Felicia must be in pain so soon after her surgery. I know I would have pain if it were me. Can she get pain medicine without getting another needle? —Mother of Felicia, 5

LEARNING OBJECTIVES

- Describe the physiologic and behavioral consequences of pain in children.
- Select an appropriate tool to assess the pain of infants and children in each age group.
- Describe the nursing assessment and management for a child receiving an opioid analgesic.
- Explain the rationale for the effectiveness of nonpharmacologic (complementary) methods of pain control.
- Assess children of different ages with acute pain and develop a nursing care plan that integrates pharmacologic interventions and developmentally appropriate nonpharmacologic (complementary) therapies.
- Develop a nursing care plan for assessing and monitoring the child having sedation and analgesia for a medical procedure.

CD-ROM
NCLEX-RN® Review
Animation: Morphine
Videos:
  - Pain Management Kit
  - Pain Perception
Nursing in Action: Administering Patient-Controlled Analgesia
Nursing in Action: Sedation Monitoring
Postoperative Pain Flow Chart
Audio Glossary
Skill 13-1 Selected Pediatric Pain Scales
Skill 13-2 Patient-Controlled Analgesia
Skill 13-3 Monitoring Sedation
Skill 13-4 Local Pain Blocks

Companion Website
NCLEX-RN® Review
Case Study
Thinking Critically
MediaLink Applications:
  - Managing Light Sedation
  - Calculating Opioid Dosage
  - Postoperative Pain Assessment
Complementary Care: Hypnotherapy for Children
Everyone has his or her own perception of pain. A neurologic response to tissue injury, pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (see "Pathophysiology Illustrated"). Effective pain management is every child’s right.

**ACUTE AND CHRONIC PAIN**

Pain exists when the patient says it does (McCaffrey & Pasero, 1999). Pain may be either acute or chronic. **Acute pain** is sudden and of short duration; it may be associated with a single event, such as surgery, or an acute exacerbation of a condition such as a sickle cell crisis. The inflammatory response that follows the initial tissue injury causes a sustained pain response (Fuller, 2001). **Chronic pain** is a persistent pattern of pain, lasting longer than 6 months; it is generally associated with a prolonged disease process such as juvenile rheumatoid arthritis.

In 2001 the Joint Commission on Accreditation of Healthcare Organizations introduced standards for the assessment and management of pain in patients. All patients are assessed for pain, and they have the right to appropriate pain management. Patient education includes managing pain as a part of treatment.

**MISCONCEPTIONS ABOUT PAIN IN CHILDREN**

Healthcare professionals once believed that children feel less pain than adults. Undertreatment of pain was based on these attitudes about pain, the difficulty and complexity of pain assessment in children, and inadequate research. Some nurses still undertreat pain, either not giving pain medication on a fixed schedule around the clock as ordered by the physician or giving less than 40% of the pain medication ordered (Vincent, 2001). For a review of past myths and the contrasting reality, see Table 42–1.

Research has shown that past beliefs about children’s perception of pain were incorrect. Even newborns feel pain. All the necessary peripheral and central nervous system anatomic structures and functional ability to process pain are present by 20 weeks’ gestation (Pasero, 2002). Pain impulses are transmitted along the nonmyelinated C fibers, and the pain signal is less precise. Pain conduction may be slower in newborns, but the distance the pain stimuli must travel is much shorter than in adults. Because the descending neurotransmitters are less developed, newborns are less able to reduce the pain impulses. Premature and newborn infants may be even more sensitive to pain than older children. Newborns and infants also remember pain. By 6 months of age, children demonstrate anticipatory fear of pain when taken to a location where they once experienced pain (McGrath & Craig, 1989).
PATHOPHYSIOLOGY ILLUSTRATED

Pain Perception

Nociceptors (free nerve endings at the site of tissue damage) transmit information by specialized nerve fibers to the spinal cord. Unmyelinated C fibers slowly transmit dull, burning, diffuse pain as well as chronic pain. Large, myelinated \( A\)-delta fibers quickly transmit sharp, well-localized pain. Nociceptors are stimulated by mechanical, thermal, and chemical injury. Biochemical mediators (bradykinin, prostaglandin, leukotrienes, serotonin, histamine, catecholamines, and substance \( P\)) are produced in response to tissue damage. These substances help move the pain impulse from the nerve endings to the spinal cord. After the sensory information reaches the substantia gelatinosa in the dorsal horn of the spinal cord, the pain signal may be modified depending on the presence of other stimuli, from either the brain or the periphery. The pain signal is then transmitted to the brain through the spinothalamic, reticulo-spinal, and spinomesencephalic nerve pathways, where perception occurs. Once the sensation reaches the brain, emotional responses may increase or decrease the intensity of the pain perceived.

The gate control theory of pain helps explain how the pain impulses are allowed to proceed to the brain. The substantia gelatinosa serves as a gate and regulates the transmission of pain and other impulses to the brain (Huether & Leo, 2002). Since pain and nonpain impulses are sent along the same pathways, nonpain impulses can compete with pain impulses for transmission.

CLINICAL MANIFESTATIONS

Physiologic Indicators

Acute pain stimulates the adrenergic nervous system and results in physiologic changes, including tachycardia, tachypnea, hypertension, pupil dilation, pallor, increased perspiration, and increased secretion of catecholamines and adrenocorticoid hormones. Changes in these signs demonstrate a complex stress response. These signs are not specific to pain, so they cannot be used for monitoring pain.

Chronic pain of long duration permits physiologic adaptation, so normal heart rate, respiratory rate, and blood pressure levels are often seen (Huether & Leo, 2002).

Behavioral Indicators

Children in acute pain behave in many of the same ways as children who show signs of fear and anxiety (Hazinski, 1999; Tesler, Holzemer, & Spreker, 1999). These behaviors include the following:

- Short attention span (child is difficult to distract)
- Irritability (child is difficult to comfort)
- Facial grimacing, biting or pursing lips; see Figure 42–1 on p. 1211 for facial expression of newborns and infants
- Posturing (guarding a painful joint by avoiding movement), remaining immobile, or protecting the painful area
- Drawing up knees, flexing limbs, massaging affected area
- Lethargy, remaining quiet, or withdrawal
- Sleep disturbances

Preverbal children may show conflicting signs of pain (restlessness, agitation or withdrawal, hyperalert or vigilant, grimacing, crying, or anger), making pain assessment and management more challenging.

Children often suffer additional emotional distress and fear that the discomfort will worsen. Depression and aggressive behavior are frequently overlooked as indicators of pain.

CONSEQUENCES OF PAIN

Unrelieved pain is stressful and has many undesirable physiologic consequences (Table 42–2). For example, the
child with acute postoperative pain takes shallow breaths and suppresses coughing to avoid more pain. These self-protective actions increase the potential for respiratory complications. Unrelieved pain may also delay the return of normal gastric and bowel functions and cause a stress ulcer. Anorexia associated with pain may delay the healing process. The long-term effects of pain on the child’s physical or psychologic condition are unknown.

PAIN ASSESSMENT

The goal of pain assessment is to provide accurate information about the location and intensity of pain and its effects on the child’s functioning. No laboratory tests are routinely used to assess pain. Prolonged, severe pain produces a physiologic stress response that includes the chemical release of catecholamines, cortisol, aldosterone, and other corticosteroids. Insulin secretion also decreases, leading to increased amounts of glucose and severe hyperglycemia (Hazinski, 1999).

PAIN HISTORY

Parents can provide a great deal of information about the child’s response to pain, such as the following:

- How the child typically expresses pain, both verbally and behaviorally. Children and parents use similar terms to describe pain. Some examples of words used are a hurt, owie, boo-boo, stinging, sore, cutting, burning, itching, hot, and tight. Knowing the appropriate word to use makes communicating with the child easier. The parent can often provide signs used to recognize the child’s pain.
- The child’s previous experiences with painful situations and reactions.
How the child copes with and manages pain. The child with several past pain experiences may not exhibit the same types of stressful behaviors as the child with few pain experiences.

What works best to reduce the child’s pain?

The parent’s and child’s preferences for analgesic use and other pain interventions.

Neonatal characteristic facial responses to pain include bulged brow, eyes squeezed shut, furrowed nasolabial creases, open lips, pursed lips, stretched mouth, taut tongue, and a quivering chin.


FIGURE 42-1

Bulged brows
Brows lowered, drawn together
Eyes squeezed shut
Furrowed nasolabial creases
Taut tongue
Open, angular, squarish lips and mouth
Quivering chin

TABLE 42-2  Physiologic Consequences of Unrelieved Pain in Children

<table>
<thead>
<tr>
<th>Respiratory Changes</th>
<th>Potential Physiologic Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid shallow breathing</td>
<td>Alkalosis</td>
</tr>
<tr>
<td>Inadequate lung expansion</td>
<td>Decreased oxygen saturation, atelectasis</td>
</tr>
<tr>
<td>Inadequate cough</td>
<td>Retention of secretions</td>
</tr>
<tr>
<td>Neurologic Changes</td>
<td>Tachycardia, change in sleep patterns, increased blood glucose and cortisol levels</td>
</tr>
<tr>
<td>Increased sympathetic nervous system activity</td>
<td></td>
</tr>
<tr>
<td>Metabolic Changes</td>
<td>Increased fluid and electrolyte losses</td>
</tr>
<tr>
<td>Increased metabolic rate with increased perspiration</td>
<td></td>
</tr>
<tr>
<td>Immune System Changes</td>
<td>Increased risk of infection</td>
</tr>
<tr>
<td>Depression of immune response</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal Changes</td>
<td>Impaired gastrointestinal functioning, ileus</td>
</tr>
<tr>
<td>Increased intestinal secretions and smooth muscle sphincter tone</td>
<td></td>
</tr>
</tbody>
</table>

TERMS THAT DESCRIBE PAIN INTENSITY

The terms pain, hurt, and ache have been found to describe pain intensity across cultures. Pain is most intense, hurt is less severe, and ache is least severe (Gaston-Johansson, Albert, Fagan et al., 1990). Similarly, pain and hurt mean greater pain than ache in school-age children and adolescents (LaFleur & Raway, 1999). The term tender or tenderness may be confusing for some families in which English is a second language. Tender or tenderness is more commonly associated with caring or romance or with meat rather than soreness or pain.

Older children may be able to give a history of painful procedures. When attempting to obtain information about the child’s pain experiences and present level of pain, keep in mind that many children modify their pain descriptions depending on the type of questions asked and what they expect will happen as a result of their response. Examples of questions to ask include the following:

- What kinds of things caused hurt in the past and what made it feel better?
- Does the child tell others about being in pain and what does the child want others to do for the pain?
- What does the child not want done when he or she is hurting? What would the child like the nurse to do for the hurt?
- Where is the hurt, and what does it feel like? What could be causing the hurting?

CULTURAL INFLUENCES ON PAIN

Children’s culture and social learning have a tremendous influence on their expression of pain. Cultural traditions often guide children about self-control, coping, and enlisting the assistance of others (Huether & Leo, 2002). Children learn directly and indirectly from their parents about how to respond to pain. By showing approval and disapproval, parents teach their children how to behave when in pain. This instruction includes the following:

- How much discomfort justifies a complaint
- How to express the complaint
- How and when to stop complaining
- Whom to approach for pain relief

For example, boys in the United States are usually encouraged to hide their pain by acting brave and not crying. Girls are often encouraged to express their pain openly. Children also observe other family members in pain and imitate their responses (Abu-Saad, 1984).

EXPRESSION OF PAIN

Some ethnic groups, such as Asian, Anglo-Saxon–Germanic, and Irish, do not openly express pain. People of Italian and Jewish descent are more likely to use both verbal and nonverbal methods to express pain freely. However, children have individualized responses, and younger children have had less time to acquire culturally learned behaviors.

DEVELOPMENTAL RESPONSES TO PAIN

A child’s responses to and understanding of pain depend on the child's age and stage of development. See Tables 42–3 and 42–4 to learn more about the child’s responses at each age. A child’s responses to pain also depend upon situational factors that influence pain responses (McGrath, 1995):

- Cognitive—understanding of the pain source, ability to control what will happen, focus of attention is on the pain or a distraction
- Behavioral—use of a pain control strategy, ability to continue usual activities, response of parents and healthcare providers
- Emotional—presence of fear, anxiety, frustration, anger, depression

Young children are unable to give a detailed description of their pain because of their limited vocabulary and pain experiences. Depending on their developmental stage, children use different coping strategies, such as escape, postponement or avoidance, diversion, and imagery, to deal with pain. Healthcare providers now recognize that children do not complain of pain for several reasons:

- Some children believe they need to be brave.
- Preschoolers and adolescents may assume the nurse knows they have pain.
- Some children are afraid that an injection to relieve pain will hurt more than the pain they have.

GROWTH AND DEVELOPMENT

School-age children and adolescents may not exhibit distress in direct proportion to their pain intensity. Thus, behavioral measures may not match the child’s self-report of pain intensity. Older children often appear calm, are expressionless, and limit movement following surgery, but report pain of moderate to severe levels (Tesler et al., 1999). Because children in these age groups can accurately report pain intensity, use the self-report of pain as a valid pain assessment.
PAIN ASSESSMENT AND MANAGEMENT IN CHILDREN

TABLE 42–3 Behavioral Responses and Verbal Descriptions of Pain by Children of Different Developmental Stages

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Behavioral Response</th>
<th>Verbal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;6 months</td>
<td>Generalized body movements, chin quivering, facial grimacing, poor feeding</td>
<td>Cries</td>
</tr>
<tr>
<td>6–12 months</td>
<td>Reflex withdrawal to stimulus, facial grimacing, disturbed sleep, irritability, restlessness</td>
<td>Cries</td>
</tr>
<tr>
<td>Toddlers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3 years</td>
<td>Localized withdrawal, resistance of entire body, aggressive behavior, disturbed sleep</td>
<td>Cries and screams, cannot describe intensity or type of pain</td>
</tr>
<tr>
<td>Preschoolers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3–6 years</td>
<td>Active physical resistance, directed aggressive behavior, strikes out physically and verbally when hurt, low frustration level</td>
<td>Can identify location and intensity of pain, denies pain, may believe his or her pain is obvious to others</td>
</tr>
<tr>
<td>(preoperational)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School-Age Children</td>
<td>Passive resistance, clenches fists, holds body rigidly still, suffers emotional withdrawal, engages in plea bargaining</td>
<td>Can specify location and intensity of pain and describe its physical characteristics in relation to body parts</td>
</tr>
<tr>
<td>7–9 years</td>
<td>May pretend comfort to project bravery, may regress with stress and anxiety</td>
<td>Able to describe intensity and location with more characteristics, able to describe psychologic pain</td>
</tr>
<tr>
<td>(concrete operations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10–12 years</td>
<td>Want to behave in a socially acceptable manner (like adults), show a controlled behavioral response</td>
<td>More sophisticated descriptions as experience is gained; may think nurses are in tune with their thoughts, so they don’t need to tell the nurse about their pain</td>
</tr>
<tr>
<td>(transitional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13–18 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(formal operations)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PAIN ASSESSMENT SCALES

Various pain scales are used to assess pain in children.

Nonverbal Children

Physical and behavioral indicators are used to quantify pain in nonverbal children. For example, the Neonatal Infant Pain Scale (NIPS) and the FLACC Behavioral Pain Assessment Scale rely on the nurse’s observation of the child’s behavior.

The NIPS is designed to measure procedural pain in preterm and full-term newborns up to 6 weeks after birth. The newborn facial expression, cry quality, breathing patterns, arm and leg position, and state of arousal are observed. This tool has high inter-rater reliability and validity. See Table 42–5 on p. 1215.

The FLACC is designed to measure acute pain in infants and young children following surgery, and it can be used until the child is able to self-report pain with another pain scale. FLACC is an acronym for the five categories that are assessed: Face, Legs, Activity, Cry, and Consolability. To use FLACC the nurse observes the child during routine care for 1 to 5 minutes, and then selects the score that most closely matches each behavior noted. The scores for the five categories are added together for the total score. The tool has validity and reliability for evaluation of postoperative pain (Manworren & Hynan, 2003; Willis, Merkel, Voepel-Lewis, et al., 2003). See Table 42–6 on p. 1215.

Young children (3 years and older) can localize pain if given an outline of the front and back of the body. The child can mark where the pain is located or color the area of pain with crayons. The child should use one color for the place where it hurts the most, and another color for areas with less pain.

Self-Report Pain Scales

Other scales depend on the child’s self-report of pain intensity (see Skill 13–1). To use pain scales, the child must be developmentally ready and understand the concept of a little or a lot of pain well enough to tell the nurse. Children 2 to 3 years of age are usually able to understand the concept of “more or less.” This child cannot be given more than three choices on a pain scale (none, some, a lot) when assessing pain. When the child can understand rank order and is able to classify, match, and estimate, a numeric scale can be used. A child who correctly responds to either of the following items is developmentally ready for a numeric scale (Merkel, 2002):

- Which number is larger, 5 or 9? Which number is smaller, 7 or 4?
TABLE 42–4  
**Children’s Understanding of Pain by Developmental Stage**

<table>
<thead>
<tr>
<th>Developmental Stage</th>
<th>Understanding of Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infants</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 months</td>
<td>No apparent understanding of pain; newborns exposed to repeated painful experiences in ICU demonstrate memory of pain by holding their breath when approached by care providers</td>
</tr>
<tr>
<td>6–12 months</td>
<td>Anticipate a painful event such as an immunization with fear; responsive to parental anxiety</td>
</tr>
<tr>
<td><strong>Toddlers</strong></td>
<td></td>
</tr>
<tr>
<td>1–3 years</td>
<td>Do not understand what causes pain and why they might have pain; demonstrate fear of painful situations; use common words for pain such as <em>owie</em> and <em>boo-boo</em></td>
</tr>
<tr>
<td><strong>Preschoolers</strong></td>
<td></td>
</tr>
<tr>
<td>3–6 years (preoperational)</td>
<td>Pain is a hurt; have language skills to express pain, and skills increase with age; do not relate pain to illness but may relate pain to an injury; often believe pain is punishment; do not understand why a painful procedure will make them feel better or why an injection takes pain away</td>
</tr>
<tr>
<td><strong>School-Age Children</strong></td>
<td>Can understand simple relationships between pain and disease but have no clear understanding of the cause of pain; can understand the need for painful procedures to monitor or treat disease; may associate pain with feeling bad or angry; may recognize psychologic pain related to grief and hurt feelings</td>
</tr>
<tr>
<td>7–9 years (concrete operations)</td>
<td>Better able to understand the relationship between an event and pain; have a more complex awareness of physical and psychologic pain, such as moral dilemmas and mental pain</td>
</tr>
<tr>
<td>10–12 years (transitional)</td>
<td></td>
</tr>
<tr>
<td><strong>Adolescents</strong></td>
<td></td>
</tr>
<tr>
<td>13–18 years (formal operations)</td>
<td>Have a sophisticated understanding of the causes of physical and mental pain; relate to the pain experienced by others; pain has both qualitative and quantitative characteristics</td>
</tr>
</tbody>
</table>

- Ask the child to place several blocks or pieces of paper of different sizes in a row from biggest to smallest.

Examples of self-report pain scales include the Faces Pain Scale and the Oucher Scale. The Oucher Scale presents a series of six photographs of a child expressing increased intensity of pain in combination with a vertical Visual Analog Scale (Figure 42–2 on p. 1216). The child selects a face that best fits his or her level of pain; an older child can select a number between 0 and 10. The nurse should not compare the photos with the child’s facial expression to determine pain level. The tool has been developed for three cultural groups with validity and reliability for children between 3 and 12 years of age.

The Faces Pain Rating Scale has a series of six cartoon-like faces with expressions from smiling to tearful that can be used by children starting at 3 years of age (Figure 42–3). The nurse explains the meaning of each face and asks the child to select the face that is the closest match to the pain felt. As with the Oucher Scale, the nurse should not compare the faces with the child’s facial expression to determine pain level. Comparison of faces pain scales has revealed that those scales with a smiling face as the indicator of no pain resulted in significantly higher pain ratings by children and parents than scales using a neutral expression face as an indicator of no pain (Chambers, Gresbrecht, Craig et al., 1999).

School-age children and adolescents have better number concepts and language skills, so additional tools can be used to assess their pain. The nurse should ask the child to describe the pain and give its location. At about 8 years of age, children can give a separate rating for the intensity of pain and describe how unpleasant it is (Jedlinksy, McCarthy, & Michel, 1999). Providing some words such as sharp, dull, aching, pounding, cold, hot, burning, throbbing, stinging, tingling, or cutting can help children describe their pain.

The Numeric Pain Scale or Visual Analog Scale is a single 10-cm horizontal or vertical line that has descriptors of pain at each end (no pain, worst possible pain). Marks and numbers are placed at each cm on the line.

The Poker Chip Tool uses four checkers or poker chips to quantify pain. The child is asked to pick the number of chips that best match the pain felt, with one chip being a little pain and four being the most pain he or she could have.

The Word-Graphic-Rating Scale has words describing increasing pain intensity across a horizontal line. The child marks the line that is closest to the level of pain felt. A millimeter ruler can be used to quantify the pain and record the pain score (Figure 42–4 on p. 1217).

The Adolescent Pediatric Pain Tool includes a human figure drawing, the Word-Graphic Rating Scale, and a choice of descriptive words. Adolescents indicate pain sites on the human figure outline, use the Word-Graphic-Rating Scale as described, and use the word choices to characterize the pain felt.
TABLE 42–5  Neonatal Infant Pain Scale (NIPS)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Scoring Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial Expression</td>
<td>0 = Relaxed muscles</td>
</tr>
<tr>
<td></td>
<td>1 = Grimace</td>
</tr>
<tr>
<td></td>
<td>■ Restful face with neutral expression</td>
</tr>
<tr>
<td></td>
<td>■ Tight facial muscles; furrowed brow, chin, and jaw (Note: At low gestational</td>
</tr>
<tr>
<td></td>
<td>ages, infants may have no facial expression)</td>
</tr>
<tr>
<td>Cry</td>
<td>0 = No cry</td>
</tr>
<tr>
<td></td>
<td>1 = Whimper</td>
</tr>
<tr>
<td></td>
<td>2 = Vigorous cry</td>
</tr>
<tr>
<td></td>
<td>■ Quiet, not crying</td>
</tr>
<tr>
<td></td>
<td>■ Mild moaning, intermittent cry</td>
</tr>
<tr>
<td></td>
<td>■ Loud screaming, rising, shrill, and continuous (Note: silent cry may be</td>
</tr>
<tr>
<td></td>
<td>scored if infant is intubated, as indicated by obvious facial movements)</td>
</tr>
<tr>
<td>Breathing Patterns</td>
<td>0 = Relaxed</td>
</tr>
<tr>
<td></td>
<td>1 = Change in breathing</td>
</tr>
<tr>
<td></td>
<td>■ Relaxed, usual breathing pattern maintained</td>
</tr>
<tr>
<td></td>
<td>■ Change in drawing breath; irregular, faster than usual, gagging, or holding breath</td>
</tr>
</tbody>
</table>

TABLE 42–6  FLACC Behavioral Pain Assessment Scale

<table>
<thead>
<tr>
<th>Categories</th>
<th>SCORING</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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

CLINICAL THERAPY FOR PAIN

Pain management includes both drug and nondrug measures. Children need adequate pain medication, but nondrug measures can enhance pain management and ultimately reduce the amount of pain medication needed.

PAIN MEDICATIONS

Drug interventions include the use of opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), and nonnarcotic analgesics (acetaminophen).


TABLE 42–6  FLACC Behavioral Pain Assessment Scale

<table>
<thead>
<tr>
<th>Categories</th>
<th>SCORING</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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
</tr>
<tr>
<td></td>
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</tr>
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<td>Content, relaxed</td>
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<td></td>
</tr>
</tbody>
</table>

Observe the child for 5 minutes or longer. Observe the legs and body uncovered. Reposition the patient or observe activity. Assess body for tensesness and tone. Initiate consoling interventions if needed. Each of the five categories is scored from 0 to 2, resulting in a total score between 0 and 10. A total score of 0 = relaxed and comfortable; 1–3 = mild discomfort; 4–6 = moderate pain; 7–10 = severe discomfort or pain.

Use the Oucher Scale that is the best match for the ethnicity of the child. After determining that the child has an understanding of number concepts, teach the child to use the scale. Point to each photo and explain that the bottom picture is "no hurt," the second picture is a "little hurt," the third picture is "a little more hurt," the fourth picture is "even more hurt," the fifth picture is "a lot of hurt," and the sixth picture is the "biggest or most hurt you could ever have." The numbers beside the photos can be used to score the amount of pain the child reports.

The Caucasian version of the Oucher used with permission from Judith E. Beyer, RN, PhD, 1983. The African-American version of the Oucher used with permission from Mary J. Denyes, RN, PhD, and Antonia M. Villarruel, RN, PhD, 1990. The Hispanic version of the Oucher used with permission from Antonia M. Villarruel, RN, PhD, 1990.

FIGURE 42–2

Opioids

Opioids are commonly given for severe pain, such as after surgery or a severe injury. Opioids (e.g., morphine and codeine) may be administered by oral, subcutaneous, intramuscular, and intravenous routes. Administration of opioids by an oral route is as effective as by intramuscular and intravenous routes when the drug is given in an equianalgesic dose (the amount of drug, whether given by oral or parenteral routes, needed to produce the same analgesic effect) (Table 42–7). Oral and intravenous routes

FIGURE 42–3

The Faces Pain Rating Scale is valid and reliable in helping children to report their level of pain. Make sure the child has an understanding of number concepts and then teach the child to use the scale. Point to each face and use the words under the picture to describe the amount of pain the child feels. Then ask the child to select the face that comes closest to the amount of pain felt.

Pain Assessment and Management in Children

Word-Graphic Rating Scale has words rather than numbers under the line. It may be used by itself or with the Adolescent Pediatric Pain tool. Teach the child to use the tool by pointing to the side of the line that is no pain. Then run your finger along the line and tell the child that this location is the worst possible pain. If the child has some pain, ask the child to make a mark along the line that is the best match for the amount of pain felt. Use a millimeter ruler to measure from the “no pain” end of the line to the marked location to identify the pain score. Make sure the line is the same length each time pain is assessed so comparisons can be made.


Common side effects include sedation, nausea, vomiting, constipation, and itching. Potential complications of opioids include respiratory depression, cardiovascular collapse, and addiction. When the child’s condition is unstable, as in trauma or critical illness, the dosage of opioids must be carefully calculated to match the child’s cardiorespiratory status, although infants and children are no more likely than adults to develop respiratory depression following administration of a weight-specific dose of narcotics (Holder & Patt, 1995). Addiction is a rare complication in adults and children treated for painful conditions.

When giving opioids over an extended period of time, children may experience withdrawal, the physical signs and symptoms that occur when a sedative or pain drug is stopped suddenly in a patient with physical dependence. An example would be a child in an intensive care setting who experienced

### TABLE 42–7  Opioid Analgesics and Recommended Doses for Children and Adolescents*

<table>
<thead>
<tr>
<th>Drug</th>
<th>Approximate Equianalgesic Oral Dose</th>
<th>Approximate Equianalgesic Parenteral Dose</th>
<th>Recommended Starting Dose (Adults &gt;50 kg) Oral</th>
<th>Recommended Starting Dose (Children &amp; Adults &lt;50 kg) Parenteral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>30 mg</td>
<td>10 mg</td>
<td>15–30 mg every 3–4 hr</td>
<td>10 mg every 3–4 hr</td>
</tr>
<tr>
<td>Codeine</td>
<td>130 mg</td>
<td>75 mg IM or Subcutaneous</td>
<td>30–60 mg every 3–4 hr</td>
<td>60 mg every 3–4 hr</td>
</tr>
<tr>
<td>Hydromorphone (Dilaudid)</td>
<td>7.5 mg</td>
<td>1.5 mg</td>
<td>4–8 mg every 3–4 hr</td>
<td>1.5 mg every 3–4 hr</td>
</tr>
<tr>
<td>Levorphanol (Levo-Dromoran)</td>
<td>4 mg (acute)</td>
<td>2 mg (acute)</td>
<td>2–4 mg every 6–8 hr</td>
<td>2 mg every 6–8 hr</td>
</tr>
<tr>
<td>Mepedidine (Demerol)</td>
<td>300 mg</td>
<td>100 mg</td>
<td>NR</td>
<td>100 mg every 3 hr</td>
</tr>
<tr>
<td>Methadone (Dolophine, others)</td>
<td>20 mg (acute)</td>
<td>10 mg (acute)</td>
<td>5–10 mg every 6–8 hr</td>
<td>10 mg every 6–8 hr</td>
</tr>
<tr>
<td>Oxycodeone (Roxicodone)</td>
<td>30 mg</td>
<td>NA</td>
<td>5–10 mg every 3–4 hr</td>
<td>NA</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>NA</td>
<td>0.01 mg</td>
<td>5 mcg/kg Lozenge</td>
<td>50–100 mcg every 1–2 hr</td>
</tr>
</tbody>
</table>

NR = Not recommended; NA = Not available

*For all parenteral opioids, start with the low dose and titrate to effective pain control.

*Caution: Doses of aspirin and acetaminophen in combination with opioid/NSAID preparation must also be adjusted to the patient’s body weight.

*The Oralet is not widely used because of nausea and vomiting side effects.

System Signs and Symptoms

Central nervous system
- Irritability, increased wakefulness, tremulousness, hyperactive deep tendon reflexes, clonus, inability to concentrate, frequent yawning, sneezing, delirium, hypertonicity, visual or auditory hallucinations

Gastrointestinal system
- Feeding intolerance with vomiting, diarrhea, uncoordinated suck and swallow

Sympathetic nervous system
- Tachycardia, tachypnea, increased blood pressure, nasal stuffiness, sweating, fever

Table 42–8

<table>
<thead>
<tr>
<th>System</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central nervous</td>
<td>Irritability, increased wakefulness, tremulousness, hyperactive deep tendon reflexes, clonus, inability to concentrate, frequent yawning, sneezing, delirium, hypertonicity, visual or auditory hallucinations</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>Feeding intolerance with vomiting, diarrhea, uncoordinated suck and swallow</td>
</tr>
<tr>
<td>Sympathetic</td>
<td>Tachycardia, tachypnea, increased blood pressure, nasal stuffiness, sweating, fever</td>
</tr>
</tbody>
</table>

Data from Tobias, J. D. (2000). Tolerance, withdrawal, and physical dependency after long term sedation and analgesia of children in the pediatric intensive care unit. Critical Care Medicine, 28(6), 2122–2132. Adapted.

Table 42–9

<table>
<thead>
<tr>
<th>Oral NSAID Peak Action Time</th>
<th>Usual Adult Dose</th>
<th>Usual Pediatric Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen 0.5–2 hr</td>
<td>500–1000 mg every 4–6 hr</td>
<td>10–15 mg/kg every 4–6 hr</td>
<td>Lacks the peripheral anti-inflammatory activity of other NSAIDs; rectal suppository available</td>
</tr>
<tr>
<td>Aspirin 1–2 hr</td>
<td>650–975 mg every 4–6 hr</td>
<td>10–15 mg/kg every 4 hr</td>
<td>Do not use in children under 12 years with possible viral illness; may cause gastric upset and bleeding; rectal suppository available</td>
</tr>
<tr>
<td>Choline magnesium trisalicylate (Trilisate) 2 hr</td>
<td>1000–1500 mg every 12 hr</td>
<td>25 mg/kg every 12 hr</td>
<td>Does not increase bleeding time like other NSAIDs; also available as oral liquid</td>
</tr>
<tr>
<td>Ibuprofen (Motrin, others) 0.5 hr</td>
<td>200–400 mg every 4–6 hr</td>
<td>10 mg/kg every 6–8 hr</td>
<td>Available as oral suspension</td>
</tr>
<tr>
<td>Naproxen (Naprosyn) 2–4 hr</td>
<td>500 mg initial dose followed by 250 mg every 6–8 hr</td>
<td>5 mg/kg every 12 hr</td>
<td>Available as oral liquid</td>
</tr>
</tbody>
</table>

Push the injection button and understand that pushing the button will give them medication to relieve pain. Parents are sometimes given responsibility for pushing the injection button for younger children or those with disabilities.

After initial pain control has been achieved with an IV infusion by the nurse, the child presses a button to receive a smaller analgesic dose for episodic pain relief. Safety features that include the ability to set the maximum number of infusions per hour and the maximum amount of drug infusion by the nurse, the child presses a button to receive a smaller analgesic dose for episodic pain relief. Safety features that include the ability to set the maximum number of infusions per hour and the maximum amount of drug received in a given time period prevent overdoses. Additional pain medication is often ordered as needed to supplement the continuous and patient-administered infusion when pain control is not maintained.

Children and adolescents benefit from PCA by receiving continuous pain control and having the ability to control their comfort level with no trauma from injections. Once children can take oral analgesics, PCA is discontinued.

**REGIONAL PAIN MANAGEMENT**

Epidural pain control provides selective analgesia and has become more common for postoperative pain management. A catheter is inserted into either the lumbar or the caudal space. Only minute doses of drugs are needed because of the high concentration achieved at the opioid receptors in the spinal cord’s dorsal horn (Pasero, 2003).

Local nerve blocks, such as a popliteal block for anesthesia and analgesia of an extremity, are used more frequently for pain control after surgery. A subcutaneous catheter is inserted into the local area for infusion of the

**DRUG GUIDE**

**ACETAMINOPHEN**

**Overview of Action**


**Routes, Dosage, Frequency**

Oral or rectal: 10 to 15 mg/kg/dose every 4 to 6 hours, as needed. Do not exceed 5 doses/day. If not prescribed by healthcare provider, seek medical advice after 5 doses for either fever or pain. Children 12 years and older should not exceed 4 g per day.

Contraindications: Previous allergy to the drug and G6PD deficiency. Do not give preparations with aspartame to children with phenylketonuria. Use cautiously in children with hepatic dysfunction, anemia, renal dysfunction, or rheumatoid arthritis.

Drug interactions: Chronic coadministration with carbamazepine, phenytoin, barbiturates, and rifampin may increase potential for chronic hepatotoxicity.

Side effects: Liver damage with overdose.

**Patient- Controlled Analgesia (PCA)**

**Patient-controlled analgesia (PCA)** is a method of administering an intravenous analgesic, such as morphine, using a computerized pump programmed by the healthcare professional and controlled by the child (Skill 13–2). A continuous infusion of opioid prevents a recurrence of pain during long sleeping periods. This method of pain management is especially useful for pain control in the first 48 hours after surgery when oral pain management is not possible. PCA is prescribed mostly for children 5 years of age and older. Children selected for PCA should be able to push the injection button and understand that pushing the

**Nursing Implications**

- Assess: Note hepatic and renal function. Assess pain level or actual temperature prior to administration.
- Administer: Follow dosage directions carefully for different liquid preparations. Concentration differs between drops and elixir. Plain or chewable tablets may be crushed and given with fluid; avoid giving with high-carbohydrate meals, which can decrease drug absorption.
- Monitor: Evaluate the response to medication. Periodic renal and hepatic studies may be ordered for patients on long-term therapy.
- Patient teaching: Do not give with other over-the-counter medications unless directed by healthcare provider as they may also contain acetaminophen or aspirin. Consult a physician for dosage in a child younger than 2 to 3 years, if fever or illness persists over 3 days, or if relief is not obtained. Limit child to 5 doses/day. Store out of the child’s reach as this medication is a frequent cause of childhood poisoning.

CHAPTER 42

PATIENT-CONTROLLED ANALGESIA (PCA)

- What is PCA? Analgesia means pain relief: you get to control the amount of medicine you receive by using the machine.
- The machine gives the medicine by passing it through the tube that is connected to your intravenous line. When you push the button, the machine pumps pain medicine into the intravenous line to make you feel better.
- The machine limits the amount of medicine you can get to what the doctor orders. You can get any amount up to the maximum by pushing the button repeatedly. The push button will not let you make a mistake if you drop it or roll on it.
- Whenever you feel pain, hurt, or discomfort, push the button to get more medicine. You should be the only one to push the button.
- No needles for pain shots are needed as long as the intravenous line is in place.
- The PCA may not relieve all of your pain, but it should make you feel comfortable. Let the nurse know if you think your PCA is not working.
- The PCA will be used until you can take pills or drink liquid pain medicine.

analgesia. Pain control is achieved without systemic side effects from the medication. Tingling felt in the fingers or toes of the affected extremity is the first sign that the nerve block is receding.

NURSING ASSESSMENT AND DIAGNOSIS

Nurses have an ethical obligation to relieve a child’s suffering not only because of the consequences of unrelieved pain but also because appropriate pain management may have benefits such as earlier mobilization, shortened hospital stays, and reduced costs. To provide effective nursing management of children in pain, anticipate the presence of pain and recognize the child’s right to pain control.

When assessing pain in children, keep the following questions in mind:

- What is happening in tissues that might cause pain? Assume that children who have had surgery, injury, vaso-occlusive episode, or illness are experiencing pain, since these events also cause pain in adults.
- What external factors could be causing pain? For example, is the cast too tight or is the child poorly positioned in bed?
- Are there any indicators of pain, either physiologic or behavioral?
- How is the child responding emotionally?
- How does the child or parent rate the pain?

Physiologic symptoms such as nausea, fatigue, dyspnea, bladder and bowel distention, and fever may influence the intensity of pain felt by a child. Fear, anxiety, separation from parents, anger, culture, age, or a previous pain experience may also affect the child’s behavior or responses to pain stimuli.

When working with an infant or child, determine which pain scale is the most appropriate for the circumstance and developmental stage. When using a self-report pain assessment tool, use the same tool each time you assess for pain or for the evaluation of pain management. This makes comparison of assessment results possible. A chronologic record of the child’s pain assessments must be documented along with actions taken to relieve pain, in addition to the follow-up assessments to determine the effectiveness of those actions.

Remember that surgery and trauma can result in multiple sites of pain (incision or laceration, cut or bruised muscles, interrupted blood supply, nasogastric tube placement, insertion sites of intravenous lines). When using pain scales in the assessment of a verbal child, attempt to identify all sites of pain. Then evaluate the intensity of pain at each site.

Examples of nursing diagnoses for children in pain include the following:

- Acute Pain (abdominal) related to injury and surgery
- Anxiety related to anticipation of pain from an invasive procedure
- Sleep Pattern Disturbed related to inadequate pain control
- Ineffective Individual Therapeutic Regimen Management related to self-management of pain control, and use of nonpharmacologic pain-control measures
- Ineffective Breathing Pattern: Potential for, related to opioid overdose
- Risk for Constipation related to opioid pain medication and limited activity

PLANNING AND IMPLEMENTATION

Nursing management involves the following actions to increase and maintain patient comfort once the assessment is completed and nursing diagnoses are developed: pharmacologic intervention; nonpharmacologic intervention; monitoring, evaluating, and documenting the effectiveness of pain-control measures to provide optimal comfort; and patient education.

The accompanying “Nursing Care Plan” summarizes nursing care for the child with postoperative pain.
### Pain Assessment and Management in Children

**NURSING CARE PLAN**

#### THE CHILD WITH POSTOPERATIVE PAIN

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rationale</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Nursing Diagnosis: Severe Abdominal Pain related to surgery and injury</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIC Priority Intervention:</td>
<td>Pain management: Alleviation of pain or a reduction in pain to a level of comfort that is acceptable to the patient</td>
<td>NOC Suggested Outcome: Comfort level: Feelings of physical and psychologic ease</td>
</tr>
<tr>
<td><strong>Goal:</strong> The child will report relief (to a level acceptable to the child on a pain scale).</td>
<td></td>
<td>The child reports pain relief after administration of analgesia.</td>
</tr>
<tr>
<td>■ Give analgesic by a pain-free method.</td>
<td>■ The child may deny pain to avoid analgesia by painful route.</td>
<td></td>
</tr>
<tr>
<td>■ Have the child select a pain scale and rate the amount of pain perceived before and 30–60 minutes after analgesia is given to ensure pain relief.</td>
<td>■ The child’s pain rating is the best indicator of pain. Maintenance of pain control requires less analgesia than treating each acute pain episode.</td>
<td></td>
</tr>
<tr>
<td>■ Assess pain control each hour to ensure that the child’s pain is relieved.</td>
<td>■ Frequent monitoring identifies inadequate pain control before it becomes significant.</td>
<td></td>
</tr>
<tr>
<td>■ Reposition the child every 2 hr to maintain good body alignment.</td>
<td>■ New positions decrease muscle cramping and skin pressure.</td>
<td></td>
</tr>
<tr>
<td>■ Provide therapeutic touch or massage. Encourage the parents to read a story or play favorite music.</td>
<td>■ Complementary therapy reduces stress and enhances the analgesic action.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Nursing Diagnosis: Disturbed Sleep Pattern related to inadequate pain control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIC Priority Intervention:</td>
<td>Sleep enhancement: Facilitation of regular sleep/awake cycles</td>
<td>NOC Suggested Outcome: Sleep: Extent and pattern of sleep for mental and physical rejuvenation</td>
</tr>
<tr>
<td><strong>Goal:</strong> The child will experience fewer disruptions of sleep by pain.</td>
<td></td>
<td>The child’s sleep is undisturbed by pain. Child sleeps for age-appropriate number of hours per day.</td>
</tr>
<tr>
<td>■ Give analgesia by continuous infusion or every 3–4 hr around the clock.</td>
<td>■ Pain breakthrough occurs even during sleep and disturbs the healing effects of sleep.</td>
<td></td>
</tr>
<tr>
<td><strong>3. Nursing Diagnosis: Ineffective Individual Therapeutic Regimen Management related to self-management of pain control and use of nondrug pain-control measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIC Priority Intervention:</td>
<td>Self-modification assistance: Reinforcement of self-directed change initiated by the patient to achieve personally important goals</td>
<td>NOC Suggested Outcome: Treatment behavior pain control: Personal actions to palliate or eliminate pain</td>
</tr>
<tr>
<td><strong>Goal:</strong> The child and family will effectively use patient-controlled analgesia (PCA) and complementary therapy pain-control measures.</td>
<td></td>
<td>The child’s pain rating stays low. The child and family independently use complementary therapies for pain control.</td>
</tr>
<tr>
<td>■ Teach the child how the PCA works and when to push the button.</td>
<td>■ The child must know that pushing the PCA button will keep pain under control.</td>
<td></td>
</tr>
<tr>
<td>■ Teach the family and the child how to use age-appropriate imagery, distraction, relaxation techniques, and other complementary therapy pain-control measures.</td>
<td>■ Complementary therapy pain-control measures reduce the amount of analgesia needed.</td>
<td></td>
</tr>
<tr>
<td><strong>Goal:</strong> The child and family will use appropriate analgesia after discharge.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>■ Discuss appropriate pain control to use at home after discharge.</td>
<td>■ The family and child may be anxious about pain management at home.</td>
<td>The family understands pain-relief measures for use at home and knows where to call if help is needed.</td>
</tr>
</tbody>
</table>
THE CHILD WITH POSTOPERATIVE PAIN—continued

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rationale</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4. Nursing Diagnosis: Risk for Ineffective Breathing Pattern related to opioid overdose</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIC Priority Intervention:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory monitoring: Collection and analysis of patient data to ensure airway patency and adequate gas exchange</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOC Suggested Outcome:</strong></td>
<td>Vital signs status: Temperature, pulse, respirations, and blood pressure within expected range for the individual</td>
<td></td>
</tr>
<tr>
<td><strong>Goal:</strong> The child will maintain adequate ventilations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>■ Verify that correct dose of opioid analgesia is given for the child’s weight.</td>
<td>■ Respiratory depression is a significant complication of opioid analgesia when too much analgesia is given.</td>
<td>■ There is no episode of respiratory depression associated with analgesia.</td>
</tr>
<tr>
<td>■ Monitor vital signs and depth of inspirations before analgesic is administered and at time of peak drug action.</td>
<td>■ Respiratory depression episode must not progress to respiratory arrest. All opioids act on brainstem center, which decreases responsiveness to CO₂ tension.</td>
<td></td>
</tr>
<tr>
<td>■ Calculate agonist dose ordered by physician to be sure it will reverse respiratory depression, but not counteract effect of analgesia.</td>
<td>■ Valuable time will be saved if agonist is needed for episode of respiratory depression. Complete reversal of analgesia will cause the child to have significant pain.</td>
<td></td>
</tr>
</tbody>
</table>

| **5. Nursing Diagnosis: Constipation related to opioid administration and decreased motility of gastrointestinal tract** |
| NIC Priority Intervention: | Constipation management: Prevention and alleviation of constipation | | |
| **NOC Suggested Outcome:** | Bowel elimination: Ability of gastrointestinal tract to form and evacuate stool effectively |
| **Goal:** The child will have minimal constipation. | | |
| ■ Palpate the abdomen, and assess bowel sounds and abdominal distention. | ■ Signs of constipation must be anticipated and identified. | The child has bowel movements at least every 2 days while on opioid pain control. |
| ■ Request physician order for stimulating laxative and stool softener. | ■ Opioids increase the transit time of feces and interfere with bile enzymes needed for evacuation. | |
| ■ Provide fluids of choice to increase fluid intake when IV fluids are decreased. | ■ Extra fluids will counteract opioid action of increasing the absorption of water from the large intestine. | |
| ■ Inform family and child that constipation is a side effect of pain medication. | ■ Parents can become partners in managing fluid intake and monitoring bowel movements. | |

**Pharmacologic Intervention**

Give analgesics as ordered by the physician, ensuring that the dose is appropriate for the child’s weight. When administering an opioid by intravenous infusion or PCA, monitor the flow rate and the site for infiltration. Monitor the child’s vital signs for complications related to opioids, such as respiratory depression. Vital signs (heart rate and blood pressure) may not change in response to effective analgesia when infection, trauma, or other stressors keep them elevated. Check for the presence of other side effects of analgesics, such as sedation, nausea, vomiting, itching, urinary retention, and constipation. Make sure analgesic antagonists such as naloxone are available should complications develop.

**NURSING PRACTICE**

Naloxone may be used to treat respiratory depression caused by an opioid drug at a dose and slow infusion rate that does not reverse the pain-control effects of the narcotic. A continuous infusion or repeated doses may be needed for severe overdoses.

When a regional nerve block is used, the analgesic effect does not recede for several hours after the catheter is removed. Be careful when ambulating a child with a regional nerve block in an extremity. Protect the extremity from injury because the child has reduced feeling in the
limb. Monitor the child for tingling of fingers or toes, an indication that the analgesic effect is receding. Begin oral analgesia to maintain pain control.

Oral NSAIDs are generally ordered for less severe pain or chronic pain. These drugs may mask fever. Be alert to the potential complication of gastrointestinal hemorrhage in critically ill children who have increased gastric acids as a physiologic stress response to pain.

Assess the child for pain 15 to 30 minutes following intravenous pain medication and 1 hour after oral pain medication to determine if adequate pain control was achieved. Evaluate the child’s level of pain frequently to identify any increase in pain intensity. Use information collected from the child and parent, as well as from an appropriate pain scale. Dramatic reductions in pain should occur, although not all pain may disappear. Be certain to record results of pain-control measures to guide future nursing actions. Use a flowsheet to document assessments and medication administration during the postoperative period.

Many children sleep after receiving an analgesic. This sleep is not a side effect of the drug or a sign of an overdose, but the result of pain relief. Pain interrupts sleep, and once pain is relieved, the child can sleep comfortably. However, sleep does not always indicate pain control. A child in pain may fall asleep in exhaustion. Look for other symptoms of pain, such as excess movement or moaning.

Become an advocate for children when the dose or type of analgesic ordered is inadequate. Tolerance is a decrease in a drug’s effect over time or the need for increasing amounts of the drug to produce or maintain the same level of pain relief or sedation effect. This may occur when children with severe pain have been taking opioids or sedatives for several days. Breakthrough pain occurs, and an increase in dosage is needed to achieve the previous level of pain relief. Tolerance can be delayed with effective use of pain scales to allow appropriate drug dosing, and often less analgesia is needed. Magnesium may also slow the development of tolerance (Tobias, 2000).

Before asking the physician to change the analgesia, review the child’s record for documentation that the prescribed drug has been given at the appropriate dose and frequency and that the child’s pain relief is ineffective despite the drug administration. After verifying the record, provide the physician with information about the characteristics of the child’s pain and ask that the medication be changed.

**Nonpharmacologic Intervention**

Complementary therapies are the nonpharmacologic methods of pain control that can be used with or without analgesics. The gate control theory helps explain why complementary pain management techniques are effective in helping to control pain. Stimulation of the larger A-delta

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### Evidence-Based Nursing

**Clinical Question**

Why does adequate management of children with acute pain continue to be a problem?

**Evidence**

In several recent studies, researchers found that some children continue to be undermedicated for moderate and severe pain despite continuing efforts to promote effective pain management for children (Higgins, Turley, Harr et al., 1999; Vincent, 2001; Vincent & Denyes, 2004). A study by Vincent and Denyes in 2004 explored factors related to the actions 67 nurses took to relieve children’s pain in actual clinical situations in a children’s hospital. The 132 children were experiencing pain from surgery, burns, vaso-occlusive episodes, and trauma. Nurses studied had a moderately high level of knowledge and attitudes about relieving children’s pain. Behavioral manifestations of pain led more nurses to believe a child’s self-report of pain. Nurses did tend to give more analgesia to children reporting higher pain levels, meaning that the child’s pain level is what triggered the nurses to administer analgesia.

**Implications**

Surprisingly, 26% of children reporting pain received no analgesia, and the 51% of children with moderate to high levels of reported pain received markedly less than the recommended and ordered amounts of analgesia. Pediatric nurses have an obligation to ask children to report their pain levels and then to accept that this pain rating is accurate. Behavioral cues that pain exists should not be necessary to evaluate pain in children who can self-report pain. Crying and grimacing in pain are not the only pain behaviors to look for. Pain behaviors vary among children. For example, children use play as a distraction to self-manage pain, and they sleep after becoming fatigued from dealing with pain. Children are entitled to comfort and pain relief, so all information that informs the nurse that the child is experiencing pain should be used in making decisions to relieve pain.

**Critical Thinking**

What could be some reasons for undermedication of children by nurses? What is your role in improving the pain management of children in all settings?

**References**


Parents are the single most powerful nonpharmacologic method of pain relief available to children. A parent’s presence greatly reduces the anxiety associated with pain and hospitalization (Broome, 2000). Children often feel more secure telling their parents about their pain and anxiety. When parents are actively participating in the child’s care during hospitalization, teach them about how complementary therapies can be used to enhance the child’s pain management. Help the parent select the age-appropriate complementary therapy for the child:

- **Infants:** holding, cuddling, sucking a pacifier, massage
- **Toddlers:** massage, stories, bubbles, touch, holding and rocking, music (Figure 42–5)
- **Preschoolers:** engaging in play, stories, music, imagining being a superhero, watching television or a video
- **School-age children:** rhythmic breathing, muscle relaxation, guided imagery, talking about pleasant experiences, playing games, listening to radio, watching television or a video
- **Adolescents:** rhythmic breathing, muscle relaxation, guided imagery, having visitors, playing games, watching television, listening to radio or CD player

One or more of these methods may provide adequate relief of low levels of pain. When used with analgesics, nonpharmacologic techniques often increase the effectiveness of the analgesic or reduce the dosage required. When used in association with a medical procedure, remember to use an intervention before, during, and after the procedure. This gives the child a chance to recover, feel mastery, and remember coping (Fanurik, Koh, Schitz et al., 1997).

Assemble a pain management kit to promote distraction, imagery, and relaxation in children. Items that might be included are magic wands, pinwheels, bubble liquid, a slinky spring toy, a foam ball, party noisemakers, and pop-up books. It may also be helpful to include items for therapeutic play such as syringes, adhesive bandages, alcohol swabs, and other supplies from a medical kit. The pain management kit may be especially helpful for distracting children who are being prepared for surgery or for painful procedures.

**Distraction.** Distraction involves engaging a child in a wide variety of activities to help him or her focus attention on something other than pain and the anxiety associated with the procedure. Examples of distracting activities are listening to music, singing a song, playing a game, watching television or a video, and focusing on a picture while counting. Select activities that are developmentally appropriate for the child. Children in severe pain cannot be distracted, but do not assume the pain is gone if a child can be distracted.

**Cutaneous Stimulation.** Cutaneous stimulation involves gently rubbing the painful area, massaging the skin gently, and holding or rocking the child. Touching provides a stimulus to compete with the pain stimuli transmitted from the peripheral nerves to the spinal cord. These actions may reduce the pain felt by the child. Swaddling and blanket rolls may calm a distressed newborn by decreasing tactile stimulation and containing gross motor behaviors (Lynn, Ulma, & Spreker, 1999).

**Sucrose Solution.** Concentrated sucrose solutions (12% or 24%) with a pacifier may be used as a pain relief measure in newborns. Sucrose may provide a natural pain relief by activating endogenous opioid systems in the body. The analgesic effect of sucrose lasts approximately 3 to 5 minutes, with a peak action in 2 minutes (Mitchell & Waltman, 2003). A moistened pacifier dipped in a packet of sugar given to the infant during a painful procedure reduced pain behaviors such as duration of crying and vagal tone during a heel stick (Greenberg, 2002).
Electroanalgesia. Also known as transcutaneous electrical nerve stimulation (TENS), electroanalgesia delivers small amounts of electrical stimulation to the skin by electrodes. This electrical stimulation is stronger than the pain impulses, and because of the gate control theory, is thought to interfere with the transmission of pain from the peripheral nerves to the spinal cord. TENS may be used for both acute and chronic pain management. The only known side effect is skin irritation at the electrode site.

Guided Imagery. Imagery is a cognitive process that encourages the child to focus concentration on an event or place unrelated to the pain process. The focus can be on exploring a favorite place, doing a favorite activity, remembering a funny story, or being a superhero. This method is most effective in children over 6 years of age. Ask the child to think about all the sights, sounds, smells, tastes, and feelings that will help him or her to experience the favorite place, activity, or story. Guided imagery is a form of self-hypnosis, and it is most effective when preceded by a relaxation exercise.

Relaxation Techniques. Relaxation techniques are used to reduce muscle tension, which aggravates pain. Relaxation methods include rhythmic breathing and alternately tensing and relaxing selected muscle groups for 10 seconds each. Progressively move from specific muscle groups to more central muscles. Enhance relaxation by focusing the child’s attention on something pleasant.

Hypnosis. An altered state of consciousness occurs when appropriate suggestions distort perception, memory, and mood. Children who respond to hypnotic suggestions are often more relaxed and experience less pain. The precise physiologic mechanism for the success of hypnosis in pain control is not known; however, the gate control theory may be a factor.

Application of Heat and Cold. Heat application promotes dilation of blood vessels. The increased blood circulation permits the removal of debris of cell breakdown from the site. Heat also promotes muscle relaxation, breaking the pain–spasm–pain cycle. To reduce edema, do not apply heat in the first 24 hours after an injury.

The application of cold is believed to slow the ability of pain fibers to transmit pain impulses. Cold also controls pain by decreasing edema and inflammation and by causing partial or complete anesthesia or numbness of the skin. When cold is applied, assess the skin for redness or signs of irritation. Take care to avoid causing thermal injury. Discontinue cold applications immediately if the skin alternately blanches and reddens afterwards or if blisters or redness do not subside between applications.

Discharge Planning and Home Care Teaching

Children are frequently discharged from the hospital with oral analgesics following surgery, injury, or treatment of acute medical conditions. Parents have the responsibility to provide adequate pain control for their child after day surgery. The child usually leaves the surgical center pain-free, and the parents may not anticipate pain. Take the time to discuss the importance of pain management and its benefits in promoting the child’s healing. Make sure parents know that a sudden increase in pain intensity indicates the development of a complication requiring medical attention.

Provide guidance to help parents assess their child’s pain, and for school-age children and adolescents to assess their own pain. Teach parents and children about the dosage and frequency of administration and the side effects of the analgesic ordered. Review nonpharmacologic methods of pain control with parents and children. Encourage children and parents to use the techniques that work best for them.

Remember that many common health problems (otitis media, pharyngitis, and urinary tract infection) have pain as one of the presenting symptoms. Often the only medication prescribed is an antibiotic to clear the infection. This may leave the child in pain for 48 to 72 hours until the antibiotic brings the infection under control. Give parents recommendations for pain control and comfort measures during this period.
device, and formulation of acetaminophen used by parents to identify any risk for overdose.

**EVALUATION**

Expected outcomes of nursing care include the following:

- The child's pain level is assessed frequently and pain management is effective in improving the child's comfort.
- The child successfully uses a PCA pump to control acute pain.
- Age-appropriate nonpharmacologic methods of pain management enhance the comfort provided by medications.

**NURSING MANAGEMENT OF CHRONIC PAIN**

Some children have medical conditions that cause chronic pain and episodic acute pain, such as rheumatoid arthritis, cancer, headaches, recurrent abdominal pain, and HIV infection. Chronic pain does not arouse the sympathetic nervous system in the same way that acute pain does. Therefore the child may perceive pain but not appear to be in pain.

Physical and psychologic signs and symptoms should be viewed together. No tools have been developed to assess chronic pain for any child age group. Assessment and evaluation of chronic pain in children should include the following aspects (American Pain Society, 2003):

- Approach pain as the present problem and obtain the history of pain onset, its development over time, intensity, duration, location, what makes it worse or relieves it, and its impact on daily life (sleeping, appetite, school, and social interactions).
- Determine the amount of distress the child and family experience with pain, including anxiety, depression, and hopelessness.
- Clarify what the family and child believe causes the pain and their response to it.
- Identify past pain problems in the family and the current methods of treatment.
- Observe the child’s appearance, posture, gait, and emotional and cognitive state.
- Assess muscle spasms, trigger points, areas sensitive to light touch, and a complete neurologic examination.

Older children with recurrent episodes of pain can be encouraged to keep a diary or log to describe the characteristics, timing, activities, and potential triggers of their pain, as well as their response to pain treatment measures. A pain assessment scale should be used to rate the pain intensity before and after medications and other pain-control measures are used. This record can help improve pain management.

Examples of nursing diagnoses for children with chronic pain include the following:

- **Chronic Pain** related to arthritic joint inflammation and degeneration
- **Disturbed Sleep Pattern** related to ineffective management of chronic pain
- **Impaired Physical Mobility** related to ineffective management of chronic pain

Children with chronic conditions (arthritis, sickle cell disease, hemophilia, cancer, recurrent headaches, etc.) often need long-term pain management. NSAIDs and acetaminophen are often ordered for pain management. Strategies for chronic pain management include the following:

- Explain and validate pain and its causes.
- Encourage the use of a pain diary.
- Discuss treatment goals with the child and family and jointly develop a care plan that integrates pharmacologic and nonpharmacologic (complementary) methods.
- Develop a care plan for sudden painful episodes associated with acute flare-ups of their condition.
- Provide effective preventive pain management for procedural pain, as many of these children have numerous medical procedures.

Parents should be actively engaged in pain control for their child. Teach parents the importance of pain control and how to use a variety of complementary therapies with their child to supplement the pain medications administered. Refer children with long-term pain to a pediatric pain program to be evaluated for customized strategies to manage pain.

**SEDATION AND PAIN MANAGEMENT FOR MEDICAL PROCEDURES**

Children undergo a wide variety of painful diagnostic and treatment procedures in the hospital and in outpatient settings. Procedures such as chest tube insertion, arterial puncture, lumbar puncture, bone marrow aspiration, fracture reduction, laceration repair, insertion of a central or peripheral intravenous line, and burn debridement cause significant pain in children. The anticipation of these procedures causes anxiety and emotional distress that can lead to greater intensity of pain. Children who have experienced severe pain in the past may be unwilling to cooperate with healthcare personnel.
When painful procedures are planned, use EMLA cream to anesthetize the skin where the painful stick will be made. Apply a thick layer of cream over intact skin (one half of a 5-g tube). Cover the cream with a transparent adhesive dressing, sealing all the sides. The cream anesthetizes the dermal surface in 45 to 60 minutes.

**FIGURE 42–6**

When sedatives are given in lower doses, **light sedation** occurs during which the child maintains protective reflexes, maintains a patent airway, and appropriately responds to verbal stimuli. **Deep sedation** is a controlled state of depressed consciousness or unconsciousness in which the protective reflexes are lost. See Table 42–10. Analgesia must be given in association with sedation because the sedated child can still feel pain but not communicate its presence.

Guidelines should exist in every healthcare facility where pediatric sedation is performed to ensure safe healthcare practices. These guidelines often require that the health professionals monitoring the child have specific qualifications, such as pediatric advanced life support training. With the combined effects of analgesia and sedatives, the child must be carefully monitored for respiratory depression and signs of deep sedation. Antagonist agents are available for opioids and benzodiazepines when the effects of sedation and respiratory depression need to be reversed. (See Skills 13–3 and 13–4 for more information.)

**NURSING MANAGEMENT**

**Increase Comfort During Painful Procedures**

Help the child cope with a painful procedure by telling the child what sensations to expect and what will happen during the procedure. This reduces stress more effectively than just providing information about the procedure. See Chapter 39 for methods of preparing children of different developmental ages for procedures.

**NURSING PRACTICE**

Whenever sedation is given, be sure to have the resources available to monitor the child’s vital signs and to provide advanced life support if the child should progress to deep sedation. In case complications occur, the following equipment should be immediately available: suction apparatus, a bag-valve mask for assisted ventilation with capability of 90% to 100% oxygen delivery, and an oxygen supply (5 L/min for more than 60 minutes). Antagonists to sedative medication must be premeasured and ready to administer.
Drug therapy is not always used for quick procedures, such as a dressing change, or an unexpected intravenous insertion, injection, or venipuncture. Complementary therapies, especially guided imagery, relaxation techniques, and distraction, may reduce the anxiety associated with the anticipation of the procedure. Teach parents and children to use these interventions before procedures. Help children control their anxiety through therapeutic play.

When pharmacologic pain management is used for a procedure, the nurse’s responsibilities include the following:

- Treat anticipated procedure-related pain prophylactically. For example, give an analgesic before a bone marrow aspiration or fracture reduction. Permit time for the drug to become effective.
- Manage preexisting pain before beginning a procedure such as scrubbing a burn.
- Whenever possible, administer drugs by a nonpainful route (oral, transmucosal, intravenous). Avoid intramuscular or subcutaneous injections.
- When procedures must be repeated (for example, bone marrow aspirations for children with leukemia), give optimal analgesia for the first procedure to reduce anxiety about future procedures.
- To prevent increased anxiety, avoid delays in performing procedures.
- Document the results of pain management.

When the child receives sedation, monitoring the child’s status is important. Nursing assessments include visual confirmation of respiratory effort, color, and vital signs. Pulse oximetry and other technology may be used for monitoring, but the equipment must not replace visual assessment. Vital signs must be checked every 15 minutes until the child regains full consciousness and level of functioning. If light sedation progresses to deep sedation, airway management is essential; check vital signs every 5 minutes.

Criteria for discharge after sedation include the following (Bindler & Ball, 2003):

- Satisfactory and stable cardiovascular function and airway patency.
- Easily arousable, protective reflexes intact.
- Adequate hydration.
- Infant is able to hold the head up and sit up unassisted if old enough to do so, or the child can stand and walk without assistance.
- Discharge status is the same as admission status.

### Critical Concept Review

#### LEARNING OBJECTIVES

Describe the physiologic and behavioral consequences of pain in children.

#### CONCEPTS

1. Physiologic consequences of acute pain:
   - Tachycardia and rapid shallow breathing.
   - Inadequate cough.
   - Inadequate lung expansion.
   - Depressed immune response.
   - Increased perspiration and loss of electrolytes and fluids.
   - Increased intestinal secretions.
LEARNING OBJECTIVES

Describe the physiologic and behavioral consequences of pain in children.

CONCEPTS

Select an appropriate tool to assess the pain of infants and children in each age group:

1. Infants and nonverbal children:
   - Neonatal infant pain scale.
   - FLACC Behavioral Pain Assessment Scale.

2. Young children:
   - Color area of pain on outline of body.
   - Faces pain scale.
   - Oucher scale.

3. Older children and adolescents:
   - Visual analog scale.
   - Poker chip scale.
   - Word graphic scale.
   - Adolescent pediatric pain tool.

Describe the nursing assessment and management for a child receiving an opioid analgesic:

- Use oral and intravenous route, if possible.
- Titrate dose to match child's cardiorespiratory status.
- Identify line of peak drug effect and monitor child's vital signs to detect respiratory depression.
- Observe for nausea, constipation and itching.
- Have nalaxone (Narcan) available for treatment of respiratory distress.

Explain the rationale for the effectiveness for nonpharmacologic (complementary) methods of pain control:

Nonpharmacologic methods of pain control are effective in children due to the Gate Control Theory. The use of methods such as nonpainful touch and massage stimulate the larger A-delta fibers and decrease the transmission of pain impulses to the brain.

Assess children of different ages with acute pain and develop a nursing care plan that integrates pharmacologic interventions and developmentally appropriate nonpharmacologic (complementary) therapies:

Interventions common to all ages:
- Assess pain frequently.
- Anticipate need for pain medication.
- Monitor vital signs.

Pharmacologic and nonpharmacologic interventions by age group:

1. Infants and toddlers:
   - Administer oral or intravenous medications around the clock.
   - Hold, swaddle, rock, or provide nonnutritive sucking.
   - Allow infant to suck sucrose solution.
   - Have toddler blow bubbles.

2. Preschooler:
   - Use distraction techniques with the use of a magic wand, pinwheel, or noise maker.
   - Allow child to watch appropriate TV shows or videos.

3. School-age child and adolescent:
   - Instruct in use of PCA or epidural until able to take oral medications.
   - Use hypnotherapy if child is able to cooperate.
   - Engage child in breathing techniques for relaxation.
   - Use guided imagery, visitors, TV, radio, tapes, or CDs for distraction.

Develop a nursing care plan for assessing and monitoring the child having sedation and analgesia for a medical procedure:

1. Explain procedure to the child and parents.
2. Administer medications by oral or intravenous route, if possible.
3. Employ nonpharmacologic methods such as distraction and guided imagery to decrease anxiety.
4. Use pulse oximetry and a cardiorespiratory monitor during procedure.
5. After procedure is completed, check vital signs and level of consciousness frequently until child is stable and awake.

Behavioral consequences of acute pain:
- Short attention span.
- Irritability.
- Facial grimacing.
- Posturing, protecting painful area, immobility.
- Lethargy or withdrawal.
- Sleep disturbance.

Describe the physiologic and behavioral consequences of pain in children.—continued
CRITICAL THINKING IN ACTION

View the Critical Thinking in Action video in Chapter 42 of the CD-ROM. Then, answer the questions that follow.

A 12-year-old boy, Kevin, is recovering from a 4-wheeler accident on the medical surgical unit at a local children's hospital. He was riding the 4-wheeler unsupervised and without permission while his parents were at work. He suffered an abdominal injury requiring surgery, three broken bones and several lacerations that needed stitches. His parents are very worried about his injuries and at the same time angry with him for not following the rules. Kevin appears expressionless in his hospital bed, but cries and grimaces at any slight movement. When asked on a scale of 1–10 (10 being the most pain) how much pain he is feeling, he says a 10. His parents are reluctant to let him have any pain medications because they fear he may become dependent on the medication. His father states that Kevin should be a man and tolerate the pain, and he thinks enduring the pain will teach him a lesson about responsibility. The nurse explains that pain management is necessary to improve Kevin’s healing, help him mobilize sooner, and potentially shorten his hospital stay. She explains the physiological consequences of ineffective pain management and discusses how the medication will help him sleep and rest. She explains that some of pain medications can be addicting, but the chances of Kevin becoming addicted to pain medications for this injury are extremely rare. She also reviews the nonpharmacological methods of relieving pain. The parents are still reluctant to the medications, but agree to conform to the doctor’s orders.

1. What are some of the potential physiological consequences to letting Kevin suffer pain?
2. What are some examples of opioid analgesics available to Kevin?
3. What are some examples of NSAIDs available to Kevin?
4. What are the signs and symptoms of opioid withdrawal and how long should it take for Kevin to be weaned off an opioid?

REFERENCES


