Part Three  Clinical Categories and Uses of Drugs

chapter 7  Drugs for Pain and Sleep Problems

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Objectives
After studying this chapter you should be able to:

1. Identify personal factors that affect a patient’s perception of pain.
2. Compare the features of acute pain with those of chronic pain.
3. Describe the different types of pain-control drugs.
4. Compare the features of drugs classified as controlled substances.
5. Explain what to do before and after giving an opioid drug for pain control.
6. List the names, actions, usual adult dosages, possible side effects, and adverse effects of commonly prescribed opioid drugs for pain control.
7. Explain what to teach patients about opioid drugs for pain control, including what to do, what not to do, and when to call the prescriber.

8. List the names, actions, usual adult dosages, possible side effects, and adverse effects of commonly prescribed nonopioid drugs for pain control.
9. Explain what to teach patients about nonopioid drugs for pain control, including what to do, what not to do, and when to call the prescriber.
10. Describe life span considerations for pain-control drugs.
11. List the names, actions, usual adult dosages, possible side effects, and adverse effects of drugs for sleep problems.
12. Explain what to do before and after giving a drug for sleep problems.
13. Explain what to teach patients about drugs for sleep problems.
14. Describe life span considerations related to drugs for sleep problems.

Key Terms

acute pain (ə-KYÜT PÄN) (p. 99) Pain that has a sudden onset, an identifiable cause, and a limited duration; triggers physiologic changes; and improves with time even when it is not treated.

addiction (ə-DIK-shon) (p. 105) The psychologic need or craving for the “high” feeling that results from using opioids when pain is not present.

analgesics (ə-nal-JÉ-zé-ik) (p. 101) Drugs that provide pain relief by either changing the perception of pain or reducing its source.

antihistamines (ən-tih-HIS-ta-menz) (p. 113) Drugs used to treat allergies and allergic reactions.

benzodiazepine receptor agonists (bén-zö-di-AZ-e-pén ré-SEP-tür A-gōn-‘ists) (p. 113) Drugs that depress the central nervous system and induce sleep by binding with gamma-aminobutyric acid (GABA) receptors.

benzodiazepines (bén-zö-di-AZ-e-pénz) (p. 113) A class of psychotropic drugs with hypnotic and sedative effects, used mainly as tranquilizers to control symptoms of anxiety or stress and as sleeping aids for insomnia.

chronic pain (kron’ik PÄN) (p. 100) Pain that has a long duration, may not have an identifiable cause, does not trigger physiologic changes, and persists or increases with time.

controlled substance (köN-TRÖLD SÜP-stëms) (p. 101) A drug containing ingredients known to be addictive that is regulated by the Federal Controlled Substances Act of 1970.

dependence (di-PEN-dëns) (p. 105) Physical changes in autonomic nervous system function that can occur when opioids are used long term.

insomnia (in-SÕM-në-ú) (p. 112) Inability to go to sleep or to remain asleep throughout the night.

narcolepsy (NAr-kol’ëp-sé) (p. 116) A sleep problem with sudden, uncontrollable urges to sleep, causing the person to fall asleep at inappropriate times.

nociceptors (no-si-SÉP-tür) (p. 98) Free sensory nerve endings that, when activated, trigger a message sent to the brain that allows the perception of pain.

nonopioid analgesic (nöN-ö-pëd’-ëyd ān-āl-JÉZ-ik) (p. 107) A drug that reduces a person’s perception of pain; it is not similar to opium and has little potential for psychologic or physical dependence.

opioid analgesic (ō-pëd’-ëyd ān-āl-JÉZ-ik) (p. 103) A drug containing any ingredient derived from the poppy plant (or a similar synthetic chemical) that changes a person’s perception of pain and has a potential for psychologic or physical dependence.
PAIN

Pain is whatever the patient says it is and exists whenever he or she says it does.

Assess the patient for pain whenever you check his or her vital signs.

Memory Jogger

Pain, like life, is personal and subjective with no objective measures. It is common, and everyone experiences it in a different way. Therefore pain is what the patient says it is. The best way to describe and monitor pain is through the patient’s own report.

Pain is an unpleasant sensory and emotional experience associated with tissue damage. We perceive pain with all our senses. How we feel and react to pain depends on our emotional makeup along with our previous experiences with pain. Issues such as culture, age, gender, and our interactions with society also affect our responses to pain.

Pain is called the **fifth vital sign** because unrelieved or undertreated pain is a common but avoidable health problem. In addition, the presence of some types of pain changes the other four vital signs (pulse, respiratory rate, temperature, blood pressure). Checking for pain as often as we check other vital signs increases our awareness of its presence and of the patient’s actual responses to drugs and other interventions.

Pain is divided into **acute** and **chronic**, with chronic pain having additional divisions. Acute pain is the most common reason that patients seek medical help. The five most common sources of acute pain are muscle, gastrointestinal, chest pain, headache, and injuries (especially when bones are broken or tissues are swollen).

Chronic pain changes a person’s life and affects not only those with pain but their families. Chronic means that a person lives with pain all day, just about every day, and has done so for at least 6 months. One type of chronic pain is the pain caused by cancer.

Pain is often both underreported and undertreated, leading to poor pain control. Box 7-1 lists factors that contribute to the poor reporting and treatment of pain. One factor in good pain control is recognizing the severity of the patient’s pain, even when he or she cannot describe it.

How much pain the patient feels is called **pain intensity**. There are several ways to work with the patient to determine pain intensity. Figure 7-1 shows examples of common pain scales that are useful for an alert patient to rate his or her pain. When the patient cannot speak or when you are working with young children, a nonverbal scale called FACES may be used (Figure 7-2). The patient picks the face on the scale that best represents how he or she is feeling. Another scale, the FLACC scale, is often used for nonverbal patients.
Box 7-1 Barriers to Good Pain Management

- Patient’s and health care worker’s fear of addiction
- Patient’s fear of meaning of pain, for example:
  - Worsening of condition
  - Threats to independence
  - Impending death
- Patient’s and health care worker’s belief that pain is an expected part of aging
- Patient’s fear of testing
- Health care worker’s fear of “drugging the older adult”
- Health care provider’s fear of overdosing a patient


FIGURE 7-2 The Wong-Baker FACES Pain Rating Scale for children and nonverbal adults.

Memory Jogger
Check behaviors for pain in patients who cannot point or express pain in words.

used for infants, very young children, and any patient who cannot express pain in words or point to a face (Figure 7-3). This scale uses observations and scoring of behaviors to establish a pain intensity level.

Follow the guidelines set by your workplace for the treatment of pain. Reassure the patient that you know that the pain is real and you will do whatever you can to relieve it.
FIGURE 7-3 The FLACC pain rating scale for infants and patients who are not alert.

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
</tr>
</tbody>
</table>

Each of the five categories—(F) Face, (L) Legs, (A) Activity, (C) Cry, (C) Consolability—is scored from 0-2, which results in a total score between 0 and 10.

FIGURE 7-4 A sensory pathway for pain perception.

REVIEW OF RELATED PHYSIOLOGY AND PATHOPHYSIOLOGY

PAIN ORIGIN AND TRANSMISSION

Acute pain, although uncomfortable, can be a helpful response because it tells us that something is wrong and often where it is wrong. The brain is the place where pain is actually “felt” (Figure 7-4). If you stub your toe, the damage stimulates nerve endings that send messages along a sensory nerve to the place in your brain where that particular nerve stops. The message triggers your brain to know that your toe hurts. So, even though the damage causing the pain occurs in the toe, it is your brain...
that *perceives* the pain. If the sensory nerve between your toe and your brain were severed, you would not feel pain in your toe no matter how badly you injured it. Also, if the area of your brain that is connected to the sensory nerve of the toe were damaged or destroyed, you would not feel pain as a result of hurting your toe.

**Nociceptors** are sensory nerve endings that, when activated, trigger the message sent to the brain that allows the perception of pain (Figure 7-5). Nociceptors can be activated when body chemicals called *mediators* bind to them. The mediators for pain include substance P ("P" is for "pain") and many of the same mediators that cause the symptoms of inflammation, especially bradykinin (see Chapter 8). When mediators are released from damaged tissue (such as when you stub your toe), they bind to the nociceptors and activate them (see Figure 7-5). Once activated, the receptor starts electrical changes that send the message along the nerve to the brain.

Other ways that the receptors can be triggered include changing their shapes (by stretching or applying pressure), exposing them to extreme heat or cold, and reducing the oxygen level in the tissue surrounding them. For example, when you have a large amount of intestinal gas, the wall of the intestine and the nociceptors in the

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**FIGURE 7-5** Sensory nerve endings (nociceptors) triggered by different types of stimuli to send pain messages to the brain.

Pain perception occurs in the brain, not at the site of injury.
intestinal walls are stretched. This stretching activates the nociceptors, which makes you feel abdominal pain.

Different types of nerve fibers transmit pain messages to the brain. These fibers differ in how fast they transmit the message, where they are located, and what type of pain sensation is transmitted. This is one reason why not all pain drugs work in the same way and why some drugs are very effective in relieving one type of pain and not effective at all for another.

**PAIN PERCEPTION**

Different nerve fibers end in different areas of the brain. This means that the brain perceives pain on different levels. At lower brain levels the person may not know exactly what is wrong but will try to move away from a pain source. This type of response can occur even when the person is asleep or not fully conscious. At the highest brain levels the person can pinpoint the location of pain and describe it.

Some fibers pass through areas of the brain where emotions and memories are stored, allowing emotions, memories, and behavior to affect pain perception. In addition, because nerve fibers pass through many body areas on the way to the brain and interact with other nerves, the perception of pain location is not always direct. Pain may be localized, which means that the patient feels pain that is confined to the site where the tissue damage is located. For example, when you stub your toe, you know which foot and which toe are affected. Other times the patient feels the pain all along the path of the nerve from the point of the damaged tissue to the spinal cord. For example, an injury to the little finger in the left hand may cause a person to have pain all along the underside of the left forearm. This type of pain is called projected pain. Sometimes a person feels the pain all around and extending out from the problem causing the pain. For example, the pain of a heart attack is often felt as chest pain that extends up the jaw and down the left arm. This type of pain is called radiating pain. A person may sense pain in an area that is not close to the tissue causing the pain (referred pain). For example, pain from gallstones is often felt under the right shoulder blade instead of directly at the location of the gallbladder.

Each person’s pain perception is different. The smallest amount of tissue damage that makes a person aware of having pain is known as the pain threshold. It is the point that a person first feels any pain. The pain threshold is different for every person and varies from one body site to another. Factors such as age and the presence of other diseases also affect pain threshold. Most drugs used for pain control change (raise) the patient’s pain threshold.

Related to pain threshold is pain tolerance, which is a person’s ability to endure or “stand” the pain intensity. Behavioral and emotional factors rather than physical factors are more likely to affect a person’s pain tolerance. These factors are modifiable and include what the person thinks the pain means, how family and friends expect the patient to behave while in pain, and previous experience with pain. This makes pain tolerance unique to each person. Fear, anxiety, and lack of sleep are a few factors that reduce a person’s pain tolerance. Relaxation and distraction increase pain tolerance.

Pain tolerance is so personal that you cannot determine a person’s level of pain on the basis of behavior. You must always ask patients about their pain. Just because a person tolerates pain does not mean that he or she isn’t suffering!

**TYPES OF PAIN**

Pain also is divided into types on the basis of its cause, how long it lasts, and whether it is present continuously or comes and goes (intermittent). The three main types of pain are acute, chronic, and cancer. Table 7-1 lists the features of acute and chronic pain.

**Acute Pain**

Acute pain has a sudden onset, an identifiable cause, and a limited duration; triggers physiologic changes; and improves with time even when it is not treated. It is the...
part
Three
Clinical Categories and Uses of Drugs

most common pain type; typical causes include trauma, surgery, heart attack, inflammation, and burns. Even though acute pain is temporary and decreases as the damaged tissue heals, it can be severe and should be treated.

One of the main features of acute pain is the physical response of the body to it. Pain is a stressor, and acute pain triggers the stress response (sometimes called the fight or flight response). This response occurs whenever the sympathetic part of the autonomic nervous system is activated. The stress response includes elevated heart rate, respiratory rate, and blood pressure. Skin becomes cool and clammy with increased sweating of the hands and feet. The mouth becomes dry, and usually the pupils of the eyes dilate. A person’s behavioral responses when the stress response is triggered by acute pain include restlessness, inability to concentrate, general distress, and a sense that something bad is happening (sometimes called a sense of impending doom).

Chronic Pain
A traditional definition for separating acute pain from chronic pain is that chronic pain is present daily for 6 months. It persists or increases with time, may not have an identifiable cause, and does not trigger the stress response. Chronic pain may hurt less on some days than others but is usually always present. Causes may be difficult to find. This problem has often led to family members and health care workers not believing the patient’s reports of pain and its intensity.

One of the most important differences between acute and chronic pain is that chronic pain is present so long that the stress response of the body is no longer triggered. This means that a person with chronic pain can have severe pain intensity without changes from the normal ranges for heart rate, breathing rate, or blood pressure.

Cancer Pain
Cancer pain, sometimes called malignant pain, has both unique features and features in common with acute and chronic pain. Not every person with cancer has pain. Box 7-2 lists the main features of cancer pain.

Cancer pain has many causes and is complex. This means that more than one pain strategy and often more than one type of drug for pain control are needed. In addition, the diagnosis of cancer may increase this patient’s anxiety and fear, making the pain worse.

Often the patient with cancer receives traditional pain-control drugs but at much higher doses than those prescribed for other types of pain. The drug therapy plan may include every type of pain-control drug given in combination to ensure ade-
Drugs for Pain and Sleep Problems

**Box 7-2 Main Features of Cancer Pain**

- The most distressing and most feared complication of cancer
- Complex, with many emotional and physical issues
- More than one cause
- Shares features with acute pain and chronic pain
- Can be present in more than one body area at the same time
- Usually occurs later in cancer progression
- Can be managed but usually requires more than one drug type for adequate control
- Type of pain in which nonopioid miscellaneous drugs play a major role

**GENERAL ISSUES RELATED TO ANALGESIC DRUG THERAPY**

Pain is the number one health problem that drives people to seek medical help. It interferes with every aspect of a person’s life and usually decreases the quality of life. Pain control involves many different approaches. Drug therapy is one approach. *Usually the nondrug therapies for pain control are used along with drug therapy, not in place of it.* The use of other therapies such as relaxation, massage, distraction, guided imagery, and application of electrical stimulation to the skin over a painful area can reduce the amount of drugs or change the type of drugs needed to help control pain.

**Analgesics** are drugs that control pain, by changing either the perception or the source of pain. Different types of drugs are used for pain control based on their composition and how they work. The three main types of pain control drugs include opioids, nonsteroidal anti-inflammatory drugs, and nonopioid miscellaneous drugs. Different types of pain respond differently to each drug type.

All analgesic drugs provide some degree of pain relief; but some drugs are stronger than others, and it may take a greater amount of a weaker drug to provide the same amount of pain relief that a stronger drug provides.

Drugs prescribed for pain control have traditionally been ordered on a PRN or “as needed” basis, usually with a range of doses permitted (for example, “Give morphine sulfate 2 to 6 mg IV every 4 to 6 hours PRN”). Such drug orders, known as *range orders*, are not always effective for controlling acute pain because there is too much variation in the timing and dose of the drug. Patients often try to go as long as possible before accepting another dose, or health care workers may stick to the lowest doses and the longest durations.

Better pain-control plans involve two techniques: doses are given on a schedule around the clock to prevent complete elimination of the drug before the next dose, or the patient is given a machine to “punch in” a small intravenous (IV) dose whenever the need arises. This is called *patient-controlled analgesia (PCA).* Sometimes these two techniques are used at the same time for personalized and effective pain control.

Many drugs used for pain control have ingredients that may be addictive. In the United States any drug that contains ingredients known to be addictive is classified by the federal government as a *controlled substance* and is regulated by the Federal Controlled Substances Act of 1970. This act classifies controlled substances into five different schedules based on how likely they are to result in addiction. The drugs most likely to lead to addiction are in schedule I. Those with the least potential for addiction are in schedule V. Table 7-2 describes and lists examples of drugs in each category.

The agency with the responsibility for enforcing the distribution of controlled substances in the United States is the Drug Enforcement Administration (DEA). The DEA reviews the actions of individual prescribers and investigates when the amount or type of drugs prescribed for a patient or a group of patients suggests controlled-substance abuse.

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**Learning Activity 7-2**

**Clinical Pitfall**

Do not rely on nondrug therapies alone for pain control.

**Memory Jogger**

Analgesics include:

- Opioids.
- Nonsteroidal anti-inflammatory drugs (NSAIDs).
- Nonopioid miscellaneous drugs.

**Clinical Pitfall**

Pain drugs have varying strengths and dosages to achieve the same level of pain relief.

**Memory Jogger**

In the United States drugs and drug products with the highest potential for addiction or abuse are classified as schedule I; those with the lowest potential for addiction or abuse are classified as schedule V.
### Table 7-2 Classification of Controlled Substances (United States)

<table>
<thead>
<tr>
<th>SCHEDULE</th>
<th>DESCRIPTION</th>
<th>EXAMPLES</th>
</tr>
</thead>
</table>
| I        | High potential for abuse  
No accepted medical use in treatment in United States  
Lack of accepted safety for use of the drug or other substance under medical supervision | More than 80 drugs or substances of which the following are the most well known:  
Alpha-acetylmethadol; gamma-hydroxybutyric acid (GBH); heroin; lysergic acid diethylamide (LSD); marijuana; mescaline; peyote; “quaaludes” |
| II       | High potential for abuse  
Currently accepted use for treatment in United States  
Abuse may lead to severe psychologic dependence or physical dependence | More than 30 drugs or substances of which the following are the most well known:  
Amphetamines; cocaine; codeine; fentanyl; hydromorphone (Dilaudid); meperidine (Demerol); methadone; methylphenidate (Ritalin); morphine; oxycodone (Percodan); pentobarbital; secobarbital |
| III      | Potential for abuse less than the drugs or substances in schedules I and II  
Currently accepted medical use for treatment in the United States  
Abuse may lead to moderate or low physical dependence or high psychologic dependence | Most drugs are compounds containing some small amounts of the drugs from schedule II along with acetaminophen or aspirin such as Tylenol No. 3 or No. 4, Fiorinal  
Other drugs include anabolic steroids such as testosterone preparations and sodium oxybate (Xyrem), a drug containing GHB for use with the sleep disorder narcolepsy |
| IV       | Low potential for abuse relative to the drugs or substances in schedule III  
Currently accepted medical use for treatment in the United States  
Abuse may lead to limited physical dependence or psychologic dependence relative to the drugs or substances in schedule III | Include diet drugs with propionic acid  
Other well-known drugs include benzodiazepines (lorazepam [Ativan], flurazepam [Dalmane], diazepam [Valium], midazolam [Versed], alprazolam [Xanax]); chloral hydrate; paraldehyde; pentazocine (Talwin); phenobarbital |
| V        | Low potential for abuse relative to the drugs or substances in schedule IV  
Currently accepted medical use in the United States  
Abuse may lead to limited physical dependence or psychologic dependence relative to the drugs or substances in schedule IV | Include cough preparations with small amounts of codeine and drugs for diarrhea that also contain small amounts of opioids such as diphenoxylate with atropine (Lomotil) |

Source: United States Drug Enforcement Administration (DEA), Title 21, Section 812.

Many different drug types can be used as analgesia for pain control. Each type has both different and common actions and effects. The intended response of all pain-control drugs is to reduce pain. General nursing responsibilities for safe administration of drugs for pain control are listed in the following paragraphs. Specific nursing responsibilities are listed with each individual drug class.

Responsibilities before administering pain-control drugs include checking the patient’s pain intensity using the pain scale preferred by your workplace (see Figures 7-1 through 7-3). Checking the pain level before you give a drug helps to determine how effective the drug is in relieving the patient’s pain.
Check to see when the patient last received the drug for pain control. Giving doses too close together can lead to more side effects or toxic levels. Giving doses too far apart can lead to pain and suffering for the patient. If the patient is to receive a drug on a regular schedule rather than PRN, try to keep on schedule even if the patient is sleeping or is not reporting pain. A sleeping patient is not necessarily comfortable or pain free.

Responsibilities after administering a pain-control drug include asking how much pain relief the patient has received as a result of the drug. This helps to determine if the drug is right for the patient’s pain, if the dose needs to be changed, or if the pain control strategy must be adjusted. Figure 7-6 shows two scales to determine how well a drug may relieve a patient’s pain. Check pain relief after 30 minutes and then hourly until the next dose is scheduled.

Teach the patient taking a pain-control drug that the best pain relief occurs when drugs are taken on a regular schedule rather than PRN. If the patient thinks that the pain is improving and less drug is needed, tell him or her to first reduce the dose but maintain the schedule. If the pain continues to improve, the time between doses may be increased. Remind the patient that addiction will not occur if the drugs are taken to relieve pain.

**OPIOIDS (NARCOTICS)**

Opioid analgesics, also called narcotics, are drugs that contain any ingredient derived from the poppy plant (or a similar synthetic chemical) that change a person’s perception of pain and have the potential for psychologic or physical dependence. All opioids work in the same way and have similar side effects. The main difference among various types of opioids is the strength of the drug.

Opioids can be addictive and are classified by the U.S. federal government as schedule II drugs. They also have a high potential for abuse that can lead to psychologic or physical dependence. The fear of addiction to opioids is one cause of poorly treated pain. In addition, opioids are high-alert drugs that have an increased risk of causing patient harm if used in error. The error may be giving too high a dose, giving too low a dose, giving a dose to a patient for whom it was not prescribed, and not giving it to a patient for whom it was prescribed.

The following table describes opioids most commonly used for pain control. Be sure to consult a drug reference for more information about any specific opioid. The

![FIGURE 7-6 Examples of patient pain-relief rating scales. A, Pain-relief visual analog scale. B, Percent pain-relief scale.](image-url)
dosages listed are those recommended for acute pain. The dosages used for other pain types may be much higher. Opioids given parenterally are usually single-agent drugs. When given orally, opioid tablets, capsules, or liquids may contain other drugs such as acetaminophen or aspirin.

### Dosages for Common Opioids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
</table>
| **morphine** (Morphine Sulfate, Duramorph, Epiphen, Morphitec, Roxanol, MS Contin) | Adults: 10-30 mg orally every 4 hr (Children’s oral dose calculated individually based on the child’s age, size, and pain severity)  
Children: 5-20 mg IM or 4-10 mg IV every 4 hr  
Children: 100-200 mcg/kg IM or 50-100 mcg/kg IV every 4 hr |
| **hydromorphone** (Dilaudid, Hydrostat) | Adults: 2-7.5 mg orally every 3-6 hr; 1-4 mg IM every 4 to 6 hr; 500 mcg-1 mg IV every 3 hr as needed  
Safety and efficacy in children not established |
| **meperidine** (Demerol) | Adults: 50-150 mg orally, IM, or IV every 3 to 4 hr  
Children: 1.1-1.7 mg/kg orally or IM every 3 to 4 hr |
| **codeine** (Paveral) | Adults: 15-60 mg orally or IM every 3-6 hr  
Children: 5.5 mg/kg orally or IM every 3-6 hr |
| **fentanyl** (Fentanyl, Actiq, Oralet) | Oral lozenges and lollipops vary in strength; check carefully  
Adults: 0.05-0.1 mg IM every 1-2 hr, or 2.5-10 mg patch every 72 hr |
| **oxycodone** (OxyContin, OxyFast, Supeudol) | Adults: 10-160 mg orally every 12 hr |
| **oxycodone with acetaminophen** (Endocet, Percocet, Tylox) | Adults: 1.5-10 mg orally every 4-6 hr |
| **oxycodone with aspirin** (Endodan, Oxydol, Percodan) | Adults: 1.5-10 mg orally every 4-6 hr |
| **oxymorphone** (Opana, Numorphan) | Adults: 10-20 mg orally every 4-6 hr |
| **hydrocodone** (Lortab, Vicodin) | Adults: 5-10 mg orally every 4-6 hr  
Children: 2-5 mg orally every 4-6 hr |
| **hydrocodone with acetaminophen** (Dolacet, Polygesic, Vicodin) | Adults: 5-7 mg orally every 4-6 hr  
Children: 2.5 mg orally in solution every 4-6 hr |
| **tramadol** (Ultram) | Adults: 50-70 mg orally every 6 hr |

**Do Not Confuse**

- **OxyContin with MS Contin**: An order for OxyContin can be confused with MS Contin. Although both drugs are opioids, the large differences in dosages make underdosing or overdosing possible.
- **Hydromorphone with Morphine**: An order for hydromorphone can be confused with morphine. Although both drugs are opioids, hydromorphone is five times stronger than morphine. Giving hydromorphone in place of morphine could result in a serious overdose.
- **Tramadol with Toradol**: An order for tramadol can be confused with Toradol. Tramadol is an oral opioid analgesic. Toradol is a nonsteroidal anti-inflammatory drug (NSAID) that can be given orally or parenterally.

**Did You Know?**

You make your own opioids when you have pain and during extreme physical labor.

**How Opioids Work**

The classic opioid is morphine. Morphine and all other opioids work by binding to opioid receptor sites in the brain and other areas. When specific opioid receptor sites are bound by morphine, they are activated and alter a person’s perception of pain. Opioids only alter the perception of pain; they do nothing at the site of damaged tissue to reduce the cause of pain.

We have opioid receptor sites because the body makes its own opioid-like chemicals called *endorphin* and *enkephalin*. When these two substances bind to opioid receptors, they activate these receptors, decreasing pain and increasing the feeling of well-being. This means that opioids are receptor agonists because they work in the same way as endorphins and enkephalins to activate opioid receptors.
Side Effects. The most common side effect of opioids is constipation. Some patients may have nausea and vomiting if intestinal motility is affected. At higher dosages drowsiness is common.

Adverse Effects. Respiratory depression is possible when opioids are used, especially at higher doses and when the drugs are given intravenously. Most patients only have mild respiratory depression, with respirations dropping to 7 to 12 breaths/minute. If severe (less than 8 breaths/minute), action must be taken to prevent hypoxia (low tissue oxygen levels).

Addiction, dependence, tolerance, and withdrawal can occur with opioid use. Dependence is the physical changes in autonomic nervous system function that can occur when opioids are used long term (more than a few weeks, especially after pain is reduced or no longer present). Addiction is the psychologic need or craving for the “high” feeling resulting from the use of opioids when pain is not present. When opioids are needed for pain, their use seldom causes either dependence or addiction.

Two other adverse effects or problems of opioid use are tolerance and withdrawal. Tolerance is the adjustment of the body to long-term opioid use that increases the rate that the drug is eliminated and reduces the main effect (pain relief) and side effects of the drug. It occurs with anyone who is taking opioids for a long period of time, whether or not he or she has pain. More drug is needed to achieve the same degree of pain relief.

Withdrawal is the occurrence of autonomic nervous system symptoms when long-term opioid therapy is stopped suddenly after physical dependence is present. Symptoms include nausea, vomiting, abdominal cramping, sweating, delirium, and seizures. This reaction seldom occurs in a patient who is taking opioids for pain. It is common among people who are not in pain but who take opioids for the psychologic “high” that they can produce.

What To do Before Giving Opioids
Be sure to review the general nursing responsibilities related to analgesic therapy for pain (p. 102) in addition to these specific responsibilities for opioid drugs.

Check the patient’s respiratory rate and oxygen saturation. Opioids can cause some degree of respiratory depression.

Check the dose and the specific drug name carefully. Opioids are not interchangeable because the strength of the drugs varies. Only the prescriber can change the drug order. Drug doses must be recalculated by the prescriber when one opioid is switched to another.

What To do After Giving Opioids
Be sure to review the general nursing responsibilities related to analgesic therapy for pain (p. 103) in addition to these specific responsibilities for opioids.

Monitor the patient’s respiratory rate and oxygen saturation at least hourly. If the respiratory rate is 8 or less and the patient is sleeping, try to wake him or her. First call the patient’s name. If there is no response, gently shake his or her arm. Shake more firmly if needed. If the patient does not respond to these actions, use a slightly stronger trigger (without using enough force to cause harm) such as:

• Squeezing the trapezius muscle (located at the angle of the shoulder and neck muscle).
• Applying pressure to the nail bed.

If the patient cannot be aroused, immediately call for help. If the patient’s oxygen saturation is below 95% or is five percentage points lower than his or her normal saturation, arouse the patient and check the saturation when fully awake. If the saturation does not improve when fully awake, apply supplemental oxygen and notify the charge nurse or prescriber.

When respiratory depression is severe, the opioid effects may need to be reversed by giving an opioid blocker (antagonist) such as naloxone (Narcan). When an IV
An opioid blocker is given, it replaces opioids on the opioid receptors. When the opioid is off the receptors, all the effects of the opioids are reversed within 1 minute, including respiratory depression. Unfortunately the pain control effects are also reversed. Watch the patient who has received an opioid receptor blocker for respiratory depression very closely for several hours in case respiratory depression recurs.

A patient receiving an opioid may become very drowsy and is at risk for falling. Be sure to raise the side rails. Place the call light button within easy reach for the patient. Remind him or her to call for help to get out of bed for any reason.

When a patient is receiving opioids for several days, ask about constipation daily. Most patients taking opioids for 2 days or longer have constipation. Urge the patient to drink plenty of fluids and be sure to give any prescribed stool softeners or laxatives.

Opioids can cause a sudden lowering of blood pressure, especially when the patient changes position (orthostatic hypotension). Help the patient change position slowly. When getting out of bed, he or she should sit for a few minutes on the side of the bed before attempting to get up. Help him or her during walking to help prevent falling.

**What To Teach Patients About Opioids**

Be sure to teach patients the general care needs and precautions related to analgesic therapy for pain (p. 103) in addition to these specific responsibilities for opioids.

Opioids can cause nausea and vomiting. Taking opioids with food rather than on an empty stomach can reduce this problem.

Opioids cause drowsiness. Warn the patient not to drive or operate heavy machinery when taking these drugs. In addition, the patient may feel dizzy or light-headed from a sudden drop in blood pressure. Tell him or her to move slowly when rising or changing positions.

Constipation is a common side effect because opioids slow intestinal movement. Teach the patient to drink at least 3 to 4 L of fluids daily if he or she has no health problem that requires fluid restriction. If the prescriber has ordered a stool softener or laxative, urge the patient to start using these drugs before constipation occurs.

**Life Span Considerations for Opioids**

**Pediatric Considerations.** Opioid drugs are high-alert medications that are used for pain control in children of all ages. Dosages are calculated for each child on the basis of the child’s age, size (weight in kilograms), health, and pain severity. Identifying pain intensity with a very young child can be difficult but is still needed. For a child who is old enough to talk, use the FACES pain scale (see Figure 7-2) to help determine pain severity. For an infant or child too young to talk, rely on behavior to help determine pain severity such as the behaviors described in the FLACC scale (see Figure 7-3). Infants in pain cry frequently with great intensity. They do not smile, laugh, or show interest in toys and are not comforted by holding, cuddling, rocking, or a pacifier.

A child can have the same side effects as an adult when taking opioids. Constipation is a problem for a child, and the same steps must be taken to avoid it.

Respiratory depression can be a dangerous problem for infants or very young children. When opioids are used with an infant or a small child, it is best to use an apnea monitor and/or pulse oximeter. When these devices are not available, check the patient’s rate and depth of respiration at least every 15 minutes. Remember that infants and small children may have a normal respiratory rate between 30 and 40 breaths/minute. A respiratory rate of less than 20 in an infant or small child is cause for concern.

**Considerations for Pregnancy and Breastfeeding.** Opioids may be prescribed to women during pregnancy. These drugs do cross the placenta and enter the fetus. The fetus can become addicted to opioids and go through withdrawal after birth. If the mother receives long-term opioid therapy or abuses heroin during pregnancy and the drug is discontinued several weeks before birth, the newborn should not
have any symptoms of withdrawal. However, if the mother is still receiving long-term opioid therapy or abusing opioid drugs when the baby is born, the newborn will need special care for withdrawal.

When opioids are given to a woman in labor, the baby may have respiratory depression after delivery. Often if an opioid is given intravenously within an hour of delivery, the baby may need a dose of an opioid antagonist such as naloxone (Narcan) after delivery.

Breastfeeding is best avoided when a woman is taking opioid drugs for more than a couple of days. If the mother is unable to stop breastfeeding while taking the drug, teach her the strategies listed in Box 1-1 in Chapter 1, to reduce infant exposure to these drugs.

**Considerations for Older Adults.** Older adults are often undertreated for pain. One reason for this is that a confused patient may not be able to describe his or her pain level. Observing behaviors and using a pain scale for cognitively impaired adults can be helpful.

In addition to the usual effects of opioids, an older adult is at risk for low vision. The pupil of the older adult does not dilate fully, and less light enters the eye, reducing vision. When the older patient takes an opioid, the pupil is even smaller than usual, reducing vision even more. This problem increases his or her risk for falling. Teach the older adult to increase room lighting to make reading easier and reduce the risk for tripping and falling over objects.

Opioids, especially meperidine (Demerol), can make the chest muscles of older adults tighter, which makes breathing and coughing more difficult. Thus the risk for pneumonia and hypoxia is greater for them. Check the respiratory rate and depth and the oxygen saturation at least every 2 hours. In addition, meperidine causes the buildup of a toxic metabolite in older adults that can result in seizures.

**NONSTEROIDAL ANTI-INFLAMMATORY DRUGS**

Nonsteroidal anti-inflammatory drugs (NSAIDs) are one type of nonopioid analgesic. Nonopioid analgesics are drugs that reduce a person’s perception of pain but are not similar to opium and have little potential for psychologic or physical dependence. NSAIDs can help manage pain associated with inflammation, bone pain, cancer pain, and soft tissue trauma. These drugs act at the tissue where pain stops and do not change a person’s perception of pain.

There are many different NSAIDs. They all work in similar ways but vary in cost and some side effects. For example, all NSAIDs except aspirin can cause headaches and kidney problems, but these side effects are more severe in some drugs. For a complete discussion of inflammation and what NSAIDs do at the cell level, see Chapter 8. The listing below describes only the NSAIDs most often prescribed for pain control. Be sure to consult a drug reference for more information about any specific NSAID.

### Dosages for Common NSAIDs

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Drug Examples</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salicylic acid</td>
<td>aspirin or ASA (Bayer Aspirin, Bufferin, Ecotrin, Entrophen, many more)</td>
<td>Adults: 325-650 mg orally 3-4 times daily Children: 10-15 mg orally or rectally every 4-6 hr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adults: 200-800 mg orally every 6-8 hr Children: 50-100 mg orally every 6-8 hr</td>
</tr>
<tr>
<td></td>
<td>ibuprofen (Actiprofen, Advil, Motrin)</td>
<td>Adults: 250-500 mg orally twice daily Children: 5 mg/kg orally every 12 hr</td>
</tr>
<tr>
<td></td>
<td>naproxen (Aleve, AnaproX, Naprosyn, Naprosyn E, NDVD-Naprox, Naxen)</td>
<td>Adults and children over 6 years old: 600-1200 mg orally once daily</td>
</tr>
<tr>
<td></td>
<td>oxaprozin (Daypro)</td>
<td></td>
</tr>
</tbody>
</table>

**Drug Alert!**

If a mother receives an opioid during labor, watch her newborn closely for the first 2 to 4 hours after birth for any sign of respiratory depression.

**Clinical Pitfall**

Avoid the use of meperidine in the older adult.

**Learning Activity 7-3**
**Dosages for Common NSAIDs—cont’d**

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Drug Examples</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td>ketorolac (Toradol)</td>
<td>Adults: 10 mg orally every 6 hr;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15-30 mg IV or IM every 6 hr</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Children</em>: 1 mg/kg IM to a maximum of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 mg or 0.5 mg/kg IV to a maximum of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mg daily</td>
</tr>
<tr>
<td>Cox-2 selective</td>
<td>celecoxib (Celebrex)</td>
<td><em>Adults</em>: 100-400 mg orally daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety and dosages for children have</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not been established</td>
</tr>
</tbody>
</table>

**How NSAIDs Work**

NSAIDs reduce pain by suppressing some part of the inflammatory pathway and reducing the amounts of pain-mediating chemicals, especially bradykinin, that are present. As a result, pain is reduced.

**Side Effects.** Most NSAIDs reduce platelet clumping and blood clotting. In fact, aspirin is often prescribed to inhibit platelet aggregation and reduce the risk for heart attack and stroke. Just one dose of aspirin or almost any other NSAID can reduce clotting for up to a week. So, anyone taking NSAIDs is at increased risk for bleeding in response to slight bumps or other injuries.

Other side effects include irritation of the stomach lining and the rest of the GI tract. All NSAIDs except aspirin reduce blood flow to the kidney and slow urine output, which can lead to high blood pressure and kidney damage.

**Adverse Effects.** The most common adverse effect of NSAIDs is the induction of asthma. Allergic reactions also are possible. A person who is sensitive to one NSAID is very likely to be sensitive to all of them.

Excessive aspirin intake can cause salicylate poisoning or toxicity. Signs and symptoms include fever, rapid heart rate, rapid respirations, abdominal pain, nausea, vomiting, confusion, and ringing in the ears (tinnitus). Without treatment this condition can lead to acidosis, seizures, coma, and death.

Taking NSAIDs long term at the same time as acetaminophen (Tylenol) increases the risk for kidney and liver damage.

**What To Do Before Giving NSAIDs**

Be sure to review the general nursing responsibilities related to analgesic therapy for pain (p. 102) in addition to these specific responsibilities for NSAIDs:

Before giving a patient the first dose of an NSAID, always ask whether the patient has had any problems with aspirin or any other over-the-counter NSAID. Carefully check the order for NSAIDs to be given parenterally. Only ketorolac (Toradol) is approved for IV use.

Ask whether the patient has ever had stomach problems with aspirin or any other NSAID. Give the drug at the time the patient is eating or very shortly after a meal. When possible, have the patient drink a full glass of water or milk with the drug.

Tell the patient not to chew an NSAID capsule or an enteric-coated NSAID because chewing will ruin its stomach-protective properties.

Check the patient’s blood pressure because NSAIDs can cause retention of sodium and water, leading to higher blood pressure. If he or she is already taking an angiotensin-converting enzyme (ACE) inhibitor for high blood pressure, the NSAID can reduce its effectiveness.

Ask whether the patient prescribed to take celecoxib (Celebrex) has ever had an allergic reaction to a “sulfa drug” type of antibiotic. Because celecoxib is similar to those antibiotics, an allergic reaction to celecoxib is more likely if the patient is also allergic to sulfa drugs.
**What To Do After Giving NSAIDs**

Be sure to review the general nursing responsibilities related to analgesic therapy for pain (p. 103) in addition to these specific responsibilities for NSAIDs.

The risk for bleeding increases within several hours after just one NSAID dose. Examine the patient’s gums, mucous membranes, and open skin areas (around IV sites) during each shift for bleeding. Look for bruises and tiny purple-red spots. Check urine, stool, or emesis for bright red blood, coffee-ground material, or other indications of bleeding.

Check the patient’s blood pressure, breathing pattern, and pulse oximetry hourly after the first dose of an NSAID to determine any sensitivity. Immediately report any breathing difficulty, drop in blood pressure, or decrease of 5% or more in oxygen saturation.

**What To Teach Patients About NSAIDs**

Be sure to teach patients the general care needs and precautions related to analgesic therapy for pain (p. 103) in addition to these specific responsibilities for NSAIDs.

To avoid GI side effects, teach the patient to always take an NSAID with food or on a full stomach. When possible, he or she should also drink a full glass of water or milk with the drug. Tell the patient not to chew an NSAID capsule or an enteric-coated tablet because chewing will ruin its stomach-protective properties. Teach the patient to examine vomit for obvious blood or the presence of coffee-ground material that may indicate bleeding in the stomach or esophagus. Also teach him or her to check bowel movements for the presence of actual blood or dark, tarry-looking material that would indicate bleeding somewhere in the GI tract and to report these symptoms to the prescriber.

Because NSAIDs reduce blood clotting, teach patients to check their gums daily for bleeding, especially after toothbrushing or flossing. Remind them to inform the dentist about their NSAID use before any dental procedure. If a female patient is still menstruating, warn her that her periods may have heavier blood flow and that her risk for becoming anemic is greater.

Teach the patient taking warfarin (Coumadin) to avoid also taking aspirin and other NSAIDs. Both of these drug types affect blood clotting in different ways, and taking them together places the patient at extreme risk for excessive bleeding and brain hemorrhage.

**Life Span Considerations for NSAIDs**

**Pediatric Considerations.** With the exception of ibuprofen, NSAIDs are not recommended for children. Aspirin is to be avoided in children because, if a child with a viral infection is given an NSAID, he or she may develop Reye’s syndrome. *Reye’s syndrome* is a liver disease that can lead to coma, mental retardation, and death.

**Considerations for Pregnancy and Breastfeeding.** Most NSAIDs are category C for the first 6 months of pregnancy. The stronger ones, particularly indomethacin and celecoxib, are to be avoided during the last 3 months of pregnancy. Their use at that time can cause a blood vessel important to fetal circulation (the ductus arteriosus) to close, which would impair the oxygen supply to some fetal tissues.

**Considerations for Older Adults.** The older adult is at higher risk for cardiac problems when taking NSAIDs. These drugs cause salt and water retention that can lead to fluid overload and high blood pressure. Both of these problems increase the risk for heart attack and heart failure. Teach older adults taking NSAIDs to carefully monitor weight, pulse, and urine output. Teach about the signs and symptoms of heart failure: weight gain; ankle swelling; and shortness of breath, especially when lying down.

---

**Clinical Pitfall**

*NSAIDs should never be taken with warfarin (Coumadin).*

**Clinical Pitfall**

*Most NSAIDs should not be given to women during the last 3 months of pregnancy.*

**Drug Alert!**

*Most NSAIDs increase blood pressure and reduce the effects of antihypertensives, especially ACE inhibitors.*
NONOPIOID MISCELLANEOUS PAIN-CONTROL DRUGS

A variety of nonopioid drugs can be used alone or with other pain-control drugs to manage special types of pain. These additional drugs are sometimes termed adjuvant drugs because they enhance the pain-control features of other pain drugs. Most have other main uses and are discussed in more detail elsewhere in this text. The issues most important in using these drugs for pain control are included in this section.

ACETAMINOPHEN

Acetaminophen alone (such as Abenol®, Atasol®, Panadol, Tylenol, and many others) can be effective for pain relief. It appears to work in the brain to change the perception of pain, and to a smaller degree it reduces the sensitivity of pain receptors.

Acetaminophen is given orally in tablets, capsules, or liquids and can also be given rectally in a suppository. It is available over-the-counter as a single drug or combined with other substances such as caffeine and aspirin (Excedrin). It also is combined with other pain-control drugs, especially opioids. The usual adult dose is 325 to 650 mg every 3 to 4 hours and should not exceed 4 g/day. For children the usual dose is 7 to 15 mg/kg every 4 hours.

Important Issues

Because acetaminophen is available without a prescription, many people believe that it has no side effects or adverse effects. However, it can be toxic when taken at high doses or too often. The liver and kidneys can be damaged or destroyed by acetaminophen. Taking this drug with alcohol greatly increases the risk for permanent liver or kidney damage.

Warn patients that many over-the-counter drugs for colds, headache, allergies, and sleep aids also contain acetaminophen, as do a variety of prescribed pain medications. The acetaminophen in these drugs must be figured into the maximum daily dose along with any separate acetaminophen. Remind patients not to drink alcoholic beverages on days when they take acetaminophen or any drug containing acetaminophen.

When acetaminophen overdose occurs, the drug acetylcysteine must be given intravenously as soon as possible as an antidote to prevent liver failure. If acetylcysteine administration is delayed more than 24 hours after an acetaminophen overdose, it will not be effective in saving the liver.

Life Span Considerations for Acetaminophen

Pediatric Considerations. Acetaminophen is toxic to the liver and kidneys at high doses. A young child should never receive an adult dose of acetaminophen. Because acetaminophen comes in liquid forms with different strengths, it is important to teach parents to read labels carefully and not assume that the doses are the same for all liquids. Some liquid forms contain as few as 16 mg/mL, and others may contain as much as 70 mg/mL.

ANTIDEPRESSANTS

Older and newer antidepressants have been found to reduce some types of chronic pain and cancer pain. The most common antidepressant drugs used for pain control are amitriptyline (Apo-Amitriptyline®, Elavil), nortriptyline (Pamelor), paroxetine (Paxil), and sertraline (Zoloft). They are usually given orally, and the doses for pain control can be different from those used to treat depression. Antidepressants help increase the amount of natural opioids (endorphins and enkephalins) in the brain and also reduce the depression that can occur with chronic pain. Usually the patient must take one of these drugs for 1 or 2 weeks before he or she feels any relief from pain.
Important Issues
The side effects of antidepressants include constipation, dry mouth, urinary retention, sweating, sexual dysfunction, and increased pressure within the eye (intraocular pressure). The drugs should not be used for patients who have seizures or cardiac problems because these patients can experience seizures and heart rhythm problems. Teach the patient who is taking antidepressant drugs to call the prescriber if hand tremors develop.

Life Span Considerations for Antidepressants
Pediatric Considerations. The use of antidepressants for pain control in children is not recommended except for cancer pain. There has been an increase in suicide attempts in children and adolescents taking these drugs.

Considerations for Pregnancy and Breastfeeding. Most antidepressants are in pregnancy categories B and C. They can be given for pain control during pregnancy if the prescriber and patient believe that the risks to the fetus are offset by the benefits to the mother. However, breastfeeding should be avoided when taking these drugs because the drugs enter breast milk and affect the infant.

Considerations for Older Adults. Antidepressants for pain control should be used carefully in older adults. They can cause heart rhythm problems and may make heart failure worse. Teach older adults taking these drugs to take their pulse at least twice daily and report any persistent changes in rhythm to the prescriber. In addition, the side effect of urinary retention may worsen urinary problems in the older man who also has an enlarged prostate gland. An older adult is more likely to have glaucoma than a younger adult, and the use of antidepressants can make glaucoma worse.

ANTICONVULSANTS
Certain anticonvulsants (drugs that reduce seizure activity) have been found to reduce some types of chronic pain and cancer pain, especially neuropathic pain (nerve pain with tingling and burning) and migraine headaches. The two most common anticonvulsant drugs used for pain control are gabapentin (Neurontin) and pregabalin (Lyrica). They appear to work by reducing the rate of electrical transmission along sensory nerves and may also affect pain perception. The doses for pain control are often higher than those used to control seizures.

Important Issues
Side effects of anticonvulsants include drowsiness, confusion, blurred vision, clumsiness, and muscle aches and weakness. Side effects are worse if the patient also drinks alcohol while using these drugs. Teach the patient not to drive, operate heavy machinery, or engage in activities that require alertness. These effects may become less severe over time.

Both drugs reduce seizure activity. When used to treat seizures, these drugs should not be stopped suddenly because seizures are more likely to occur. Instead the drug doses should be decreased over time. It is not known if seizures could occur when the drug is stopped suddenly in patients taking anticonvulsants for pain control only. To be safe, even when taken just for pain control, teach the patient not to stop these drugs suddenly.

Life Span Considerations for Anticonvulsants
Pediatric Considerations. Anticonvulsants may be used in children for pain control. One side effect seen in children but much less often in adults is an increase in aggressive behavior.

Considerations for Pregnancy and Breastfeeding. Anticonvulsants used for pain control are in pregnancy category C. They can be given for pain control during
pregnancy if the prescriber and patient believe that the risks to the fetus are offset by the benefits to the mother. However, breastfeeding should be avoided when taking these drugs because the drugs enter breast milk and affect the infant.

### INSOMNIA

#### REVIEW OF RELATED PHYSIOLOGY AND PATHOPHYSIOLOGY

Sleep is a natural and necessary periodic state of rest for the mind and body. When we sleep, our bodies rest and restore energy levels. Sleep helps a person recover from illness, cope with stress, and solve problems. During sleep, consciousness is partially or completely lost, the eyes close, body movements decrease, metabolism slows, and responsiveness to external stimuli declines. There are five stages of sleep (Table 7-3). An average sleep cycle is 90 to 110 minutes, and most people have four or five cycles during an 8-hour sleep period.

The amount of sleep a person needs is unique. Some people can get by with 5 to 6 hours of sleep, whereas others need 10 to 11 hours. Most adults need between 7 and 8 hours of sleep per night to function at their best. Sleep needs also vary by age. Infants and children need more sleep (14 to 16 hours per day) than adults. Sleep problems are very common. Typically they include difficulty getting enough sleep, although sleeping too much or at inappropriate times may also be a problem.

Failing to get enough sleep causes sleep debt or sleep deprivation. **Sleep deprivation** is a shortage of quality, undisturbed sleep that reduces physical and mental well-being. Coordination, judgment, reaction time, and social function are all impaired by lack of sleep. Drowsiness interferes with the ability of the brain to concentrate, learn, and remember. Simple tasks seem more difficult to perform, and complex tasks may seem impossible to complete. People become anxious, moody, and impatient and have increased difficulty interacting with others.

Signs of sleep deprivation include falling asleep at the wheel while driving, watching television, or reading a book; sleeping for extra-long periods; difficulty awakening in the morning; irritability during the day; and falling asleep during quiet times of the day. Sleep deprivation may be short term or long term.

Amazingly, the body can make up for lost sleep by sleeping more the next night or on days off from work such as weekends. Catching up on missed sleep is important for the body to recover and restore itself.

**Insomnia** is the inability to go to sleep or remain asleep throughout the night. It is the most common sleep problem. Most people experience acute, short-term insomnia at some time during their lives. People of any age may have insomnia. Symptoms include difficulty falling asleep, waking often during the night or early morning, and not feeling rested after sleep. Many factors may cause a person to have
insomnia, including lifestyle, environment, psychologic issues, menopause, illness or medical problems, drug therapy, and sleep-related disorders (Box 7-3).

**DRUGS FOR INSOMNIA**

The most commonly prescribed sleep drugs are sedatives, a broad group of drugs that promote sleep by acting on signals in the central nervous system (CNS) to produce calm and ease agitation. Sedatives include benzodiazepine receptor agonists, benzodiazepines, antihistamines, and sedating antidepressants.

**Benzodiazepine receptor agonists** are now the first-line sleep aids to treat insomnia. They are less likely to be addictive but must be carefully monitored by the prescriber because of the possibility of misuse. Benzodiazepines have hypnotic and sedating effects and are mainly used to treat anxiety or stress. They can be habit forming when used for prolonged periods of time (more than 2 to 4 weeks) and are no longer the first-line drugs for insomnia.

**Antihistamines** are drugs used to treat allergies and allergic reactions. Some, such as diphenhydramine (Allerdryl, Benadryl) and dimenhydrinate (Dramamine, Gravol), have sedating effects and are available over-the-counter to manage insomnia. Sedating antidepressants also have some effect for insomnia.

Generic names, brand names, and dosages of the most commonly prescribed drugs for insomnia are listed in the following table. Be sure to consult a drug reference for information about specific drugs used to treat insomnia.

**Dosages for Common Drugs for Insomnia**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benzodiazepine Receptor Agonists</strong></td>
<td></td>
</tr>
<tr>
<td>zolpidem (Ambien)</td>
<td><em>Adults</em>: 10 mg orally at bedtime; extended release 12.5 mg at bedtime</td>
</tr>
<tr>
<td>zaleplon (Sonata)</td>
<td><em>Adults</em>: 10 mg orally at bedtime (dosage range is 5 to 20 mg)</td>
</tr>
<tr>
<td><strong>Benzodiazepines</strong></td>
<td></td>
</tr>
<tr>
<td>flurazepam (Dalmane, Novoflupam, Somnol)</td>
<td><em>Adults</em>: 15-30 mg orally at bedtime</td>
</tr>
<tr>
<td>quazepam (Doral)</td>
<td><em>Adults</em>: 7.5-15 mg orally at bedtime</td>
</tr>
<tr>
<td>triazolam (Gen-Triazolam, Halcion, Novotriolam)</td>
<td><em>Adults</em>: 0.125-0.25 mg orally at bedtime (maximum dose 0.5 mg)</td>
</tr>
<tr>
<td>estazolam (ProSom)</td>
<td><em>Adults</em>: 1-2 mg orally at bedtime</td>
</tr>
<tr>
<td>temazepam (Restoril)</td>
<td><em>Adults</em>: 7.5-30 mg orally at bedtime</td>
</tr>
</tbody>
</table>

Continued
Drug Dosage

Over-the-Counter Antihistamines

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>diphenhydramine (Allerdryl, Benadryl)</td>
<td>Adults: 50 mg orally 20-30 min before bedtime</td>
</tr>
<tr>
<td></td>
<td>Children (2-12 years): 1 mg/kg orally 20-30 min before bedtime (maximum dose 50 mg)</td>
</tr>
<tr>
<td>dimenhydrinate (Dramamine, Gravol, Nauseatol)</td>
<td>Adults: 50-100 mg orally</td>
</tr>
<tr>
<td></td>
<td>Children 6-12 years: 25-50 mg orally</td>
</tr>
</tbody>
</table>

Sedating Antidepressants

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>trazodone (Desyrel)</td>
<td>Adults: 50-100 mg orally at bedtime</td>
</tr>
<tr>
<td>amitriptyline (Apo-Amitriptyline, Elavil)</td>
<td>Adults: 10-25 mg orally at bedtime</td>
</tr>
<tr>
<td>doxepin (Novo-Doxepin, Sinequan, Triadapin)</td>
<td>Adults: 25 mg orally at bedtime</td>
</tr>
</tbody>
</table>

How Drugs for Insomnia Work

Benzodiazepines such as temazepam (Restoril) and benzodiazepine receptor agonists such as zaleplon (Sonata) relieve insomnia by causing a general depression of the CNS. Antihistamines such as diphenhydramine (Benadryl) and sedating antidepressants such as trazodone (Desyrel) produce drowsiness and mild sedation, which enhances sleep.

Intended Responses

- Insomnia is relieved, and sleep is improved.
- Person is sedated, and sleep is induced.
- Length of time to fall asleep is decreased.
- Sleep duration is increased.

Side Effects. Benzodiazepine receptor agonists can cause amnesia, daytime drowsiness, dizziness, and a feeling of "being drugged." Gastrointestinal side effects include nausea, vomiting, and diarrhea. Additional side effects of zaleplon (Sonata) include hallucinations, impaired memory, and impaired psychomotor functions for a brief period of time after the drug dose.

Benzodiazepines may cause confusion, daytime drowsiness, decreased ability to concentrate, dizziness, headache, and lethargy. These drugs can also cause blurred vision, constipation, diarrhea, nausea, and vomiting.

Antihistamines may cause drowsiness, loss of appetite and dry mouth. Other side effects may include dizziness, headache, urinary retention, blurred vision, tinnitus, constipation, nausea, and photosensitivity.

Sedating antidepressant drugs may cause drowsiness, hypotension, and dry mouth. Other side effects may include confusion, dizziness, nightmares, slurred speech, blurred vision, tinnitus, nausea, vomiting, constipation, and diarrhea.

Adverse Effects. Drugs for insomnia are metabolized by the liver and excreted by the kidney. When liver or kidney function is reduced, drug levels can become very high, with more side effects and adverse effects.

A rare adverse effect of any drug for insomnia is a severe allergic reaction that can cause respiratory problems.

Benzodiazepines are potentially addictive. Psychologic and physical dependence can develop within a few weeks or months of regular or repeated use.

What To Do Before Giving Drugs for Insomnia

Obtain a complete list of drugs currently being used by the patient, including herbal supplements and over-the-counter drugs. Ask the patient about usual sleep patterns and assess for possible causes of difficulty with sleeping.
Check the patient’s heart rate and rhythm, blood pressure, and respiratory rate. Ask about a history of depression, confusion, falls, and pain. Assess the patient’s current mental status.

Ask patients about liver or kidney problems that may affect the metabolism and breakdown of these drugs. Ask all female patients within childbearing years if they are pregnant, breastfeeding, or planning to become pregnant.

**What To Do After Giving Drugs for Insomnia**

Recheck the patient’s vital signs and reassess the level of consciousness. Watch for changes in heart rate, blood pressure, and level of consciousness. Check for orthostatic hypotension, excessive sedation, or confusion, especially in older adults.

Instruct the patient to call for help when getting out of bed and ensure that the call light is within easy reach because these drugs can cause drowsiness and dizziness. Remind the patient to get up or change positions slowly.

**What To Teach Patients About Drugs for Insomnia**

Tell patients to take these drugs exactly as directed by the prescriber and remind them of the importance of follow-up appointments to monitor the progress of treatment. Remind patients never to take a double dose of these drugs. Tell them to report side effects to the prescriber.

Teach patients taking benzodiazepines about the possibility of becoming dependent on these drugs when they are taken for extended periods of time. Remind them that drugs for insomnia should be taken only for a short period of time (2 to 4 weeks) and only when needed.

Tell patients that drugs for insomnia should not be taken unless there is adequate time to sleep (4 to 8 hours, depending on the sleep drug). Also, teach patients taking zaleplon (Sonata) or zolpidem (Ambien) to go to bed immediately after taking the drug because of its rapid onset of action. Remind them that the amnesia side effect of zaleplon (Sonata) can be avoided if they are able to get 4 or more hours of sleep after taking the drug. Warn patients not to take these drugs on overnight airplane flights of less than 7 to 8 hours because they may experience transient memory loss called traveler’s amnesia.

Because drugs for insomnia can cause drowsiness and blurred vision, caution patients to avoid driving, operating machines, or performing any activities that require alertness.

Instruct the patient taking an antihistamine about the importance of frequent mouth care, such as oral rinses, to reduce dry mouth.

Caution patients to use sunscreen and wear protective clothing to prevent severe sunburns.

Remind female patients in their childbearing years to notify their prescriber if they become pregnant or plan to become pregnant.

**Life Span Considerations for Drugs for Insomnia**

**Pediatric Considerations.** Antihistamines such as diphenhydramine (Benadryl) can cause an increase in excitement when given to children. (This response, which is opposite of what is expected, is called a paradoxical response.)

**Considerations for Pregnancy and Breastfeeding.** Benzodiazepines (category D/X) should not be taken during pregnancy. Zolpidem (Ambien) is category B/C and is generally considered safe for use during pregnancy, but only if the benefits outweigh the possible side effects. Most insomnia drugs cross the placenta and enter breast milk and can have sedating effects on the fetus or infant.

**Considerations for Older Adults.** Older adults should be given lower doses of drugs for insomnia because they are more sensitive to the effects of these drugs and more likely to experience side effects. In addition, older adults are at increased risk for falls while taking these drugs.
NARCOLEPSY

REVIEW OF RELATED PHYSIOLOGY AND PATHOPHYSIOLOGY

Narcolepsy is a sleep problem with uncontrollable urges to sleep, causing a person to fall asleep at inappropriate times. It is a chronic neurologic disorder in which the brain cannot regulate sleep-wake cycles. This problem tends to occur in patients and families with respiratory illnesses that cause carbon dioxide retention. Sleep episodes caused by narcolepsy can occur at any time during the day, at work, at school, during a conversation, while eating, or while driving or operating machinery. The symptoms of narcolepsy include sudden loss of voluntary muscle tone and reflexes commonly triggered by emotion, a heavy meal, or stress (cataplexy), vivid hallucinations during sleep onset or when waking, and brief episodes of total paralysis at the beginning or end of sleep. Not only does a person with narcolepsy fall asleep suddenly, but he or she also frequently wakes up during the night.

DRUGS FOR NARCOLEPSY

Generic names, brand names, and dosages of the most commonly prescribed drugs for narcolepsy are listed in the following table. Be sure to consult a drug reference for information about any specific drug used to treat narcolepsy.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>methylphenidate (Ritalin)</td>
<td>Adults: 10 mg orally 2-3 times daily</td>
</tr>
<tr>
<td>modafinil (Provigil)</td>
<td>Adults: 100-200 mg orally; one daily single dose in morning</td>
</tr>
<tr>
<td>sodium oxybate (Xyrem)</td>
<td>Adults: Initial dose 2.25 g orally at bedtime and again 3-4 hr later</td>
</tr>
</tbody>
</table>

How Drugs for Narcolepsy Work

Drugs such as methylphenidate (Ritalin) cause increased general CNS stimulation to promote wakefulness and reduce the sudden sleepiness of narcolepsy. Modafinil (Provigil) is a CNS stimulant but appears to be more selective in the brain areas stimulated. Oxybate (Xyrem) increases sedation to ensure a good night’s sleep and prevent daytime sleepiness.

Intended Responses

- Attention span is increased.
- Motor activity and mental alertness during waking hours are increased.
- Fatigue is decreased.
- Episodes of inappropriately falling asleep are decreased.

Side Effects. Common side effects of CNS stimulant drugs used for narcolepsy include hyperactivity, insomnia, restlessness, tremor, hypertension, palpitation, tachycardia, and loss of appetite (anorexia). Other side effects include nervousness, headache, upset stomach, diarrhea, mood swings, and depression.

Sodium oxybate (Xyrem) can cause sleepwalking. It should never be used with alcohol because it will dramatically increase CNS effects.

Adverse Effects. CNS stimulants may cause seizures. They can also cause abnormal heart rhythms and chest pain.

What To Do Before Giving Drugs for Narcolepsy

Obtain a complete list of drugs currently being used by the patient, including over-the-counter drugs and herbal supplements. Check the patient’s blood pressure, heart rate, and body temperature. Monitor the patient for any adverse effects, and adjust the dosage if necessary.
rate and rhythm, and respiratory rate. Ask about liver or kidney problems that may affect the metabolism and breakdown of these drugs and may require a reduced dosage. Assess the patient’s current level of consciousness and mood.

Ask female patients in their childbearing years if they are pregnant or planning to become pregnant.

What To Do After Giving Drugs for Narcolepsy
Recheck the patient’s vital signs every shift and weigh the patient daily. Instruct the patient to call for help when getting out of bed and ensure that the call light is within easy reach because these drugs can cause drowsiness.

Watch for signs and symptoms of allergic reaction such as rash, hives, itching, and difficulty with breathing and swallowing.

Monitor patients on sodium oxybate (Xyrem) for possible sleepwalking. Watch for seizure activity in patients taking CNS stimulants.

What To Teach Patients About Drugs for Narcolepsy
Remind patients to take these drugs exactly as instructed by the prescriber. Tell them about the importance of follow-up appointments to monitor the progress of controlling the narcolepsy. Instruct patients to report side effects and signs of allergic reaction to the prescriber immediately.

Tell patients taking methylphenidate (Ritalin) not to take a missed dose close to bedtime because it may cause difficulty getting to sleep.

Remind female patients taking modafinil (Provigil) that this drug can decrease the effectiveness of birth control pills and that another form of birth control should be used while taking this drug. Tell any woman in childbearing years to notify her prescriber if she becomes pregnant or plans to become pregnant.

Instruct a patient taking modafinil to avoid eating grapefruit and drinking grapefruit juice because it affects the action of this drug.

A patient who is taking sodium oxybate (Xyrem) should have a family member watch him or her for possible sleepwalking. If this occurs, it should be reported to the prescriber.

Instruct patients to take these drugs with food or milk if they cause upset stomach. Because drowsiness, dizziness, and blurred vision can result from using these drugs, caution the patient to avoid driving, operating machines, and performing other activities that require increased alertness. Tell the patient to change positions slowly to keep dizziness to a minimum.

Tell patients to avoid alcohol and other CNS depressants. Remind them to talk with the prescriber before taking any over-the-counter drugs or herbal remedies. Instruct the patient taking methylphenidate (Ritalin) to avoid caffeine-containing drinks while taking this drug.

Life Span Considerations with Drugs for Narcolepsy

Pediatric Considerations. Methylphenidate can cause slower growth (both height and weight) in children.

Considerations for Pregnancy and Breastfeeding. These drugs are not recommended during pregnancy or breastfeeding.

Considerations for Older Adults. Older adults may need to be started on lower doses of these drugs to avoid adverse effects or side effects. They are at increased risk for changes in thinking patterns and problems with movement.

Drug Alert!
Monitor patients for seizure activity when they also take CNS stimulants.

Teaching Alert
Remind women taking modafinil (Provigil) to use an additional form of birth control to prevent an unplanned pregnancy.
Get Ready for Practice!

Key Points

- Pain is whatever the patient says it is and exists whenever he or she says it does.
- Acute pain usually triggers the stress response of the body and results in changes in a patient’s vital signs; chronic pain often does not.
- Giving pain-control drugs on a regular schedule rather than on a PRN basis is more likely to provide better pain relief.
- A sleeping patient may still have pain. Do not skip a regularly scheduled dose of a drug for pain control just because the patient is sleeping.
- Opioids only alter the perception of pain; they do nothing at the site of the damaged tissue to affect the cause of the pain.
- Physical dependence, addiction, and withdrawal are rare when opioids are taken by a patient who is in pain.
- Use an apnea monitor and pulse oximeter to monitor the breathing effectiveness of an infant or small child receiving opioids.
- Do not give celecoxib (Celebrex) to a patient who is allergic to the sulfa drug type of antibiotics.
- Teach the patient who is taking an antidepressant for pain control to call the prescriber if hand tremors or an irregular heartbeat develop.
- Teach older adults taking antidepressants for pain control to avoid stopping the drug suddenly.
- Sleep allows the body to rest and restore energy levels and is essential for a person to recover from illness, cope with stress, and solve problems.
- Sleep deprivation causes negative effects on physical and mental well-being.
- Teach patients taking drugs for insomnia to be sure that there is adequate time for sleep (4 to 8 hours) before taking these drugs.
- Patients taking CNS stimulants must be monitored for signs of seizure activity.
- A family member should be taught to watch the patient taking sodium oxybate (Xyrem) for sleepwalking.

Review Questions

1. Which personal condition or factor can be modified to increase pain tolerance?
   A. Age or gender
   B. Pain location
   C. Fear or anxiety
   D. Family expectations

2. A patient is reporting pain. Which feature indicates to you that the patient’s pain is chronic rather than acute?
   A. The pain is better in the morning and worse at night.
   B. The patient is sweating, and blood pressure is elevated.
   C. The pain limits the ability of the patient to participate in care.
   D. The patient has difficulty describing the exact nature of the pain.

3. Which drug has the main action of controlling pain by changing the cellular responses at the site of the cause of pain?
   A. ibuprofen (Advil)
   B. naloxone (Narcan)
   C. amitriptyline (Elavil)
   D. hydromorphone (Dilaudid)

4. Why is morphine categorized in the United States as a schedule II drug rather than a schedule I drug?
   A. It has a high potential for abuse.
   B. It has a currently accepted use for treatment.
   C. It is a synthetic product rather than a naturally occurring substance.
   D. It contains only small amounts of opioids compared with substances in schedule I.

5. What is the most important action to take after administering any drug for pain?
   A. Ask the patient whether the pain interferes with sleep.
   B. Document the patient’s response to the medication.
   C. Ask the patient to rate his or her level of pain relief.
   D. Remind the patient that dependence is possible.

6. Which side effects or adverse effects are associated with opioid analgesics? (Select all that apply.)
   A. Constipation
   B. Slow, shallow respirations
   C. Aggression
   D. Insomnia
   E. Liver failure
   F. Nausea and vomiting
   G. Irregular heartbeat

7. A patient taking oxycodone (Percocet) at home has all of the following problems. For which problem should the patient call the prescriber?
   A. Appetite is absent.
   B. Pupils are the size of a pinpoint.
   C. Pain is unrelieved at the current dose.
   D. Bowel movements have changed color.

Additional Learning Resources

go to your Evolve website (http://evolve.elsevier.com/Workman/pharmacology/) for the following FREE learning resources:

- eLearning Activities
- Animations
- Video Clips
- Interactive Review Questions
- Audio Key Points
- Audio Glossary
- Audio Glossary—Spanish-English
- Drug Dosage Calculators
- Patient Teaching Handouts

Go to your Study Guide for additional learning activities to help you master this chapter content.
8. A patient prescribed amitriptyline (Elavil) asks how this drug can help reduce pain. What is your best response?  
   A. “The drug increases the amount of natural endorphins in your brain.”  
   B. “It binds to receptor sites in the brain and changes your perception of pain.”  
   C. “It works in the nerve endings and prevents nerve transmission of pain.”  
   D. “Elavil reduces the tissue damage and inflammation at the injured site.”  

9. Which precaution should you include when teaching a patient about the proper use of NSAIDs for chronic pain?  
   A. “Be sure to drink at least 3 L of fluid each day.”  
   B. “Take this drug 1 hour before or 2 hours after eating.”  
   C. “Stop taking the drug 1 week before dental work or surgery.”  
   D. “Avoid driving or operating dangerous equipment while taking this drug.”  

10. What is the most important precaution to teach the parents of a 1-year-old child taking acetaminophen (Tylenol) for pain?  
   A. “Watch your child closely for slowing of the rate and depth of breathing.”  
   B. “Be sure to call the prescriber if your child develops tremors of the hand.”  
   C. “Read the label carefully for the correct amount of liquid drug to give your child.”  
   D. “Check your child’s pain level using the FACES pain scale before and after you give the drug.”  

11. For which side effect should you be sure to monitor when a patient is taking CNS stimulants for narcolepsy?  
   A. Respiratory depression  
   B. Temporary amnesia  
   C. Seizure activity  
   D. Dehydration  

12. What factors should you check before giving a drug for insomnia? (Select all that apply.)  
   A. Level of consciousness  
   B. Handgrip strength  
   C. Pupil size  
   D. Abdominal distention  
   E. Heart rate and rhythm  
   F. History of kidney disease  
   G. Patient’s usual sleeping pattern  

13. What should you instruct the patient to do immediately after taking a benzodiazepine receptor agonist?  
   A. Go to bed  
   B. Drink at least 8 oz of water  
   C. Check the pulse for 1 full minute  
   D. Listen to soft music to ensure adequate sleep  

14. When taking a drug for insomnia, which problem is more likely to occur in an older adult?  
   A. Severe constipation  
   B. Liver failure  
   C. Narcolepsy  
   D. Falls  

15. An infant is to receive 80 mg of acetaminophen (Tylenol). The liquid you have on hand has a drug concentration of 100 mg/mL.  
   a. How many milliliters is the correct dose for this infant? _____ mL  
   b. How many milliliters is the correct dose if the liquid has a concentration of 120 mg/5 mL? _____ mL  

16. An 80-year-old patient is prescribed to receive hydromorphone (Dilaudid) 1 mg IV. The unit-dose syringe has hydromorphone 4 mg/mL. How many milliliters should you give intravenously? _____ mL  

**Critical Thinking Activities**  
Mr. Green is a 64-year-old man who is 1 day post-op from a total knee replacement. He has a patient-controlled analgesia pump to give him morphine intravenously. He was a heroin addict in his 20s but has been drug-free for more than 30 years. Although he is now in severe pain, Mr. Green is afraid of becoming addicted and is trying to wait as long as he can before he punches in a dose.  

1. What type of drug is morphine?  
2. What is the major adverse effect of this drug?  
3. List three common signs of this adverse effect.  
4. Is his history of heroin addiction likely to affect either his current perception of pain or his response to morphine? Why or why not?  
5. What should you tell him about addiction?