentations/Sunday/McLain.pdf>
- Merck Manual (2019). Drug administration. Retrieved from <https://www.merckmanuals.com/home/drugs/administration-and-kinetics-of-drugs/drug-administration>
- Minnesota Legislature, Office of Revisor of Statutes. (2017). SF 623: acupuncture service health insurance plan coverage requirement; opioid alternatives continuing education requirement. Retrieved from <https://www.revisor.mn.gov/bills/bill.php?b=senate&f=sf0623&ssn=0&y=2017>
- Moore E. (2018). Pain management: an ethical approach. *American Nurse Today*, 13(12), 31–8.



- Morton D, Sandhu J, & Jones A. (2016). Brain imaging of pain: state of the art. *J Pain Res*, 9, 613–24. doi:10.2147/JPR.S60433
- National Conference of State Legislatures (NCSL). (2018). Prescribing policies: states confront opioid overdose epidemic. Retrieved from <http://www.ncsl.org/research/health/prescribing-policies-states-confront-opioid-overdose-epidemic.aspx>
- National Institutes of Health (NIH). (2019a). Acetaminophen. Retrieved from <https://pubchem.ncbi.nlm.nih.gov/compound/acetaminophen#section=Topm>
- National Institutes of Health (NIH). (2019b). Opioid addiction. Retrieved from <https://ghr.nlm.nih.gov/condition/opioid-addiction#resources>
- National Institutes of Health (NIH). (2019c). Opioid overdose crisis. Retrieved from <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis>
- National Institutes of Health (NIH). (2019d). Opioid crisis and pain management. Retrieved from <https://www.drugabuse.gov/nidamed-medical-health-professionals/opioid-crisis-pain-management>
- National Institutes of Health (NIH). (2018a). Pain. Retrieved from <https://nccih.nih.gov/health/pain>
- National Institutes of Health (NIH). (2018b). Marijuana and cannabinoids. Retrieved from <https://www.drugabuse.gov/publications/research-reports/marijuana/letter-director>
- National Institutes of Health (NIH). (2018c). Iontophoresis with dexamethasone and physical therapy to treat apophysitis of the knee in pediatrics. Retrieved from <https://clinicaltrials.gov/ct2/show/NCT03606980>
- National Institutes of Health (NIH). (2018d). Relaxation techniques for health. Retrieved from <https://nccih.nih.gov/health/stress/relaxation.htm>
- National Institutes of Health (NIH). (2018e). What is the scope of prescription drug misuse? Retrieved from <https://www.drugabuse.gov/publications/research-reports/misuse-prescription-drugs/what-scope-prescription-drug-misuse>
- National Institutes of Health (NIH). (2018f). Screening and assessment tools. Retrieved from <https://www.drugabuse.gov/nidamed-medical-health-professionals/screening-tools-resources/chart-screening-tools>
- National Institutes of Health (NIH). (2016). Tai chi and qi gong: in depth. Retrieved from <https://nccih.nih.gov/health/taichi/introduction.htm>
- Pearson Education. (2016). Nursing process focus charts: clients receiving opioid therapy. Retrieved from [http://wps.prenhall.com/chet\\_adams\\_pharmacology\\_2/63/16215/4151236.cw/content/index.html](http://wps.prenhall.com/chet_adams_pharmacology_2/63/16215/4151236.cw/content/index.html)
- Physiopedia. (2019). Thermotherapy. Retrieved from <https://www.physio-pedia.com/Thermotherapy>
- Portenoy R, Ahmed E & Keilson Y. (2019). Cancer pain management: adjuvant analgesics (coanalgesics). *UpToDate*. Retrieved from <https://www.uptodate.com/contents/cancer-pain-management-adjuvant-analgesics-coanalgesics>
- Portenoy R & Copenhaver D. (2017). Cancer pain management: interventional therapies *UpToDate*. Retrieved from <https://www.uptodate.com/contents/cancer-pain-management-interventional-therapies>



- Portenoy R & Dhingra L. (2019). Assessment of cancer pain. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/assessment-of-cancer-pain>
- Portenoy R, Mehta Z, & Ahmed E. (2018). Prevention and management of side effects in patients receiving opioids for chronic pain. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/prevention-and-management-of-side-effects-in-patients-receiving-opioids-for-chronic-pain>
- Pourmand A, Davis S, Marchak A, Whiteside T, & Sikka N. (2018). Virtual reality as a clinical tool for pain management. *Curr Pain Headache Rep*, 22(8), 53. doi:10.007?s11916-018-0708-2
- Practical Pain Management (PPM). (2018). Interventional pain management. Retrieved from <https://www.practicalpainmanagement.com/treatments>
- Quinlan J & Cox F. (2017). Acute pain management in patients with drug dependence syndrome. *PAIN Reports*, 2(4), E611. doi:10.1097/oPR9.0000000000000611
- Quora. (n.d.). What are the advantages and disadvantages of oral route drug administration? Retrieved from <https://www.quora.com/What-are-the-advantages-and-disadvantages-of-oral-route-drug-administration>
- Raffaeli W & Arnaudo E. (2017). Pain as a disease: an overview. *J Pai Res*, 10, 2003–8. doi:10.2147/JPR.S138864
- Rashid H. (2017). Physiology of pain pathways. Retrieved from <https://www.slideshare.net/hassandoc90/physiology-of-pain-pathways>
- Reiner K, Shvartzman P, Cohen ZZ, et al. (2018). Assessing the effectiveness of mindfulness in the treatment of chronic back pain: use of quantitative sensory pain assessment. *Mindfulness*, 1–10. <https://doi.org/10.1007/s12671-018-1053-6>
- Rosenquist E. (2018). Evaluation of chronic pain in adults. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/evaluation-of-chronic-pain-in-adults>
- Safer Pain Relief.org. (2019). 8 alternative therapies and modalities you need to treat pain. Retrieved from <http://www.saferpainrelief.org/pain-management-products/alternative-therapies-modalities>
- Sawynok J. (2018). Benefits of tai chi for fibromyalgia. *Pain Management*, 8(4). <https://doi.org/10.2217/pmt-2018-0021>
- Schepis T (Ed.). (2018). *The prescription drug abuse epidemic*. Santa Barbara, CA: ABC-CLIO, LLC.
- Scholten A, Chekka KM, & Benzon H. (2018). Physical examination of patient with pain. Ch. 4b in Benson H, Raja S, Fishman S, Liu S, & Cohen S (Eds.), *Essential of pain medicine* (4th ed.), Philadelphia: Elsevier.
- Sierpina V. (2016). Tai chi in pain management. In Bonakdar R & Sukiennik A (Eds.), *Integrative pain management*, London: Oxford University Press.
- Smith D, Wilkie R, Croft P, & McBeth. (2017). Pain and mortality in older adults: the influence of pain phenotype. *Arthritis Care & Research*, 70(2), 236–43. <https://doi.org/10.1002/acr.23268>
- Solomon D. (2019). NSAIDs: pharmacology and mechanism of action. *UpToDate*. Retrieved from <https://www.uptodate.com/contents/nsaids-pharmacology-and-mechanism-of-action>



- Staikou C, Kokotis P, Kyrozis A, Rallis D, et al. (2017). Differences in pain perception between men and women of reproductive age: a laser-evoked potentials study. *Pain Medicine*, 18(2), 316–21. <https://doi.org/10.1093/pm/pnw167>
- Stanford Health Care. (2019). Management of pain without medications. Retrieved from <https://stanfordhealthcare.org/medical-conditions/pain/pain/treatments/non-pharmacological-pain-management.html>
- Stanford Medicine. (2017). Virtual reality alleviates pain, anxiety for pediatric patients. Retrieved from <https://med.stanford.edu/news/all-news/2017/09/virtual-reality-alleviates-pain-anxiety-for-pediatric-patients.html>
- Stöppler M. (2018). Chronic pain. Retrieved from [http://www.emedicinehealth.com/chronic\\_pain/article\\_em.htm](http://www.emedicinehealth.com/chronic_pain/article_em.htm)
- Suri P, Palmer M, Tsepilov Y, Freidin M, Boer C, Yau M, et al. (2018). Genome-wide meta-analysis of 158,000 individuals of European ancestry identifies three loci associated with chronic back pain. *PLoS Genet*, 14(9), e1007601. <https://doi.org/10.1371/journal.pgen.1007601>
- Tennant F. (2017). Painful genetic diseases. *Practical Pain Management*, 19(2).
- The Joint Commission (TJC). (2019). About the Joint Commission. Retrieved from [https://www.jointcommission.org/about\\_us/about\\_the\\_joint\\_commission\\_main.aspx](https://www.jointcommission.org/about_us/about_the_joint_commission_main.aspx)
- The Joint Commission (TJC). (2018). Facts about Joint Commission accreditation standards for health care organizations: pain assessment and management. Retrieved from [https://www.jointcommission.org/facts\\_about\\_joint\\_commission\\_accreditation\\_standards\\_for\\_health\\_care\\_organizations\\_pain\\_assessment\\_and\\_management/](https://www.jointcommission.org/facts_about_joint_commission_accreditation_standards_for_health_care_organizations_pain_assessment_and_management/)
- Thieme H, Morkisch N, Mehrhoz J, Pohl M, et al. (2018). Mirror therapy for improvement movement after stroke. Retrieved from [https://www.cochrane.org/CD008449/STROKE\\_mirror-therapy-improving-movement-after-stroke](https://www.cochrane.org/CD008449/STROKE_mirror-therapy-improving-movement-after-stroke)
- Thiyagarajah A. (2018). Intradiscal electrothermal therapy. *Medscape*. Retrieved from <https://emedicine.medscape.com/article/1145641-overview>
- Tick H, Nielsen A, Pelletier K, Bonakdar R, Simmons S, et al. (2017). Evidence-based nonpharmacological strategies for comprehensive pain care. Retrieved from [http://dph.nv.gov/uploadedFiles/dphnvgov/content/Resources/opioids/Evidence\\_Based\\_Nonpharmacologic\\_Strategies\\_for\\_Comprehensive\\_Pain\\_Care\\_White\\_Paper.pdf](http://dph.nv.gov/uploadedFiles/dphnvgov/content/Resources/opioids/Evidence_Based_Nonpharmacologic_Strategies_for_Comprehensive_Pain_Care_White_Paper.pdf)
- Toney-Butler T. (2019). Nursing admission assessment and examination. Retrieved from <https://www.statpearls.com/kb/viewarticle/41082/>
- United States Department of Health & Human Services (USDHHS). (2019a). Fibromyalgia. Retrieved from <https://ghr.nlm.nih.gov/condition/fibromyalgia#inheritance>
- United States Department of Health & Human Services (USDHHS). (2019b). Biology of addiction. Retrieved from <https://newsinhealth.nih.gov/2015/10/biology-addiction>
- United States Drug Enforcement Administration (USDEA). (2019). Drug addiction in health care professionals. Retrieved from [https://www.deadiversion.usdoj.gov/pubs/brochures/drug\\_hc.htm](https://www.deadiversion.usdoj.gov/pubs/brochures/drug_hc.htm)
- United States Drug Enforcement Administration (USDEA). (2018). Drug scheduling: controlled substances: alphabetical order. Retrieved from [https://www.deadiversion.usdoj.gov/schedules/orangebook/c\\_cs\\_alpha.pdf](https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf)



- United States Food & Drug Administration (FDA). (2018a). FDA approves first drug comprised of an active ingredient from marijuana to treat rare, severe forms of epilepsy. Retrieved from <https://www.fda.gov/newsevents/newsroom/pressannouncements/ucm611046.htm>
- United States Food & Drug Administration (FDA). (2018b). Disposal of unused medicines: what you should know. Retrieved from [https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm#Medicines\\_recommended](https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm#Medicines_recommended)
- United States Food & Drug Administration (FDA). (2018c). Abuse-deterrent opioid analgesics. Retrieved from <https://www.fda.gov/drugs/drugsafety/postmarketdrugsafetyinformationforpatientsandproviders/ucm600788.htm>
- University of Florida Health (UFHealth). (2019). Basics of pain management. Retrieved from <http://pami.emergency.med.jax.ufl.edu/e-learning-modules/basics-of-pain/>
- University of Rochester Medical Center (URMC). (2019). TENS therapy. Retrieved from <https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=134&ContentID=127>
- Venable E. (2018). Pain assessment in persons with cognitive impairment. *Medscape*. Retrieved from <https://emedicine.medscape.com/article/2113960-overview>
- Wang C, Schmid C, Fielding R, Harvey W, Reid K, et al. (2018). Effect of tai chi versus aerobic exercise for fibromyalgia; comparative effectiveness randomized controlled trial. *BMJ*, 360. <https://doi.org/10.1136/bmj.k851>
- Watson T. (2019). Ultrasound therapy. Retrieved from <http://www.electrotherapy.org/modality/ultrasound-therapy#Ultrasound%20Energy>
- Weber CG. (2019). *Clinical pain management (the clinical medicine series, book 22)* [Kindle version]. Retrieved from [http://www.amazon.com/dp/B004I5BU5M/ref=rdr\\_kindle\\_ext\\_tmb](http://www.amazon.com/dp/B004I5BU5M/ref=rdr_kindle_ext_tmb)
- Weimer M. (2017). Managing pain in patients with substance use disorder. Retrieved from <https://www.ohsu.edu/xd/health/for-healthcare-professionals/telemedicine-network/for-healthcare-providers/ohsu-echo/addiction-medicine/upload/ODU-and-pain.pdf>
- West Virginia Expert Pain Management Panel (WVEPMP). (2019). SEMP guidelines. Retrieved from <http://sempguidelines.org>
- WGBH Education Foundation. (2014). Frontline: marijuana timeline. Retrieved from <http://www.pbs.org/wgbh/pages/frontline/shows/dope/etc/cron.html>
- Whitlock E, Diaz-Ramirez G, Glymour M, et al., (2017). Association between persistent pain and memory decline and dementia in a longitudinal cohort of elders. *JAMA Intern Med*, 177(8), 1146–53. doi:10.1001/jamainternmed.2017.1622
- Wiech K. (2016). Deconstructing the sensation of pain: the influence of cognitive processes on pain perception. *Science*, 354(6323), 584–7. doi:10.1126/science.aaf8934
- Winters B, Gregoriou G, Kisiwaa S, Wells O, Medagoda D, et al. (2017). Endogenous opioids regulate moment-to-moment neuronal communication and excitability. *Nature Communications*, 8. <https://doi.org/10.1038/ncomms14611>



World Health Organization (WHO). (2019). WHO's cancer pain ladder for adults. Retrieved from <https://www.who.int/cancer/palliative/painladder/en/>

World Health Organization (WHO). (2018). Management of substance abuse. Retrieved from [https://www.who.int/substance\\_abuse/information-sheet/en/](https://www.who.int/substance_abuse/information-sheet/en/)

Yasgur B & Barclay L. (2018). Role of CBT in treatment of chronic pain. *Medscape*. Retrieved from <https://www.medscape.org/viewarticle/891357>

Zamliana Z. (2016). Route of administration of drug. Retrieved from <https://www.slideshare.net/zamaairawn/route-of-administration-of-drug>

Zeidan F, Adler-Neal AL, Wells RE, et al. Mindfulness-meditation-based pain relief is not mediated by endogenous opioids. *Journal of Neuroscience*, 36(11), 3391–7.



## DISCLOSURE

Wild Iris Medical Education, Inc., provides educational activities that are free from bias. The information provided in this course is to be used for educational purposes only. It is not intended as a substitute for professional healthcare. Neither the planners of this course nor the author have conflicts of interest to disclose. (A conflict of interest exists when the planners and/or authors have financial relationship with providers of goods or services which could influence their objectivity in presenting educational content.) This course is not co-provided. Wild Iris Medical Education, Inc., has not received commercial support for this course. There is no “off-label” use of medications in this course. All doses and dose ranges are for adults, unless otherwise indicated. Trade names, when used, are intended as an example of a class of medication, not an endorsement of a specific medication or manufacturer by Wild Iris Medical Education, Inc., or ANCC. Product trade names or images, when used, are intended as an example of a class of product, not an endorsement of a specific product or manufacturer by Wild Iris Medical Education, Inc., or ANCC. Accreditation does not imply endorsement by Wild Iris Medical Education, Inc., or ANCC of any commercial products or services mentioned in conjunction with this activity.

## ABOUT THIS COURSE

You must score 70% or better on the test and complete the course evaluation to earn a certificate of completion for this CE activity.

### [ABOUT WILD IRIS MEDICAL EDUCATION](#)

Wild Iris Medical Education offers a simple CE process, relevant, evidence-based information, superior customer service, personal accounts, and group account services. We've been providing **online accredited continuing education since 1998**.

### [ACCREDITATION INFORMATION FOR WILD IRIS MEDICAL EDUCATION](#)



## TEST

[ [Take the test online at wildirismedicaleducation.com](http://wildirismedicaleducation.com) ]

1. Which is **true** regarding the prevalence of chronic pain in the United States?
  - a. Veterans have a lower prevalence of chronic pain than nonveterans.
  - b. The CDC reports an estimated 50 million Americans experience chronic pain.
  - c. People with some form of public health insurance experience more chronic pain.
  - d. Adults with at least a bachelor's degree have a higher prevalence of chronic pain.
  
2. Which is a **true** statement about the nature of pain?
  - a. Pain is always a protective function motivating withdrawal from the source.
  - b. Pain is simply a stimulus-response mechanism.
  - c. Pain alters quality of life more than any other health-related problem.
  - d. Psychological pain can be clearly distinguished from pain due to tissue damage.
  
3. Pain caused by a lesion or disease of the somatosensory nervous system is called:
  - a. Allodynia.
  - b. Hyperalgesia.
  - c. Neuropathic pain.
  - d. Neuralgia.
  
4. Pain that results when tissue damage produces a stimulus that sends an electrical impulse across a pain receptor is called:
  - a. Psychogenic pain.
  - b. Nociceptor pain.
  - c. Neuropathic pain.
  - d. Idiopathic pain.
  
5. The function of the endogenous opioid system is to:
  - a. Modulate pain.
  - b. Mediate pain.
  - c. Perceive pain.
  - d. Transmit pain.



6. Which statement **best** describes the influence of gender on pain?
- Women are less sensitive to noxious stimuli than men.
  - Men experience pain more often and of higher intensity than women.
  - Anxiety is more associated with pain in females.
  - Men are more troubled by low and persistent levels of pain.
7. The meaning ascribed to pain by an individual is called:
- A stress response.
  - Pain appraisal.
  - Catastrophizing.
  - A genetic response.
8. Which is **not** a recommended question to be asked by the clinician when taking a patient's pain history?
- Did the pain start suddenly or gradually?
  - Which pain medications have you tried before?
  - What do you think is causing the pain?
  - Why is your pain continuing even with medications?
9. Which assessment tool is used to measure only the intensity of acute pain with known etiology?
- Brief Pain Inventory Short Form (BPI-SF)
  - Multidimensional Pain Inventory
  - McGill Pain Questionnaire (MPQ)
  - Numerical Rating Scale (NRS)
10. 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.



- 11.** Which part of a physical examination for pain involves assessing for suspected disease conditions that can cause referred pain?
- Abdominal examination
  - Neurological examination
  - Obtaining vital signs
  - Auscultation
- 12.** 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
- 13.** 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.
- 14.** When assessing pain in infants and young children, the clinician is aware that:
- Withdrawn behavior in a child may be their strategy to control pain.
  - Lying very still is a good indicator that an infant is not in pain.
  - Children who are not crying are not experiencing significant pain.
  - Children often overreport pain in order to gain the clinician's attention.
- 15.** Which is a **true** statement regarding acetaminophen?
- It is only used to treat acute pain.
  - It is harmless at high doses.
  - It can cause liver injury.
  - It reduces inflammation.



**16.** The opioid receptors that impart most of their analgesic effect in the central nervous systems are the:

- a. Delta receptors.
- b. Kappa receptors.
- c. Beta receptors.
- d. Mu receptors.

**17.** Which is a **correct** statement about the side effects of opioids?

- a. Opioids have no effect on the genitourinary system.
- b. Opioids do not increase risk for infection.
- c. Opioids can cause excessive constriction of pupils.
- d. Opioids can help prevent constipation.

**18.** Breakthrough pain that occurs with specific activities and can be predicted is called:

- a. Incident pain.
- b. Spontaneous pain.
- c. Uncontrollable pain.
- d. End-of-dose medication failure.

**19.** When both the brain and the body can only function in the presence of a drug, this is known as:

- a. Dependence.
- b. Addiction.
- c. Tolerance.
- d. Overdose.

**20.** Adjuvant drugs are prescribed to patients for:

- a. Enhancing analgesic effects.
- b. Central nervous system pain.
- c. Pain caused by primary tissue damage.
- d. Addiction to prescription opioids.

**21.** Which route of analgesic administration gives the most rapid and shortest duration of pain relief?

- a. Oral
- b. Intravenous bolus
- c. Subcutaneous opioid infusion
- d. Intraspinal



- 22.** Which is a **correct** statement regarding medical marijuana (cannabinoids)?
- It is now legal in all 50 states.
  - The federal government says it has no medical value.
  - Cannabidiol (CBD) has intoxicating effects.
  - There are no FDA-approved CBD-based medications, only THC-based.
- 23.** Which is an evidenced-based practice commonly used by osteopathic physicians, chiropractors, and physical therapists to adjust and correct alignment for treatment of musculoskeletal pain?
- Acupressure
  - Interferential stimulation
  - Manipulation therapy
  - Reflexology
- 24.** The process by which an electrophysical agent allows medications to be delivered into and through the skin to a painful area is called:
- Iontophoresis.
  - Phonophoresis.
  - Shortwave diathermy.
  - Interferential stimulation.
- 25.** The interventional pain modality that uses medical-grade nitrous oxide to destroy nerve tissue is called:
- Radiofrequency ablation.
  - Spinal cord stimulator.
  - Dry needling.
  - Cryotherapy ablation.
- 26.** Which is **not** a correct statement regarding mind-body techniques used in pain management?
- Yoga has been found to be as effective as cognitive behavioral therapy.
  - Virtual reality therapy addresses pain by reducing activation in certain areas of the brain.
  - Relaxation therapies have been found helpful with chronic pain in adults but not children.
  - Mindfulness meditation practice may have a buffering effect for chronic pain.



- 27.** The purpose of evaluation after pain interventions is to inform clinicians 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.
- 28.** 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 in accredited facilities.
  - Require pain management policies in all of its accredited facilities.
- 29.** The most important member of the interdisciplinary pain management team is the:
- Physician.
  - Nurse.
  - Patient.
  - Pharmacist.
- 30.** 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.
- 31.** The occupational therapist explains to the patient that "self-pacing" for pain management involves taking breaks, asking for help, and:
- Clarifying the relationship between physical pain and emotional distress.
  - Learning proper body mechanics and ergonomics.
  - Introducing adaptive equipment to help maintain independence.
  - Changing the way an activity is done.
- 32.** Functional goal setting as provided by the occupational therapist involves:
- 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.



- 33.** 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
- 34.** According to the CDC guidelines for prescribing opioids for pain:
- Opioids are first-line therapy for chronic pain.
  - When opioids are needed for acute pain, prescribe no more than needed.
  - Use extended-release opioids when starting treatment.
  - Start at the highest possible dose and taper rapidly to avoid risk of drug tolerance.
- 35.** 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.
- 36.** C-I controlled substances do **not** include:
- Heroin.
  - Marijuana.
  - LSD.
  - Morphine.
- 37.** Which is a **true** statement about abuse-deterrent opioids?
- Delivery system methods can offer resistance to abuse.
  - There are several generic opioids with FDA-approved abuse-deterrent labeling.
  - An antagonist drug has a substance added that produces an unpleasant effect.
  - They prevent drug abuse.
- 38.** When identifying drug-seeking patients, the clinician understands that:
- Drug seekers are most often people of lower socioeconomic status.
  - Most drug-seeking patients do so to divert drugs for illicit uses.
  - Drug seeking may be the result of undertreatment of pain.
  - Such patients are often willing to consider non-drug treatments first.

- 39.** When addressing drug diversion behavior in a healthcare worker, it is important to:
- Check the agency's written drug and alcohol policy and follow recommendations.
  - Directly intervene if a colleague is known to be selling or stealing drugs.
  - Ignore the situation and defer to management.
  - Cover the colleague in order to help them avoid the loss of ability to practice.
- 40.** Which is recommended as a general principle when offering pain management to an individual with substance use disorder?
- Use only nonpharmacologic approaches
  - Use parenteral instead of oral opioid formulations
  - Provide less-rewarding medications when effective
  - Never prescribe opioids
- 41.** Which is a **true** statement regarding assessing risk for developing substance use disorders?
- There are many highly accurate screening tools available.
  - Urine screening is the most accurate method to determine risk.
  - Drug testing is not recommended if other clinical assessment tools are available.
  - Patients can falsify responses on screening questionnaires.
- 42.** Which is **not** a true statement regarding common barriers to adequate pain management at the end of life?
- Patient stoicism may lead to their failure to report pain.
  - Clinicians may fear causing harm or adverse effects in patients.
  - Prescribers are concerned about drug diversion to nonpatients.
  - Evidence shows that the use of opioids often hastens death.
- 43.** When accepting a patient's decision to refuse a medication that may relieve pain, the clinician is honoring the ethical principle of:
- Beneficence.
  - Autonomy.
  - Justice.
  - Honesty.

