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Pain: Assessment and Management

Disclosures

Description
Authors: Meredith Patterson, RN, BSN, CRRN, Shelda L. Hudson, RN, BSN, PHN, Kim Falk, RN, BSN, MSN

This course presents material to educate the healthcare professional about pain - its pathophysiology, influencing factors, assessment techniques, and interventions. It also addresses common misconceptions about pain and pain management.

Learning outcomes include:
1. Describe several physical and behavioral signs and symptoms of pain
2. Compare pharmacologic and nonpharmacologic options for pain management
3. Explain the principles of pain treatment

Criteria for Successful Completion

After reading the material, complete the online evaluation. If you have a Florida nursing license or an electrology license you must also complete the multiple choice test online with a score of 70% or better. Upon completion of the requirements you may immediately print your CE certificate of completion.

Accreditation

American Nurses Credentialing Center’s Commission on Accreditation (ANCC)
California Board of Registered Nursing Provider No. CEP 1704.
This course has been approved by the Florida Board of Nursing No. 50-1408.
Kentucky Board of Nursing Provider No. 70031

Conflicts of Interest

No conflict of interest exists for any individual in a position to control the content of the educational activity.
Expiration Date
This course expires January 15, 2023.

About the Authors

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Purpose and Goals

This course presents material to educate the healthcare professional about pain: its pathophysiology, influencing factors, assessment techniques, and interventions. It also addresses common misconceptions about pain and pain management.

Learning Objectives

After completing this course, the learner should be able to:
1. Distinguish between pain, pain threshold, and pain tolerance.
2. Name the three nociceptors involved in pain sensation.
3. Describe factors that influence pain perception.
4. Outline the parts of the assessment mnemonic PQRS.
5. Describe several physical and behavioral signs and symptoms of pain.
6. Compare pharmacologic and nonpharmacologic options for pain management.
7. Explain the principles of pain treatment.
8. Discuss The Joint Commission’s standards for pain management.
9. Identify objectives and areas of future pain research.

Introduction

You know it at once. It may be the fiery sensation of a burn moments after your finger touches the stove. Or it’s a dull ache above your brow after a day of stress and tension. Or you may recognize it as a sharp pierce in your back after you lift something heavy.

It is PAIN. In its most benign form, it warns us that something isn’t quite right, that we should take medicine or seek a healthcare professional. At its worst, however, pain robs us of our productivity, our well-being, and, for many suffering from extended illness, their very lives. Pain is a complex perception that differs enormously among individual patients, even those who appear to have identical injuries or illnesses. We, as healthcare professionals, must do our part to provide patients with adequate pain management through proper pain assessment and prompt interventions that are patient specific.
A Brief History of Pain

Ancient civilizations recorded on stone tablets accounts of pain and the treatments used: pressure, heat, water, and sun. Early humans related pain to evil, magic, and demons. Relief of pain was the responsibility of sorcerers, shamans, priests, and priestesses who used herbs, rites, and ceremonies as their treatments.

The Greeks and Romans were the first to advance a theory of sensation, the idea that the brain and nervous system have a role in producing the perception of pain. But it was not until the Middle Ages and well into the Renaissance — the 1400s and 1500s — that evidence began to accumulate in support of these theories. Leonardo da Vinci and his contemporaries came to believe that the brain was the central organ responsible for sensation. Da Vinci also developed the idea that the spinal cord transmits sensations to the brain.

In the 17th and 18th centuries, the study of the body and the senses continued to be a source of wonder for the world’s philosophers. In 1664, the French philosopher René Descartes described what to this day is still called a pain pathway. Descartes illustrated how particles of fire, in contact with the foot, travel to the brain, and he compared pain sensation to the ringing of a bell.

In the 19th century, pain came to dwell under the new domain of science and thus paved the way for advances in pain therapy. Physician scientists discovered that opium, morphine, codeine, and cocaine could be used to treat pain. These drugs led to the development of aspirin, to this day the most commonly used pain reliever. Before long, anesthesia, both general and regional was refined and applied during surgery.

In 1931, the French medical missionary Dr. Albert Schweitzer wrote “Pain is a more terrible lord of mankind than even death itself.” Today, pain has become the universal disorder, a serious and costly public health issue, and a challenge for family, friends, and healthcare providers who must give support to the individual suffering from the physical as well as the emotional consequences of pain.

“It has no future but itself,” wrote the 19th century American poet Emily Dickinson, speaking about pain. In the 21st century, however, advances in pain research are creating hope and a less grim future than that portrayed in Dickinson’s verse, a future that includes a better understanding of pain, along with greatly improved treatments to keep it in check.

The Two Faces of Pain: Acute and Chronic

What is pain? For many years, the International Association for the Study of Pain has defined it as: an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. However, in 2019, the Association put forth a new definition of pain, “An aversive sensory and emotional experience typically caused by, or resembling that caused by, actual or potential tissue injury.”

It is useful to distinguish between two basic types of pain, acute and chronic, because they differ greatly.

Acute pain is of short duration, typically less than 6 months, and, for the most part, results from disease, inflammation, or injury to tissues. This type of pain generally comes on suddenly, for example, after trauma or surgery, and may be accompanied by anxiety or emotional distress. The cause of acute pain can usually be diagnosed and treated, and the pain is self-limiting, that is, it is confined to a given period of time and severity. In some rare instances, it can become chronic. Of importance is that a person experiencing acute pain usually manifests signs and symptoms caused by stimulation of the sympathetic nervous system, such as an increase in heart rate, respiratory rate, and blood pressure. In contrast, many people suffering from chronic pain do not demonstrate these objective physical signs but rather experience sleep disturbances, irritability, lack of energy, depression, and even lifestyle or personality changes. Chronic pain can have an insidious onset with characteristics that change over time.

WHAT IS CHRONIC PAIN?

CHRONIC PAIN
is considered a disease itself. It can be influenced by environmental and psychological factors and is resistant to most medical treatments.

ACUTE PAIN
often results from disease, inflammation, or injury to tissues. It generally comes on suddenly.

Source: https://www.painconsortium.nih.gov/, last accessed January 15, 2020
Chronic pain, is not necessarily acute pain that has persisted. Most often, the cause of acute pain is known, and the course of healing follows a predictable pattern. With chronic pain, treatment does not eradicate the pain, the cause of which may or may not be known. It can be made much worse by environmental and psychological factors. Chronic pain persists over a longer period of time than acute pain and is resistant to most medical treatments. It can—and often does—cause severe problems for patients. A person may have two or more coexisting chronic pain conditions. Such conditions can include chronic fatigue syndrome, endometriosis, fibromyalgia, inflammatory bowel disease, interstitial cystitis, and temporomandibular joint dysfunction. It is not known whether these disorders share a common cause.

Scientifically, pain is a sensation caused by some type of noxious stimulus. From the behavioral aspect, pain is a pattern of responses that function to protect an individual from harm. Within nursing, one of the most popular definitions has been the one coined by Margo McCaffery in 1968: “Pain is whatever the experiencing person says it is, existing whenever he says it does.”

Hundreds of pain syndromes or disorders make up the spectrum of pain. There are the most benign, fleeting sensations of pain, such as a pin pricking. There is the pain of childbirth, the pain of a heart attack, and the pain that sometimes follows amputation of a limb. There is also pain accompanying cancer and the pain that follows severe trauma, such as that associated with head and spinal cord injuries. Pain is one of the most common reasons people enter the healthcare system, yet it is also one of the most widely under-treated health problems. Untreated and inadequately treated pain cause suffering and financial burden to both patients and society. It is not just pain that is the problem. The side effects of chronic pain illnesses caused by a sedentary lifestyle, seclusion and depression, and sometimes addiction to pain killers can be just as devastating as the pain itself. Pain has a profound effect on the quality of human life.

Pain can cause disruptions in sleep, eating, mobility, and overall ability to function. Progress is being made in understanding the physiological mechanisms involved in pain. However, understanding individuals’ pain experience presents unique scientific challenges. The levels of pain different people experience and their reactions to it vary widely, perhaps due to psychological state, age, gender, social environment, and cultural background, as well as genetic or physiological differences. Thus, the pain experience needs to be examined at all levels of research, with the goal of developing interventions to manage or prevent pain.

Pathophysiology of Pain

Pain is a term every healthcare practitioner is familiar with, from the professional standpoint as well as through personal experience. However, beyond knowing what pain personally feels like, healthcare professionals need to know what causes pain and the best ways to manage it to give patients excellent care. Though the experience may seem simple -- you stub your toe, then you feel pain -- as a multifactorial phenomenon, pain has been defined and is described in numerous ways.

For the sake of clarity, pain can be divided into two basic components, physical and emotional. From the physical standpoint, almost every tissue found in the human body contains pain receptors, called nociceptors. It has been estimated that the skin may contain as many as 1,300 nociceptors in 1 square inch. These nociceptors respond to thermal, chemical, and mechanical stimuli through a-delta, C, and a-beta fibers. The a-delta receptors contain small, myelinated fibers that rapidly transmit acute, sharp pain signals from the peripheral nerves to the spinal cord. C receptors have larger, unmyelinated fibers that transmit pain at a slower rate and are commonly associated with long lasting, burning pain sensation. The a-beta receptors respond to non-painful touch, such as a gentle rub or pressure.

Physiologically, both the peripheral and central nervous systems are involved with pain perception (Figure 4). The peripheral nerve fibers first convey the painful stimuli to the spinal cord. Numerous ascending pathways transmit the stimuli through the dorsal root of a spinal nerve, ending in the dorsal horn of the spinal gray matter. In the substantia gelatinosa, located in the dorsal horn, the stimuli are directed to various parts of the spinal cord. Long nerve fibers, termed spinothalamic axons and spinoreticular axons, cross over to the opposite side of the spinal cord and ascend to the brain in the anterolateral column of the spinal white matter. The interactions between these pathways are complex, involving multiple influences, chemicals, and neurological processes. However, it is this intricate system of neurological processes that enables humans to determine the presence, location, nature, and intensity of pain. Pain perception also involves descending pathways, which have been theorized to be principally involved with pain modulation.

In response to the tissue damage from the noxious stimulus, pain-producing substances are released into the extracellular fluid surrounding the pain fibers. These substances include bradykinin, cholecystokinin, serotonin, histamine, potassium ions, norepinephrine, prostaglandins, leukotrienes, and substance P. The first six chemicals stimulate, whereas the latter three chemicals sensitize the a-delta and C fibers. But the brain and spinal cord also produce pain relieving substances, endorphins and enkephalins. These chemicals attach to endogenous receptors in the brain, spinal cord, and peripheral tissues, activating the descending inhibitory system. The descending opioid-related pain...
The inhibitory system was proposed by Fields and Basbaum and describes several centers in the brain that produce analgesia. The release of endorphins can be triggered by many situations, particularly those entailing stress, fear, or excitement. Aerobic activity can also stimulate endorphins.

From the emotional standpoint, the interconnectedness of thoughts, feelings, and beliefs plays a part in pain perception. Research has shown that people experience more pain when they focus on it, are told to expect one thing but experience something different, expect a high level of pain, and are tense and under stress. It has been theorized that structures in the brain are closely involved with the emotional aspects of pain perception. It is believed that stimuli are filtered through the limbic-hypothalamic system and that the frontal cortex influences rational interpretation and response to pain.

Though physical pain reception is a universal human phenomenon, people experience different pain thresholds and tolerances. Pain threshold is the earliest point at which a person perceives stimuli as painful. Most researchers conclude that there is little variation in pain threshold, from person to person and from situation to situation. However, it has been noted that repeated exposure to noxious stimuli can lower a person’s threshold, even if only minimally. This may be due to increased nociceptor sensitivity; when nociceptors are already stimulated, less stimulus is needed to produce pain. Pain tolerance refers to the lowest level of stimulation at which a person will stop or seek to stop the stimulus.

One theory that attempts to explain both the psychological and physiologic aspects of pain is the gate control theory. First proposed by Melzack and Wall in 1965, it has undergone numerous modifications and is still used today to explain pain. The theory proposes that the transmission of noxious stimuli is modulated by a gating mechanism in the dorsal horn. These theoretical gates can be opened or closed to either allow for or prevent pain transmission. The stimulation of smaller fibers opens the gate, the wider it is opened, the more pain occurs. However, stimulation of large fibers closes the gate, inhibiting pain transmission. It is these large fibers that are thought to selectively activate cognitive processes. The gate can also be closed by messages from higher brain centers; therefore, both ascending and descending systems are involved to control pain impulses and reduce pain intensity.

Pain can be categorized either by its origination or duration. Categories of origin include cutaneous, somatic, visceral, neuropathic, and referred. Cutaneous pain is a direct, acute, and localized sensation activated within the epidermis, dermis, or subcutaneous tissues. A pinprick or paper cut is an example of cutaneous pain. Somatic pain originates from the musculoskeletal system, from structures such as the tendons, ligaments, muscles, joints, bones, blood vessels, and nerves. It is felt as a scattered or diffuse sensation, such as the pain experienced by a sprain. Visceral pain is a diffuse, poorly localized feeling emanating from body organs with hollow cavities, such as the cranium, thorax, and abdomen. Appendicitis often causes visceral pain. Neuropathic pain results from damage to either the peripheral or central nervous system. Typically, neuropathic pain is caused by non-noxious stimuli and has a delayed onset. Many people describe neuropathic pain as a burning with periodic stabbing sensations. When pain
is felt in a part of the body away from the site of injury, it is known as referred pain. Pain can also be categorized in other ways, many of which involve specific sites, such as headache and phantom limb pain which is pain from the amputated part of the body that still is registering as pain within the nervous system.

**Age, Gender, Culture, and Social Support**

People of all ages are capable of feeling pain. Two particular age groups with special needs include children and older adults. Nonverbal children will not be able to articulate the presence of pain, nor describe its characteristics. The practitioner must be alert to nonverbal cues, such as excessive crying, grimacing, and restlessness. Even those children who can speak may have difficulty expressing their feelings. Therefore, the practitioner needs to be very astute when assessing children for the presence of pain.

One way of assessing pain in children is using the FLACC pain scale. The terms in the scale stand for facial expression, leg activity, general activity, crying behavior and consolability. This scale is usually used for infants and small children and is graded in each section from a 0 to a 2 where the higher the score the more the child is perceived to be in pain.

The other age group with special needs is that of the older adult. Many older adults assume that pain is a natural part of aging; this is untrue. What is true is that the incidence of disease and illness increases as we age, and pain is a common accompanying symptom. Practitioners need to inquire about and then explore older adults’ areas of pain. Treatment of the diseases and illnesses is of utmost importance in achieving pain relief.

While studies have been conducted on pain threshold and pain tolerance in relationship to age, many conflicting results have been documented. Considering older adults, two researchers concluded that pain threshold increases but pain tolerance decreases with age. However, numerous other researchers have criticized studies conducted on older adults’ pain thresholds and tolerances, citing attitudinal bias, delayed reaction times, physical impairments, and cognitive deficits as variables not taken into account. One would suspect that the changes that often accompany aging do affect the pain experience.

In respect to gender, it is now widely believed that pain affects men and women differently. While the sex hormones estrogen and testosterone certainly play a role in this phenomenon, psychology and culture, too, may account at least in part for differences in how men and women receive pain signals. For example, young children may learn to respond to pain based on how they are treated when they experience pain. Some children may be cuddled and comforted, while others may be encouraged to tough it out and to dismiss their pain.

Many investigators are turning their attention to the study of gender differences and pain. Many experts now agree that women recover more quickly from pain.
seek help more quickly for their pain, and are less likely to allow pain to control their lives. They also are more likely to marshal a variety of resources such as coping skills, support, and distraction which helps them to deal with their pain.

Research in this area is yielding fascinating results. For example, male experimental animals injected with estrogen, a female sex hormone, appear to have a lower tolerance for pain. Similarly, the presence of testosterone, a male hormone, appears to elevate tolerance for pain in female mice: the animals are simply able to withstand pain better. Female mice deprived of estrogen during experiments react to stress similarly to male animals. Estrogen, therefore, may act as a sort of pain switch, turning on the ability to recognize pain.

Investigators know that males and females both have strong natural pain-killing systems, but these systems operate differently. For example, a class of painkillers called kappa-opioids is named after one of several opioid receptors to which they bind, the kappa-opioid receptor, and they include the compounds nalbuphine and butorphanol. Research suggests that kappa-opioids provide better pain relief in women.

Though not prescribed widely, kappa-opioids are currently used for relief of labor pain and in general work best for short-term pain. Investigators are not certain why kappa-opioids work better in women than men. It maybe because a woman’s estrogen makes them work, or because a man’s testosterone prevents them from working. Or is there another explanation, such as differences between men and women in their perception of pain? Continued research may result in a better understanding of how pain affects women differently from men, enabling new and better pain medications to be designed with gender in mind.

Another aspect of culture is the patient’s environment: how the patient was raised and where the patient is currently situated. Many professionals are familiar with patients who are more expressive of their pain when familiar with people who abuse drugs can experience pain. In fact, changes in the brain alters the way the patient perceives and reacts to pain.

There are many misconceptions among healthcare workers that are barriers to patients receiving adequate pain management. One of the most common and persistent myths is that drug abusers overreact to pain. Healthcare workers may assume that drug abusers are seeking to satisfy their addiction and not eliminate actual physical pain. While it is true that part of the drug-abusing syndrome involves drug-seeking behavior, it is also true that people who abuse drugs can experience pain. In fact, changes in the central nervous system related to drug abuse may result in an exaggeration of the patient's response to pain stimuli; thus a drug-abusing patient may be less tolerant of pain than someone who doesn’t use drugs, and the patient may be suffering more intensely than other patients. As with all people, the pain deserves to be treated effectively. Even though studies have shown that drug abusers tend to respond to higher doses of pain medicine than the general population due to this tolerance, doctors may prescribe lower doses of narcotics or substitute non-narcotics.

Another misconception lies in the belief that minor illnesses and injuries are less painful than severe ones. However, the amount of tissue damage is not a predictable factor for pain intensity. In fact, when pain receptors are destroyed in a severe injury, the patient can experience little or no pain as in the case of fourth degree burn victims. Additionally, many disorders manifest differently among patients, and each patient can encounter great fluctuations, which may or may not be predictable in their pain.

Lastly, because pain is subjective, the best authority on the patient’s pain is the patient himself. However, many healthcare workers consider themselves the expert on the patient’s pain. While it is true that healthcare workers often have more knowledge about pain in general, this does not negate the fact that the patient is the only one experiencing the particular pain being treated. This is a very important point to remember when assessing and treating pain. One study of elderly patients’ and nurses’ pain ratings found a significant difference between when nurses and patients thought pain should be treated. Additionally, the nurses tended to underestimate severe pain and overestimate mild pain. This emphasizes the need to continually involve the patient in the treatment process. The most effective treatment occurs when healthcare workers and patients work together to relieve pain.

**Assessment**

One of the most common mnemonics for remembering the steps involved in pain assessment is PQRST: Provoking factors, Quality, Region/Radiation, Severity/Symptoms, and Timing.

**Provoking factors** include both precipitating and aggravating conditions: what brings the pain on and what makes it worse. This information may lead to the origin of the pain, if unknown, and can also be useful when teaching patients what situations to avoid or modify to help lessen or eliminate the pain. The number of provoking factors is vast and can include certain positions, movements, or activities; specific times of the day or night; and even particular emotions, such as anxiety or anger.

To ascertain the **quality** of the pain the nurse should ask open-ended questions, thus allowing the patient to provide his or her own description. If the patient is having difficulty, prompts are acceptable and should include common descriptors, for example sharp, dull, pulling, crushing, throbbing, burning, or pricking. This information can often help determine the pain origin and can be most useful when prescribing or recommending treatment options.

The easiest way to determine the **region** of pain is to ask the patient to point to or name the specific area or areas on his or her body. When a patient has diffuse pain, he or she may indicate a large area or be unable to pinpoint the exact spot. Additionally, those experiencing deep pain, such as visceral pain, may verbally describe the feeling as...
“deep” or “inside”. Not all pain radiates, but this is a good time to ascertain if radiation is occurring and, particularly when the patient indicates a large area, to clarify if the pain is at the same intensity within the whole area. Remember, radiation is when the pain originates from the injury outward, whereas, referred pain is when the feeling occurs at a site different from the injury. Patients also can experience shifting areas of pain, where certain areas are only periodically painful.

Many tools have been developed to assist the nurse in determining the severity of pain. The use of standardized tools has several advantages. First, they are reliable and objective and thus the most accurate way to rate pain severity. Also, they take very little time and training to implement. Third, the same tools can be used to assess the effectiveness of interventions. The most common tool is the visual analog scale, which features a numerical pain-rating scale (Figure 6). It uses a 10 cm line with numbers ranging from 0 to 10. Patients point to a number that corresponds to the level of pain they are feeling. Before using the scale with a particular patient the nurse should explain the significance of the numbers:

- 0 represents no pain,
- 1-3 mild pain,
- 4-6 moderate pain,
- 7-9 severe pain, and
- 10 means you are experiencing the worst pain imaginable.

A variation of the scale often used by health professionals is to describe verbally the 0 to 10 rating and ask the patient to state the corresponding number.

For patients who may respond better to visual cues, do not have mastery of the English language or the appropriate cognitive level to use a number scale, the Wong-Baker FACES Pain Rating Scale is an appropriate alternative (Figure 7). This tool depicts six faces ranging from a happy face to a crying grimace. The nurse reads a statement about how each face correlates to pain and then the patient points to the face that best represents how he or she is feeling.

Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain. Face 0 is very happy because he doesn’t hurt at all. Face 1 hurts just a little bit. Face 2 hurts a little more. Face 3 hurts even more. Face 4 hurts a whole lot. Face 5 hurts as much as you can imagine, although you don’t have to be crying to feel this bad.

Ask the person to choose the face that best describes how he is feeling.

Rating scale is recommended for persons age 3 years and older.

**Brief word instructions:** Point to each face using the words to describe the pain intensity. Ask the child to choose the face that best describes his own pain and record the appropriate number.

Besides severity, the “S” in the mnemonic PQRST stands for symptoms. Assess the patient for other symptoms that accompany the pain. Common ones include nausea, vomiting, dizziness, and restlessness. Many times when the patient is given treatment for pain, these symptoms subside or are eradicated, but other times, adjuvant treatments are needed. The questions to ask in determining timing include:

- How long does the pain usually last?
- When and how does it usually lessen or stop?

The answers to these questions help the professional to understand the precise nature and experience of the patient’s pain allowing the support of the patient’s methods of pain relief, unless they are harmful.

Besides using the PQRST mnemonic, the nurse must be alert for various physical and behavioral signs and symptoms associated with pain or those that may accompany pain. The nurse may observe some of these behavioral indicators, such as restlessness, moaning, crying, clenched teeth, or protecting/guarding body parts. Or the patient may need to state their presence, such as when the patient is feeling anxious or nauseated. Vital sign changes can also indicate pain, such as an elevation in pulse rate, blood pressure, and respirations. However, this is more accurate for the presence of acute, not chronic, pain. Also, elevated vital signs are not always seen in every acute pain situation, nor are they a reliable indicator of pain intensity. Therefore, the absence of behavioral indicators or vital sign elevations does not mean the patient is not experiencing pain. For example, it is unclear whether a comatose person experiences pain; just because a person cannot respond to a noxious stimulus may not mean that the person cannot feel it. Conversely, these other signs and symptoms may be the only clue the nurse has that the patient is in pain. This is particularly significant when the patient has difficulty expressing pain due to factors such as socio-culturally learned behaviors, immaturity, neurologic damage, or mental or physical handicap. Another set of patients to be mindful of are the patients that cannot speak or vocalize their pain such as infants, the non-verbal or the cognitively impaired.

Another area for the healthcare professional to observe is how the patient’s pain is affecting their quality of life. In assessing their quality of life, look at how pain is affecting their normal activities of daily living (ADLs). When a patient is in pain, ADLs are often either neglected or altered. Sleep can become erratic, sexual activity may decline, exercise programs can cease, playtime or hobbies are neglected, and the patient may miss more hours at work. Simply asking patients, “How does pain limit your daily activities?” or “What can you no longer do because of your pain?” may elicit useful
Neurological status is also important for the healthcare professional to consider when assessing pain. When deficits are present in the central nervous system, or in cases of dementia, mental handicap or even immaturity, the nonverbal cues of pain become essential. Though it is more difficult to assess a patient with cognitive impairment, it is not impossible; every person deserves a thorough pain assessment. Behaviors that can indicate pain include flinching, guarding, grimacing, whimpering, and restlessness. Additionally, further investigation is warranted when a patient refuses to move or eat, pulls at equipment such as tubing, or has a change in continence.

A pain measurement tool developed especially for patients with progressed dementia is called the Pain Assessment in Advanced Dementia (“PAIN-AD”) scale. Useful for both verbal and non-verbal patients, the scale rates five categories: breathing, negative vocalization, facial expression, body language and consolability. Scoring is from 0-10 points, giving the practitioner an objective pain acuity guideline. The tool and instructions are shown in Figure 8.

When the patient has a peripheral nervous system deficit, such as the diabetic with peripheral neuropathy, the sensation of pain in certain parts of the body is altered. Teaching the patient with peripheral nervous system deficits to visually inspect his or her body on a daily basis is important; injuries can occur without the sensation of pain as a warning. Also, careful application of certain treatments, for example, hot or cold packs, is essential.

There is no objective way to tell how much pain a person has. No test can measure the intensity of pain, no imaging device can show pain, and no instrument can locate pain precisely. Sometimes, as in the case of headaches, physicians find that the best aid to diagnosis is the patient’s own description of the type, duration, and location of pain. Defining pain as sharp or dull, constant or

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**Pain AD Scale**

Instructions: Observe the patient for five minutes before scoring his or her behaviors. Score the behaviors according to the following chart. Definitions of each item are provided on the following page. The patient can be observed under different conditions (e.g., at rest, during a pleasant activity, during caregiving, after the administration of pain medication).

<table>
<thead>
<tr>
<th>Behavior</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing Independent of</td>
<td>Normal</td>
<td>Occasional labored breathing</td>
<td>Noisy labored breathing</td>
<td></td>
</tr>
<tr>
<td>vocalization</td>
<td></td>
<td>Short period of hyperventilation</td>
<td>Long period of hyperventilation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cheyne-Stokes respirations</td>
<td></td>
</tr>
<tr>
<td>Negative vocalization</td>
<td>None</td>
<td>Occasional moan or groan</td>
<td>Repeated troubled calling out</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low-level speech with a negative or disapproving quality</td>
<td>Loud moaning or groaning</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Crying</td>
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<tr>
<td>Facial expression</td>
<td>Smiling or inexpressive</td>
<td>Sad</td>
<td>Facial grimacing</td>
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<td></td>
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<td>Frightened</td>
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<td>Frown</td>
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<td>Body language</td>
<td>Relaxed</td>
<td>Tense</td>
<td>Rigid</td>
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<td></td>
<td></td>
<td>Distressed pacing</td>
<td>Fists clenched</td>
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<td></td>
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<td>Fidgeting</td>
<td>Knees pulled up</td>
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<td>Pulling or pushing away</td>
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<td>Striking out</td>
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<tr>
<td>Consolability</td>
<td>No need to console</td>
<td>Distracted or reassured by voice or touch</td>
<td>Unable to console, distract, or reassure</td>
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</tbody>
</table>

**Total Score**

Scoring: The total score ranges from 0-10 points. A possible interpretation of the scores is: 1-3=mild pain; 4-6=moderate pain; 7-10=severe pain. These ranges are based on a standard 0-10 scale of pain, but have not been substantiated in the literature for this tool.

intermittent, burning or aching may give the best clues to the cause of pain. These descriptions are part of what is called the pain history, taken by the health professional during the preliminary examination of a patient with pain.

There are a number of technologies available to find the cause of pain. Primarily these include:

- **Electrodiagnostic procedures** include electromyography (EMG), nerve conduction studies, and evoked potential (EP) studies. Information from EMG can help physicians tell precisely which muscles or nerves are affected by weakness or pain. Thin needles are inserted in muscles and a physician can see or listen to electrical signals displayed on an EMG machine. With *nerve conduction studies* the doctor uses two sets of electrodes (similar to those used during an electrocardiogram) that are placed on the skin over the muscles. The first set gives the patient a mild shock that stimulates the nerve that runs to that muscle. The second set of electrodes is used to make a recording of the nerve’s electrical signals, and from this information the doctor can determine if there is nerve damage. **EP tests** also involve two sets of electrodes—one set for stimulating a nerve (these electrodes are attached to a limb) and another set on the scalp for recording the speed of nerve signal transmission to the brain.

- Imaging, especially **magnetic resonance imaging** or MRI, provides physicians with pictures of the body’s structures and tissues. MRI uses magnetic fields and radio waves to differentiate between healthy and diseased tissue.

- **A neurological examination** in which the physician tests movement, reflexes, sensation, balance, and coordination.

- **X-rays** reveal bones and joints, that are fractured or out of alignment causing nerve pain.

There are several technologies under research and development that combine imaging such as fMRI with machine learning or artificial intelligence to attempt associate an imaging of the brain with “pain”. While still a long way off.

**How Is Pain Treated?**

The goal of pain management is to improve function, enabling individuals to work, attend school, or participate in other day-to-day activities. A number of options exist for the treatment of pain; some are more effective than others. Whatever the treatment regime, it is important to remember that pain is treatable. Once a complete assessment has been done, the patient needs to receive treatment in a timely manner. The key to any treatment plan is individualization, for each patient and sometimes each pain episode. Often a variety of resources are needed for pain control. Although the goal is pain eradication, often bringing pain to an acceptable level of tolerance is more realistic. Sometimes, relaxation and the use of imagery as a distraction can provide relief for mild to moderate pain and some procedural pain. These methods can be powerful and effective, according to those who advocate their use.

**Pharmacologic interventions**

The three main categories of pharmacologic pain relief medications are nonopioids, opioids, and adjuvants.

Specific examples of commonly used nonopioid pain medications, often called non-narcotics, include acetaminophen, and nonsteroidal anti-inflammatories (NSAIDs) such as aspirin, ibuprofen, naproxen, choline magnesium trisalicylate and diflunisal. Acetaminophen’s analgesic properties appear to involve central mechanisms associated with nitric oxide and N-methyl-D-aspartate receptors. Aspirin, other salicylates, and NSAIDs inhibit prostaglandin synthesis to produce analgesia.

Common opioid medications, sometimes referred to as narcotics, are traditionally characterized as either weak or strong. Weak opioids include codeine and hydrocodone combined with either acetaminophen or aspirin. Morphine, hydromorphone and fentanyl are examples of strong narcotic medications. Opioids can also be classified by two subtypes: agonists and agonist-antagonists. Both types of opioids provide analgesia through mu, delta, and kappa receptors found in the central and peripheral nervous systems. The agonists attach to mu, delta, and kappa sites; however, the agonist-antagonists bind to the mu and kappa receptors, producing effects at the kappa sites but blocking effects at the mu sites.

The problems of opioid use have magnified in recent years. According to the CDC, more than 11 million people age 12 and over self-reported misuse of prescription pain medication in 2017. While this is a decrease of 3.8% over the previous year, all illicit drug use and prescription drug misuse increased by 6.8% to approximately 1 in 6 for those 12 and over. Health care providers have increasing concerns about patient addiction and its consequences. Accordingly, the CDC has now revised its guidelines for dosage and includes assessment strategies for risks and harm potential. Dosages are now lower than previous opioid prescribing guidelines. Although higher doses are more heavily associated with overdose and death, even relatively small doses increase risk.

Adjuvant medications can also be used to supplement nonopioid and opioid medications. Adjuvant analgesics are medications whose primary indication is not for pain management, but which have demonstrated analgesic effects. Examples of adjuvant medications used to treat pain include tricyclic antidepressants and anticonvulsants. Tricyclic antidepressants help to improve mood and increase pain threshold. The analgesic action of tricyclic antidepressants is not certain; however, it has been theorized that they enhance the descending pain inhibitory system through prevention of serotonin and norepinephrine reuptake. They have been found to be particularly useful for treating some types of migraines and nerve pain such as with shingles or diabetic neuropathy. Examples of tricyclic antidepressants include amitriptyline and nortriptyline. The anticonvulsants’ mechanism for pain control is also uncertain but may have something to do with altering the irritable foci in the nervous system causing the pain. They have been found to be particularly useful in treating lancinating and neuropathic pain. Carbamazepine, valproate, and gabapentin are three examples of anticonvulsants used to treat pain associated with complex regional pain syndrome (CRPS) possibly by way of modulation of the GABA system.

The medication chosen to treat pain is often based on practitioner’s preference; however, certain restrictions apply. Generally, a patient should not be taking two analgesics from the same class at the same time, unless one is sustained release used on a round-the-clock basis and the other is instant release for breakthrough pain. When a patient needs to switch from one narcotic to another, due to ineffectiveness or intolerable side effects, health practitioners should consult an equianalgesic guide. An equianalgesic chart shows practitioners the equivalent potency regarding dosage and route between narcotics, helping to eliminate the possibility of under or overdosing. Educate patients to ask for pain medication when the pain begins, not when it becomes unbearable. Pain control methods work best when they are administered at the onset of pain. Also remember to check patients’ allergies before administering any medication.

In addition to administering medications, nurses are also responsible for knowing the potential side effects of each medication.
Every medication has the potential for side effects, even if the patient has had the medication before and not experienced a particular side effect. Also, be aware that side effects may occur at lower doses among the older adult population. With the exception of acetaminophen and trilisate, the nonopioids have antithrombotic effects that can lead to bleeding, particularly in the gastrointestinal tract. Nausea and vomiting have also been associated with the nonopioids. Acetaminophen may cause hepatotoxicity, but this is rarely seen except for overdose or when used with people who have a compromised liver. Be aware that for each nonopioid there is a ceiling dose. The ceiling dose is the highest level of analgesia that can be achieved without significant side effects or toxicity.

A common side effect of the opioids is constipation. Concurrently instituting a bowel regimen usually helps to eliminate this side effect. A good bowel regimen includes initiating the daily use of a stool softener plus a laxative if needed, increasing fiber and fluid intake, and instituting routine aerobic exercises. Opioids can also cause sedation, nausea, and vomiting. As with any sedating medication, caution must be instituted when performing physical activities. An antiemetic can be prescribed for relief of nausea and vomiting. Fortunately, tolerance generally develops to sedation, nausea, and vomiting. Respiratory depression is a potentially serious side effect of opioids but fortunately not a very common one at low levels. If respiratory depression does occur, it tends to be a short-lived phenomenon. Additionally, using the antagonist medication naloxone can reverse respiratory depression. However, because the half-life of naloxone is shorter than most opioids, the patient must be monitored closely for recurrence of respiratory depression. Also, using naloxone can reverse the analgesic effects of the opioid; therefore, the patient may need further treatment to control pain.

Besides the choice of medication, the way a medication is administered is also important. Options include enteral and parenteral medications. Enteral medications are those that use the gastrointestinal (GI) tract, while parenteral medications bypass the GI system. If the GI system is intact, enteral medications are usually the best choice. When parenteral medication is preferred, there are several notable options: local pain relief, epidurals, rectal administration, and patient-controlled analgesia.

Local pain relief can involve a topical application to the skin or mucous membranes. One popular use of topical pain relief, particularly among the pediatric population, has been the use of a cream mixture of prilocaine and lidocaine applied to the skin before an intravenous insertion is performed.

Another way to administer parenteral medication is through an epidural. An anesthesiologist or anesthetist places a catheter into the epidural space in the spine, securing it with a sterile dressing and tape. Medication is either administered continuously through a pump or intermittently by the anesthesiologist or anesthetist. Usually the catheter placement is temporary and exits out the back; however, long-term epidurals can be performed, and they often exit through the abdomen. The nurse’s responsibility to a patient who has an epidural includes making sure the catheter is securely in place, usually taped to the skin, and informing the anesthesiologist or anesthetist when the patient on intermittent dosing needs more medication to be injected into the catheter. Advantages of the epidural route include site-specific, rapid, prolonged pain relief with less severe systemic adverse side effects.

An often-neglected route is rectal administration. Advantages of the rectal route include simplicity of administration, bioavailability and lower cost than most other parenteral methods. To administer, position the patient on the left side with top leg flexed. While aiming toward the patient’s umbilicus, insert a moistened suppository against the rectal wall approximately a finger’s length into the rectum. After withdrawing the gloved finger after administration, ask the patient to relax and not bear down. Briefly holding the patient’s buttocks together may aid in eliminating expulsion. While suppositories are most often the products given rectally, solutions, injectable medications, and even tablets have been used with little or no alteration. Contraindications of the rectal route include spinal cord injury, neutropenia (low white blood cell count), neutropenia (low platelets), and use after recent rectal or anal surgery.

Another effective method of parenteral pain medication administration entails the use of patient-controlled analgesia (PCA). The effectiveness of PCA is based on its individualization, a primary component of pain management. With PCA the patient receives either intravenous or subcutaneous...
medication when he or she presses a button on the PCA machine to which the patient is attached. The nurse, following prescriptive order, prescribes the medication, dosage, and timing before the patient is attached to the machine. The machine can be set to include a lockout time. This is when the patient can push the button to deliver medication but no medicine is released until a certain time elapses, thus preventing overdose. However, it is very important to monitor patients who are on PCAs, particularly in the initial stage of operation. Areas for potential problems include machinery malfunction, a too strong prescribed dosage, or too short or too long lockout time. Additionally, patients must be educated on how to use a PCA machine. When a patient is on PCA, a nurse should include, as part of the pain assessment, whether the patient understands how PCA works and how to use it to obtain medication. Luckily, PCA machines are easy to use and have the advantage of giving the patient control of his or her own pain relief. An additional advantage is that patient’s serum drug levels can remain more consistent since the moment he feels pain, the patient can push a button to receive medication. When patients rely on nurses for pain medication, relief takes longer since the patient must notify the nurse feeling pain, the nurse must check the medication order, then obtain the medication before finally giving it. One word of caution regarding PCA should be mentioned which is PCA by proxy. The nurse should check their institutional policies regarding who, if any other person may dose the PCA device besides the patient. Some institutions allow the nurse or trusted family member to dose only after being properly trained, so check the policy to ensure that proper PCA policy is being followed.

A simple, widely used, and effective approach to pharmacotherapy for cancer and other pain has been devised by the World Health Organization (WHO). The five essential concepts in the WHO approach to drug therapy of pain are:

- By the mouth.
- By the clock.
- By the ladder.
- For the individual.
- With attention to detail.

This approach has been shown to be effective in relieving pain for approximately 80-90 percent of patients with cancer.

Called the WHO Pain Ladder, this approach incorporates the concept of an analgesic ladder, a rational, stepwise approach to pain management. [https://www.who.int/cancer/palliative/painladder/en/](https://www.who.int/cancer/palliative/painladder/en/)

The first step in the ladder is the use of acetaminophen, aspirin or another NSAID for mild to moderate pain. Adjuvant drugs to enhance analgesic efficacy, treat concurrent symptoms that exacerbate pain, and provide independent analgesic activity for specific types of pain may be used at any step.

When pain persists or increases, an opioid such as codeine or hydrocodone should be added (not substituted) to the NSAID. Opioids at this step are often administered in fixed dose combinations with acetaminophen or aspirin, because this combination provides additive analgesia. Fixed-combination products may be limited by the content of acetaminophen or NSAID, which may produce dose-related toxicity. When higher doses of opioid are necessary, the third step is used. At this step separate dosage forms of the opioid and nonopioid analgesic should be used to avoid exceeding maximally recommended doses of acetaminophen or NSAID.

Pain that is persistent, or moderate to severe at the outset, should be treated by increasing opioid potency or using higher dosages. Drugs such as codeine or hydrocodone are replaced with the more potent opioids (usually morphine, hydromorphone, methadone, fentanyl, or levorphanol), as described above. Medications for persistent cancer-related pain should be administered on an around-the-clock basis, with additional as-needed doses given for breakthrough pain, because regularly scheduled dosing maintains a constant level of drug in the body and helps to prevent a recurrence of pain. Patients who have moderate to severe pain when first seen by the clinician should be started at the second or third step of the ladder.

Although the WHO Pain Ladder, first developed in 1986, is still followed, some researchers have questioned its validity and have proposed modifications broadening the range of adjuvant medications, allowing for “stepping up or stepping down” from the ladder when appropriate and omitting opioids for pure neuropathic pain.

**Nonpharmacologic Interventions**

Besides medications there are also nonpharmacologic options to control pain. Most often they are used to complement pharmacologic options. The advantages of using nonpharmacologic methods include the fact that many of them do not require a prescription or any special equipment. However, always make sure an intervention is appropriate and safe for each patient situation before implementation.

The simplest way to eliminate or reduce pain can involve altering the environment. Many variables within the patient’s setting can cause or worsen pain, such as temperature, bedding, body alignment, equipment, and clothing. Adjusting the air conditioning, adding a fan, or removing or supplying a blanket can help the patient who is uncomfortable due to temperature. Wrinkles in sheets can cause extra friction and pressure, which can be relieved by tightening and smoothing linens. Adding an egg crate mattress or foam mattress topper can improve old or unsupportive mattresses. Positioning in anatomical alignment, providing support for limbs, and eliminating pressure points are important ways to prevent pain from occurring in the immobilized patient. Therapeutic beds can also relieve pressure. Encouraging active range-of-motion exercises or providing passive range-of-motion can alleviate...
pain caused from stiffness and prevent painful muscle contractures. Equipment can cause pressure points and friction areas and therefore must be routinely checked for proper placement, with frequent skin assessments. For example, a nasal cannula can cause erosion of nares or ear tissue, and tubing can become lodged underneath the patient. Also, clothing, whether a gown, or street clothes can become bunched up or caught on equipment, causing constriction and pain. Wet clothing can also become an irritant.

Other nonpharmacologic interventions are relaxation and guided imagery, often used together. Relaxation can be as simple as focusing on one’s breathing to control tachypnea or mentally concentrating on a pleasant thought or scene. Patients can also be taught to progressively contract and then relax various muscle groups, usually in a sequential pattern, such as from neck to toes.

Meditation is a form of relaxation. Guided imagery generally implies that a trained practitioner reads or speaks in soothing tones while the patient focuses on a positive image, such as a beach scene or a walk in the park. The key points of guided imagery involve focusing on a repetitive thought, word, phrase, or activity and taking a positive attitude toward intruding thoughts, eliminating them as distractions. Relaxation and guided imagery are thought to counterbalance the “fight or flight” response the body often activates in response to pain. As a result of using these techniques the body often experiences a reduction in skeletal muscle tension, a decrease in vital signs, lowered metabolic rate, and less oxygen consumption.

Cutaneous stimulation can be used to eliminate pain mild to moderate pain as well. The therapeutic effects of cutaneous stimulation are based on the Gate Control Theory of pain discussed earlier. Cutaneous stimulation focuses on non-painful peripheral skin surfaces, thereby blocking the painful stimulation, causing a decrease in pain. Techniques that use cutaneous stimulation are massage, acupressure, acupuncture, hot and cold applications, herbal creams and transcutaneous electrical nerve stimulation — TENS.

**Massage** involves using either the hands or a smooth hard object, such as a sandbag, to hold, clutch, knead, and rub the skin and superficial muscle layer. Particular attention is given to areas of pain. In its simplest form, a person may automatically massage a painful area; however, the use of professional massage therapists is growing in popularity.

Both **acupressure and acupuncture** originated in China. Acupressure entails massaging and applying pressure to trigger points. Trigger points are hypersensitive areas in connective or muscle tissue. Acupuncture also uses trigger points but instead of massage fine sterilized flexible needles are placed at these sites. After the needles are inserted under the skin, the practitioner agitates the needles in order to produce pain relief. Pain relief is based on the belief that health is a state of constantly changing flow of energy which, when unbalanced, causes disease and pain. Acupuncture is thought to help regulate the body’s energy flow back to a state of balance. Though the energy flow theory has not been proven, it has been demonstrated that acupuncture stimulates the body’s endorphins and monoamines.

**Heat** has been found effective in soothing inflamed muscles and helping to reduce inflammation, particularly for post-traumatic pain, rheumatic aches, and neck and back pain. It is best used after initial inflammation has resolved, usually 24 hours after injury occurs. Also, heat can be applied before mobilization is attempted, allowing for a greater degree of movement as well as increased comfort. When heat is applied there is increased blood flow, decreased vasomotor tone, and increased tissue metabolism providing overall effects of analgesia, reduced muscle spasticity, sedation, and elevation of the pain threshold. Heat should not be used, however, at the site of neoplasms, skin desensitization, vascular insufficiency, active infection, or bleeding. Heat should also be used with a skin barrier between the heat source and the skin to prevent burns.

**Cold** application can be as effective as heat and is usually the first application in an initial acute injury. Cold reduces inflammation and swelling through decreasing vascular flow. It is useful to lessen muscle spasticity and may elevate pain threshold by reducing nerve conduction velocity. Contraindications for cold therapy include vascular insufficiency and conditions directly aggravated by cold, such as Raynaud’s syndrome. Both hot and cold are useful for analgesia, and the choice may be simply a matter of patient preference.

A **TENS** unit is a portable machine attached to the patient’s skin at specific trigger points or peripheral nerves near the site of pain. The practitioner applies the unit and then, with patient input, adjusts the placement, frequency, and voltage. A TENS unit can either be set for continual or periodically delivered electrical stimulation in order to provide for optimal pain relief. The electrical current stimulates sensory cutaneous nerve endings that are thought to block deeper, more painful sensations. Additionally, TENS may stimulate the release of endorphins. Patients report that the stimulus feels like a pricking or buzzing sensation. TENS has been found to be very effective for certain types of pain, such as rheumatic aches, back and neck pain, stump pain, postoperative pain, and neuralgia. People with cardiac arrhythmias or pacemakers should not use...
a TENS unit. Also, TENS should not be placed over an open wound or on areas of desensitivity.

Another nonpharmacologic treatment option is biofeedback. Biofeedback requires the use of special equipment and trained practitioners, which can be a costly endeavor. The patient is taught, through systematic trial and error, to condition brain wave activity. The patient is attached to a machine that relays information about body changes occurring and thus, the patient learns to control or replace those associated with pain with a more pleasant experience. Biofeedback has been found to be effective for a variety of painful conditions including headaches and osteoarthritis.

Easing Pain Without Swallowing a Pill

Somewhere along the line, pain relief became synonymous with swallowing a “pill.” But nature offers relief can be just as effective when applied topically, especially for joint and muscle pain. There is a growing list of plants that have been and continue to be explored for pain. Some of the more common ones are: comfrey, arnica, capsaicin, and marijuana.

There is comfort from the herb comfrey for the treatment of painful muscles and joints. In fact, the herb has been used for centuries in Europe and parts of Asia for both pain and wound healing. Numerous controlled studies have confirmed its impact on pain, including sources of its anti-inflammatory and analgesic effects. In a double-blind clinical trial, 220 osteoarthritis patients applied 2 grams of ointment three times a day to a painful knee joint. The ointments were randomly given containing either comfrey or a placebo. In terms of self-rated pain, there was a 55% pain decrease in the comfrey group as opposed to 11% in the placebo group. Pain was reduced both at rest and with pain on movement, mobility improved, and quality of life increased. In a two-week study that compared a comfrey ointment with conventional cryotherapy, acute ankle distortion patients pain and swelling symptoms improved significantly faster for those with the comfrey treatment.

An herb that works better than ibuprofen? Some claim that would be arnica, the perennial plant native to Europe and North America. Independently, different cultures concluded that arnica has properties to help with injuries. The yellow-orange flowers of this plant have been used in preparations for centuries. Today, topical arnica is used for different conditions such as bruises, muscle aches, sprains, inflammation, rheumatic pain, wound healing, insect bites, and swelling due to fractures. In 1981, a compound was isolated in arnica called helenalin. Testing has since confirmed that it has both anti-inflammatory and anti-neoplastic effects when tested in a lab. However, testing in vivo has been less compelling. While some small clinical tests with high percentage tinctures have shown moderate efficacy, tests with arnica at homeopathic levels have not supported arnica’s use for the aforementioned conditions pain beyond a placebo effect.

What about the heat of chili peppers? The hot feeling, red face, and watery eyes you experience when you bite into a red chili pepper may make you reach for a cold drink, but that reaction has also given scientists important information about pain receptors. The chemical found in chili peppers that causes those feelings is capsaicin (pronounced cap-SAY-sin), and it works its magic by grabbing onto receptors scattered along the surface of sensitive nerve cells in the mouth.

More than two decades ago, scientists at the University of California at San Francisco discovered a gene for a capsaicin receptor called the vanilloid receptor. Once in contact with capsaicin, vanilloid receptors open and pain signals are sent from the peripheral nociceptor and through central nervous system circuits to the brain. Investigators have also learned that this receptor plays a role in the burning type of pain commonly associated with heat, such as the kind you experience when you touch your finger to a hot stove. The vanilloid receptor functions as a sort of “ouch gateway,” enabling us to detect burning hot pain, whether it originates from a three-alarm habanero chili or from a stove burner.

Capsaicin is currently available as a prescription or over-the-counter cream for the treatment of a number of pain conditions, such as shingles. It works by reducing the amount of substance P found in nerve endings and interferes with the transmission of pain signals to the brain. Individuals can become desensitized to the compound, however, perhaps because of long-term damage to nerve tissue. Some individuals find the burning sensation they experience when using capsaicin cream to be intolerable, especially when they are already suffering from a painful condition, such as postherpetic neuralgia. Soon, however, better treatments that relieve pain by blocking vanilloid receptors may arrive in drugstores.

Cannabis, familiarly known as marijuana, is gaining traction as a pain modality as more states legalize and broaden medical use. Compounds of cannabis, called cannabinoids, work by binding with receptors in the brain and body which in turn modulate various human functions. Although research in the United States is challenging due to the classification of cannabis as a Schedule I drug, efficacy for pain usage has been established by multiple, randomized controlled clinical trials. In June 2015, JAMA, The Journal of the American Medical Association reported an evidence review of medical literature of medical marijuana from 1948-March 2015. They reported that, “Use of marijuana for chronic pain, neuropathic pain and spasticity due to multiple sclerosis is supported by high-quality evidence.”

Since laws vary from state to state, both
Principles of Pain Treatment

Some principles to remember when administering pain treatments include obtaining the patient’s consent before implementation, particularly for the nonpharmacologic options. Consent can be as simple as a verbal agreement to participate in the activity or the patient may need to sign an actual form. Also teach the patient to inform you of his or her pain before it becomes severe; pain is best treated before reaching a severe level. Likewise, assessments should occur on a routine basis so that pain does not become severe before it is treated. Be aware that people may not use the word pain but may call the experience an ache or discomfort. Also, do not assume that, because the patient received adequate relief for 4 hours from the last medication administration, he or she will get the same length of relief from the same amount of medicine at the next administration. Too many variables are changing throughout the day; for instance, if a painful procedure is done during one time span, or when nighttime occurs endorphins are known to be lower. It is also important to consider the patient’s willingness and ability to engage in treatment. The best methods will not help if the patient is unwilling or unable to utilize them.

Documentation

An integral part of pain treatment is documentation. Things that need to be documented for each pain intervention include:
• assessment findings
• treatments offered
• treatments utilized
• results of the treatments

Documentation can occur in a variety of forms, from narratives to flow charts or a combination; however, it is most important that documentation be done routinely in a systematic format. Documentation helps to facilitate regular reassessment and follow-up and is essential for effective pain management. Examples of documentation forms for assessment and evaluation are included in Appendices B and C.

Evolving Pain Standards

Practitioners who work with patients with cancer have long been aware of the problems caused by pain. Much of the research on pain has in fact been conducted in an effort to deal with cancer pain. Unfortunately, treatment of cancer pain is still problematic. Identified barriers include lack of knowledge and assessment skills among healthcare professionals, patient and family reluctance to report pain, fears concerning opioid medications, and physicians’ hesitancy to prescribe adequate amounts and certain medications due to fear of investigation by regulatory authorities. To overcome these barriers and to begin steps toward satisfactory pain management for patients with cancer, many healthcare professionals have focused on the process of institutionalizing pain management. The basic underlying principle of institutionalizing pain management is that healthcare professionals would make pain management a priority within their practice environment.

From the 1990s through the early part of the early part of the 21st century, the notion of pain as “the fifth vital sign” gained traction. The notion elevated pain to an importance given to real vital signs with measurements of pain taken along with measurements of temperature, pulse, blood pressure, and respirations during patient assessments.

Unfortunately, the notion in practice with the perverseness of inconsistent and incomplete pain assessments, have been cited as major factors contributing to inadequate pain management.

In 1999, California added to their Health and Safety Code that as a condition of licensure, health facilities “include pain as an item to assessed at the same time as vital signs are taken”

In 2001, the U.S. Congress established a “Decade of Pain Control and Research” H.R. 2260 which states, “This will result in focusing greater attention among scientists and practitioners into pain management and research. Further, the law charges the Attorney General to carry out educational training programs for law enforcement personnel in how better to accommodate health professionals’ legitimate use of controlled substances for pain management.”

Recognizing the importance of adequate pain management, the Joint Commission, (then known as Jethe Joint Commission on Accreditation of Healthcare Organizations or JCAHO for short) approved standards for pain management in 2001.

The standards discussed below were developed as guidelines for healthcare organizations providing ambulatory care, behavioral health care, home care, hospice care, hospital care, and long-term care. These guidelines have evolved over the years and most recently in the period 2017-2019 new and revised guidelines for pain assessment and management were developed. The older standards are offered here to provide historic perspective.

The healthcare organization addresses care at the end of life. Patients facing death need respectful, responsive care. Among the responsibilities of caregivers is managing pain aggressively and effectively and responding to the psychological, social, emotional, spiritual, and cultural concerns of the patient and the family.

Patients have the right to appropriate assessment and management of pain. Pain management is an important part of patient care. Not only should healthcare providers be educated fully on assessment and management, but patients and their families should understand its importance and appreciate their roles in managing pain.

Pain is assessed in all patients. Good patient care requires treatment of all symptoms that might be associated with a disease, condition, or treatment, including pain. The initial assessment of every patient includes pain, and appropriate treatment is provided. More comprehensive assessments may be required by the specific condition of the patient. Measures of pain intensity and quality should be used that facilitate reassessment and follow-up.

Policies and procedures support safe medication prescription or ordering. Procedures supporting safe medication prescription or ordering address, among other issues, appropriate use of patient-controlled analgesia (PCA), spinal/epidural or intravenous administration of medications, and other pain management techniques.

The patient is monitored during the post procedure period. Pain intensity and quality (e.g., the character, frequency, location, and duration of pain), and responses to treatments are to be monitored continuously.

Rehabilitation is designed to achieve an optimal level of functioning, self-care, self-responsibility, independence, and quality of life. Problems addressed during the rehabilitation process may include pain interfering with optimal level of function or participation in rehabilitation.

Patients are educated about pain and managing pain as part of treatment, as appropriate. Topics to be covered during patient/family education include understanding pain, the potential for pain accompanying various procedures, the importance of effective pain management, the pain assessment process, and methods for pain management.
The discharge process provides for continuing care based upon the patient’s assessed needs at the time of discharge. Pain and pain management should be addressed as part of the discharge planning process.

The Joint Commission collects data to monitor its performance. Each healthcare organization is expected to collect and evaluate data from patients and their families regarding their perceptions of care and service. Data considered for collection include the appropriateness and effectiveness of pain management.

In 2012 the Centers for Medicare and Medicaid Services (CMS) implemented a payment system that used scores from Hospital Consumer Assessment of Health Providers and Systems (HCAHPS) satisfaction surveys that were administered to patients 48 hours to six weeks after discharge from hospitals. Because of questions about pain management and the timing of the surveys, there was conjecture that there could be inadvertent overprescribing of pain medications in an effort to increase satisfaction ratings and thus reimbursement rates. In 2017 CMS announced they would discontinue use of the pain management part of the survey as a factor for reimbursement rates.


Accredited hospitals are required to:
- Identify pain assessment and pain management, including safe opioid prescribing, as an organizational priority
- Actively involve the organized medical staff in leadership roles in organization performance improvement activities to improve quality of care, treatment, and services and patient safety
- Assess and manage the patient’s pain and minimize the risks associated with treatment
- Collect data to monitor its performance
- Compile and analyze data

[https://www.jointcommission.org/assets/1/18/R3_Report_Issue_11_Pain_Assessment_2_11_19_REV.pdf](https://www.jointcommission.org/assets/1/18/R3_Report_Issue_11_Pain_Assessment_2_11_19_REV.pdf), last accessed January 15, 2020

For pain assessment and management, hospitals must:
- “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 non-pharmacological 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”

“The enhanced elements of performance will require ambulatory care organizations, critical access hospitals and office-based surgeries to do the following:
- Provide staff and licensed independent practitioners with educational resources and programs to improve pain assessment, pain management, and the safe use of opioid medications based on the identified needs of their patient populations
- Involve patients in developing their treatment plans and setting realistic expectations and measurable goals
- Facilitate clinician access to prescription drug monitoring program databases
- Conduct performance improvement activities focusing on pain management and safe prescribing to increase safety and quality for patients
- Ensure that the critical access hospital organized medical staff take an active part in pain assessment, pain management, and safe opioid prescribing through participating in the establishment of protocols, quality metrics, and reviewing performance improvement activities
- Monitor high-risk patients in critical access hospitals”

https://www.jointcommission.org/assets/1/18/PROVED_New_and_Revised_Pain_Assessment_and_Management_Standards.pdf, last accessed January 15, 2020

While the Standards are not publicly accessible online, The Joint Commission releases R3 (Requirement, Rational, Reference) reports related to the standards that are available to the public on their website.

**What Is the Future of Pain Research?**

In the forefront of pain research are scientists supported by the National Institutes of Health (NIH). Some pain medications dull the patient’s perception of pain. Morphine is one such drug. It works through the body’s natural pain-killing machinery, preventing pain messages from reaching the brain. Scientists are working toward the development of a morphine-like drug that will have the pain-deadening qualities of morphine but without the drug’s negative side effects, such as sedation and the potential for addiction. Patients receiving morphine also face the problem of morphine tolerance, meaning that over time they require higher doses of the drug to achieve the same pain relief. Studies have identified factors that contribute to the development of tolerance; continued progress in this line of research should eventually allow patients to take lower doses of morphine.

One objective of investigators working to develop the future generation of pain medications is to take full advantage of the body’s pain “switching center” by formulating compounds that will prevent pain signals from being amplified or stop them altogether. Blocking or interrupting pain signals, especially when there is no injury or trauma to tissue, is an important goal in the development of pain medications. An increased understanding of the basic mechanisms of pain will have profound implications for the development of future medicines. The following areas of research are bringing us closer to an ideal pain drug.

**Systems and Imaging**

The idea of mapping cognitive functions to precise areas of the brain dates back to phrenology, the now archaic practice of studying bumps on the head. Positron emission tomography (PET), functional magnetic resonance imaging (fMRI), and other imaging technologies offer a vivid picture of what is happening in the brain as it processes pain. Using imaging, investigators can now see that pain activates at least three or four key areas of the brain’s cortex, the layer of tissue that covers the brain. When patients undergo hypnosis so that the unpleasantness of a painful stimulus is not experienced, activity in some, but not all, brain areas is reduced. This emphasizes that the experience of pain involves a strong emotional component as well as the sensory experience, namely, the intensity of the stimulus.

**Channels**

The frontier in the search for new drug targets is represented by channels. Channels are gate-like passages found along the membranes of cells that allow electrically charged chemical particles called ions to pass into the cells. Ion channels are important for...
transmitting signals through the nerve’s membrane. The possibility now exists for developing new classes of drugs, including pain cocktails that would act at the site of channel activity.

**Trophic Factors**

A class of “rescuer” or “restorer” drugs may emerge from our growing knowledge of trophic factors, natural chemical substances found in the human body that affect the survival and function of cells. Trophic factors also promote cell death, but little is known about how something beneficial can become harmful. Investigators have observed that an over accumulation of certain trophic factors in the nerve cells of animals results in heightened pain sensitivity, and that some receptors found on cells respond to trophic factors and interact with each other. These receptors may provide targets for new pain therapies.

**Molecular Genetics**

Certain genetic mutations can change pain sensitivity and behavioral responses to pain. People born genetically insensitive to pain; that is, individuals who cannot feel pain have a mutation in part of a gene that plays a role in cell survival. Using knockout animal models, animals genetically engineered to lack a certain gene, scientists are able to visualize how mutations in genes cause animals to become anxious, make noise, rear, freeze, or become hypervigilant. These genetic mutations cause a disruption or alteration in the processing of pain information as it leaves the spinal cord and travels to the brain. Knockout animals can be used to complement efforts aimed at developing new drugs.

**Plasticity**

Following injury, the nervous system undergoes a tremendous reorganization. This phenomenon is known as plasticity. For example, the spinal cord is rewired following trauma as nerve cell axons make new contacts, a phenomenon known as sprouting. This in turn disrupts the cells’ supply of trophic factors. Scientists can now identify and study the changes that occur during the processing of pain. For example, using a technique called polymerase chain reaction, abbreviated PCR, scientists can study the genes that are induced by injury and persistent pain. There is evidence that the proteins that are ultimately synthesized by these genes may be targets for new therapies. The dramatic changes that occur with injury and persistent pain underscore that chronic pain should be considered a disease of the nervous system, not just prolonged acute pain or a symptom of an injury. Thus, scientists hope that therapies directed at preventing the long-term changes that occur in the nervous system will prevent the development of chronic pain conditions.

**Neurotransmitters**

Just as mutations in genes may affect behavior, they may also affect a number of neurotransmitters involved in the control of pain. Using sophisticated imaging technologies, investigators can now visualize what is happening chemically in the spinal cord. From this work, new therapies may emerge, therapies that can help reduce or obliterate severe or chronic pain.

Despite the wide variety of reasons people seek healthcare, pain is one of the most common presenting symptoms found to accompany health problems. Often, pain is the main reason a person has chosen to enter the healthcare system. And though pain is a common experience, there are many types, many influencing factors, and numerous ways to treat it. It has been noted that nurses spend more time with patients in pain than any other member of the healthcare team. Therefore, nurses have a duty to stay informed about pain so they can be competent partners with their patients towards effective pain management.

**Hope for the Future**

Thousands of years ago, ancient peoples attributed pain to spirits and treated it with mysticism and incantations. Over the centuries, science has provided us with a remarkable ability to understand and control pain with medications, surgery, and other treatments. Today, scientists understand a great deal about the causes and mechanisms of pain, and research has produced dramatic improvements in the diagnosis and treatment of a number of painful disorders. For people who fight every day against the limitations imposed by pain, continued scientific research holds the promise of an even greater understanding of pain in the coming years. Their research offers a powerful weapon in the battle to prolong and improve the lives of people with pain: hope.

**Selected Resources and Websites**

**American Chronic Pain Association**

http://www.theacpa.org

ACP A Mission

To facilitate peer support and education for individuals with chronic pain and their families so that these individuals may live more fully in spite of their pain.

To raise awareness among the health care community, policy makers, and the public at large about issues of living with chronic pain.

**American Society for Pain Management Nursing**

http://www.aspmn.org/

**Centers for Disease Control and Prevention**

CDC Guidelines for Prescribing Opioids for Chronic Pain

https://www.cdc.gov/drugoverdose/prescribing/guideline.html

**Clinical Trials**

http://www.clinicaltrials.gov

“ClinicalTrials.gov is a database of privately and publicly funded clinical studies conducted around the world.” For studies on pain, go to the “Find a Study” section on the webpage and enter “pain” in the field for Condition or disease.

**The Joint Commission**


With respect to pain assessment and management, the not-for profit healthcare accreditation organization has developed standards with “requirements that outline a multi-level approach to pain management to help frontline staff and clinicians deliver safe, individualized pain care.” Unfortunately, they are only available for purchase outside of the single copy made available to commission-accredited or certified organizations. The link above leads to the landing page from which “program-specific Requirement, Rationale, and References (R3) reports can be accessed.

**National Institutes of Health (NIH) Pain Consortium**

Pain Condition Resources

https://www.painconsortium.nih.gov/Health_Info/Pain_Conditions

The Pain Condition Resources page of NIH.gov provides an alphabetical listing of pain conditions and resources with helpful website links for more in-depth information.

**International Association for the Study of Pain**


IASP brings together scientists, clinicians, health-care providers, and policymakers to stimulate and support the study of pain and to translate that knowledge into improved pain relief worldwide.

(Note the American Pain Society which had served as IASPs chapter in the USA dissolved in 2019 after filing for bankruptcy after being named in lawsuits related to the
References


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https://www.jointcommission.org/facts_about_joint_commission_accreditation_standards_for_health_care_organizations_pain_assessment_and_management/


Schulenburg J. Considerations for complementary and alternative interventions for pain. AORN J, Mar 2015, 101(3) p319-26


Appendix A
Selected Treatments from A to Z

Acupuncture dates back 2,500 years and involves the application of needles to precise points on the body. It is part of a general category of healing called traditional Chinese medicine. Acupuncture remains controversial but is quite popular and may one day prove to be useful for a variety of conditions as it continues to be explored by practitioners, patients, and investigators. In November, 2019 clinicaltrials.gov listed 113 studies related specifically to acupuncture for pain that were either active or in the readying stages prior to being active.

Biofeedback is used for the treatment of many common pain problems, most notably headache and back pain. Using a special electronic machine, the patient is trained to become aware of, to follow, and to gain control over certain bodily functions, including muscle tension, heart rate, and skin temperature. The individual can then learn to effect a change in his or her responses to pain, for example, by using relaxation techniques. Biofeedback is often used in combination with other treatment methods, generally without side effects. Similarly, the use of relaxation techniques in the treatment of pain can increase the patient’s feeling of well-being.

Capsaicin is a chemical found in chili peppers that is also a primary ingredient in pain-relieving creams.

Chiropractic refers to hand manipulation of the spine, usually for relief of back pain, and is a treatment option that continues to grow in popularity among many people who simply seek relief from back disorders. It has never been without controversy, however. Chiropractic’s usefulness as a treatment for back pain is, for the most part, restricted to a select group of individuals with uncomplicated acute low back pain who may derive relief from the massage component of the therapy.

Cognitive-behavioral therapy involves a wide variety of coping skills and relaxation methods to help prepare for and cope with pain. It is used for postoperative pain, cancer pain, and the pain of childbirth.

Counseling can give a patient suffering from pain much needed support, whether it is derived from family, group, or individual counseling. Support groups can provide an important adjunct to drug or surgical treatment. Psychological treatment can also help patients learn about the physiological changes produced by pain.

Electrical stimulation, including transcutaneous electrical stimulation (TENS), implanted electric nerve stimulation, and deep brain or spinal cord stimulation, is the modern-day extension of age-old practices in which the nerves of muscles are subjected to a variety of stimuli, including heat or massage. Electrical stimulation, no matter what form, involves a major surgical procedure and is not for everyone, nor is it 100 percent effective. The following techniques each require specialized equipment and personnel trained in the specific procedure being used:

TENS uses tiny electrical pulses, delivered through the skin to nerve fibers, to cause changes in muscles, such as numbness or contractions. This in turn produces temporary pain relief. There is also evidence that TENS can activate subsets of peripheral nerve fibers that can block pain transmission at the spinal cord level, in much the same way that shaking your hand can reduce pain.

Peripheral nerve stimulation uses electrodes placed surgically on a carefully selected area of the body. The patient is then able to deliver an electrical current as needed to the affected area, using an antenna and transmitter.

Exercise has come to be a prescribed part of some doctors’ treatment regimes for patients with pain. Because there is a known link between many types of chronic pain and tense, weak muscles, exercise, even light to moderate exercise such as walking or swimming can contribute to an overall sense of well-being by improving blood and oxygen flow to muscles. Just as we know that stress contributes to pain, we also know that exercise, sleep, and relaxation can all help reduce stress, thereby helping to alleviate pain. Exercise has been proven to help many people with low back pain. It is important, however, that patients carefully follow the routine laid out by their physicians.

Hypnosis, first approved for medical use by the American Medical Association in 1958. Studies have confirmed that hypnosis can assist significantly with chronic pain. However, standards for intervention have not been developed. In general, hypnosis is used to control physical function or response, that is, the amount of pain an individual can withstand. How hypnosis works is not fully understood. Some believe that hypnosis delivers the patient into a trance-like state, while others feel that the individual is simply better able to concentrate and relax or is more responsive to suggestion. Hypnosis may result in relief of pain by acting on chemicals in the nervous system, slowing impulses. Whether and how hypnosis works involves greater insight and research into the mechanisms underlying human consciousness.

Low-power lasers have been used occasionally by some physical therapists as a treatment for pain.

Magnets have been used by athletes and others who swear by their effectiveness for the control of sports-related pain and other painful conditions. Usually worn as a collar or wristwatch, the use of static magnets as a treatment dates back to the ancient Egyptians and Greeks. While it is often dismissed as quackery and pseudoscience by skeptics, proponents offer the theory that magnets may effect changes in cells or body chemistry, thus producing pain relief. Controlled studies do not support their use for pain beyond a placebo effect. In addition, some magnets may cause interference with medical devices.

Physical therapy and rehabilitation date back to the ancient practice of using physical techniques and methods, such as heat, cold, exercise, massage, and manipulation, in the treatment of certain conditions. These may be applied to increase function, control pain, and speed the patient toward full recovery.

R.I.C.E., Rest, Ice, Compression, and Elevation are four components prescribed by many orthopedists, nurses, coaches, trainers, and other professionals for temporary muscle or joint conditions, such as sprains or strains. While many common orthopedic problems can be controlled with these four simple steps, especially when combined with over-the-counter pain relievers, more serious conditions may require surgery or physical therapy, including exercise, joint movement or manipulation, and stimulation of muscles.
Initial Pain Assessment Tool

Date ________________

Patient’s Name ___________________________ Age ____________ Room ____________

Diagnosis ___________________________ Physician ___________________________

Assessed by ___________________________

1. Provoking factors. What causes the pain? ___________________________

2. Pain quality. (Allow patient to use own words, or use with descriptors such as sharp, dull, burning, throb, pricking.) ___________________________

3. Location of pain. (Patient may mark directly on drawing.) Note region and radiation. ___________________________

4. Pain severity. ___________________________ (Scale used: ___________________________

   Right now __________________________________________
   At its worst __________________________________________
   At its best __________________________________________
   Highest acceptable level ___________________________
   Related symptoms __________________________________________

5. Time Factors. Does the pain vary throughout the day? When does it start? Stop? How long does it usually last? ___________________________

   __________________________________________
   __________________________________________
   __________________________________________

6. Pain related behaviors. ___________________________

   __________________________________________
   __________________________________________

7. Effects on functional status and quality of life. ___________________________

   __________________________________________
   __________________________________________

8. Treatment plan. ___________________________

   __________________________________________
   __________________________________________
Appendix C

Pain Management Flow Chart

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<th>Time</th>
<th>* Pain Rating</th>
<th>Analgesic Admin.</th>
<th>Other Relief Measures</th>
<th>R</th>
<th>P</th>
<th>BP</th>
<th>Level of Arousal</th>
<th>Side Effects</th>
<th>Concerns of Patient/family</th>
<th>Other Comments</th>
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*Scale used: __________