LEARNING OBJECTIVES

• Examine the various childbirth preparation methods.
• Describe breathing and relaxation techniques used for each stage of labor.
• Identify nonpharmacologic strategies to enhance relaxation and decrease discomfort during labor.
• Compare pharmacologic methods used to relieve discomfort in different stages of labor and for vaginal or cesarean births.
• Discuss the use of naloxone (Narcan).
• Apply the nursing process to the management of the discomfort of a woman in labor.
• Summarize the nursing responsibilities appropriate for a woman receiving analgesia or anesthesia during labor.

KEY TERMS AND DEFINITIONS

analgesia  Absence of pain without loss of consciousness
anesthesia  Partial or complete absence of sensation with or without loss of consciousness
Bradley method  Husband-coached childbirth preparation method using labor breathing techniques and environmental modification
counterpressure  Pressure applied to the sacral area of the back during uterine contractions
Dick-Read method  A prepared childbirth approach based on the premise that fear of pain produces muscular tension, producing pain and greater fear; includes teaching physiologic processes of labor, exercise to improve muscle tone, and techniques to assist in relaxation and prevent the fear-tension-pain mechanism
effleurage  Gentle stroking used in massage, usually on the abdomen
epidural block  Type of regional anesthesia produced by injection of a local anesthetic alone or in combination with a narcotic analgesic into the epidural (peridural) space
epidural blood patch  A patch formed by a few milliliters of the mother’s blood occluding a tear in the dura mater around the spinal cord that occurs during induction of spinal block; its purpose is to relieve headache associated with leakage of spinal fluid
gate-control theory of pain  Pain theory used to explain the neurophysiologic mechanism underlying the perception of pain: the capacity of nerve pathways to transmit pain is reduced or completely blocked by using distraction techniques
Lamaze (psychoprophylaxis) method  Childbirth preparation method developed in the 1950s by a French obstetrician, Fernand Lamaze, that gained popularity in the United States in the 1960s; requires practice at home and coaching during labor and birth; goals are to minimize fear and the perception of pain and to promote positive family relationships by using both mental and physical preparation, including breathing and relaxation techniques, effleurage, and focusing
local perineal infiltration anesthesia  Process by which a substance such as a local anesthetic medication is deposited within the tissue to anesthetize a limited region of the body
neonatal narcosis  Central nervous system depression in the newborn caused by an opioid (narcotic); may be signaled by respiratory depression, hypotonia, lethargy, and delay in temperature regulation
opioid (narcotic) agonist analgesics  Medications that relieve pain by activating opioid receptors
opioid (narcotic) agonist-antagonist analgesics  Medications that combine agonist activity (activates or stimulates a receptor to perform a function) and antagonist activity (blocks a receptor or medication designed to activate a receptor) to relieve pain without causing significant maternal or fetal or newborn respiratory depression
opioid (narcotic) antagonists  Medications used to reverse the CNS depressant effects of an opioid, especially respiratory depression
pudendal nerve block  Injection of a local anesthetic at the pudendal nerve root to produce numbness of the genital and perianal region

Continued
Pain is an unpleasant, complex, highly individualized phenomenon with both sensory and emotional components. Pregnant women commonly worry about the pain they will experience during labor and birth and how they will react to and deal with that pain. A variety of childbirth preparation methods can help the woman or couple cope with the discomfort of labor. The interventions selected depend on the situation and the preference of both the woman, her significant other, and her health care provider. The discomforts experienced during labor are discussed in this chapter, as are the nonpharmacologic and pharmacologic interventions to relieve the discomforts possible during the different stages of labor. This information provides the basis for understanding the nurse’s role in the management of maternal discomfort during labor.

**Neurologic Origins**

The pain and discomfort of labor have two origins, visceral and somatic (Lowe, 2002). During the first stage of labor, uterine contractions cause cervical dilation and effacement. Uterine ischemia (decreased blood flow and therefore local oxygen deficit) results from compression of the arteries supplying the myometrium during uterine contractions. Pain impulses during the first stage of labor are transmitted via the T11 to T12 spinal nerve segment and accessory lower thoracic and upper lumbar sympathetic nerves. These nerves originate in the uterine body and cervix.

The pain from cervical changes, distention of the lower uterine segment, and uterine ischemia that predominates during the first stage of labor is visceral pain. It is located over the lower portion of the abdomen. Referred pain occurs when the pain that originates in the uterus radiates to the abdominal wall, lumbosacral area of the back, iliac crests, and gluteal area and down the thighs. The woman usually has discomfort only during contractions and is free of pain between contractions, although some women have continuous contraction-related low back pain, even in the interval between contractions (Lowe, 2002).

During the second stage of labor the woman has somatic pain, which is often described as intense, sharp, burning, and well localized. Pain results from stretching and distention of perineal tissues and the pelvic floor to allow passage of the fetus, from distention and traction on the peritoneum and uterocervical supports during contractions, and from lacerations of soft tissue (e.g., cervix, vagina, perineum). Discomfort also can be produced by expulsive forces or by pressure exerted by the presenting part on the bladder, bowel, or other sensitive pelvic structures. Pain impulses during the second stage of labor are transmitted via the pudendal nerve through S2 to S4 spinal nerve segments and the parasympathetic system (Lowe, 2002).

Pain experienced during the third stage of labor and the afterpains of the early postpartum period are uterine, similar to the pain experienced early in the first stage of labor. Areas of discomfort during labor are shown in Fig. 12-1.

**Factors Influencing Pain Response**

A woman’s pain during childbirth is unique to each woman and is influenced by a variety of physiologic, psychologic, and environmental factors.

**Physiologic factors**

A variety of physiologic factors can affect the intensity of pain experienced by women during childbirth. Women with a history of dysmenorrhea may experience increased pain during childbirth as a result of higher prostaglandin levels. Back pain associated with menstruation also may increase the
Endorphins are endogenous opioids secreted by the pituitary gland that act on the central and peripheral nervous systems to reduce pain. Beta-endorphin is the most potent of the endorphins. The physiologic role of endorphins is not completely understood. It is thought that endorphin levels increase during pregnancy and birth in humans. Higher endorphin levels may increase the ability of women in labor to tolerate acute pain and may reduce their irritability and anxiety. Levels of beta-endorphins are higher when a woman experiences a spontaneous, natural childbirth (Righard, 2001).

**Cultural Considerations**

The obstetric population reflects the increasingly multicultural nature of U.S. society. As nurses care for women and families from a variety of cultural backgrounds, they must have knowledge and understanding of how culture mediates pain (Mattson, 2000). An understanding of the beliefs, values, and practices of various cultures helps the nurse provide appropriate culturally sensitive care (see Cultural Considerations box). It is important for the nurse to recognize that although a woman’s behavior in response to pain may vary according to her cultural background, it may not accurately reflect the intensity of the pain she is experiencing. The nurse must assess the woman for the physiologic effects of pain and must listen to the words the woman uses to describe the sensory and affective qualities of her pain (Lowe, 2002).
Anxiety

Anxiety is commonly associated with increased pain during labor. Mild anxiety is considered normal for a woman during labor and birth. However, excessive anxiety and fear cause more catecholamine secretion, which increases the stimuli to the brain from the pelvis because of decreased blood flow and increased muscle tension; this in turn magnifies pain (Lowe, 2002). Thus, as fear and anxiety heighten, muscle tension increases, the effectiveness of the uterine contractions decreases, the experience of discomfort increases, and a cycle of increased fear and anxiety begins. Ultimately this cycle will slow the progress of labor. The woman’s “self-efficacy” or confidence in her ability to cope with pain will be diminished, potentially resulting in reduced effectiveness of pain relief measures being used.

Previous experience

For women who have had a difficult and painful previous birth experience, anxiety and fear from this past experience may lead to increased pain. Conversely, a woman who has experienced a labor and birth where pain coping skills were successful may experience increased anxiety when those previous coping skills are ineffective during a more difficult labor and birth.

Sensory pain for nulliparous women is often greater than that for multiparous women during early labor (dilation less than 5 cm) because their reproductive tract structures are less supple. During the transition phase of the first stage of labor and during the second stage of labor, multiparous women may experience greater sensory pain than nulliparous women because their more supple tissue increases the speed of fetal descent and thereby intensifies pain. The former tissue of nulliparous women results in a slower more gradual descent. Affective pain is usually greater for nulliparous women throughout the first stage of labor but decreases for both nulliparous and multiparous women during the second stage of labor (Lowe, 2002).

Women with a history of substance abuse experience as much pain during labor as other women. It is usually unnecessary to withhold pain medications. However, certain pain medications (e.g., opioid agonist-antagonists) can cause withdrawal symptoms in the woman with opioid addiction as well as in her newborn.

Pain is a personal response in each individual. As pain is experienced, people develop various coping mechanisms to deal with it. Emotional tension from anxiety and fear may increase pain and perception of pain during labor (see discussion of the Dick-Read method later in this chapter). Pain, or the possibility of pain, can induce fear in which anxiety borders on panic. Fatigue and sleep deprivation magnify pain. Parity may affect perception of labor pain because nulliparous women have longer labors and therefore greater fatigue, causing a vicious cycle of increased pain and a more likely use of pharmacologic support.

Childbirth preparation

Even pain stimuli that are particularly intense can, at times, be ignored. This is possible because certain nerve cell groupings within the spinal cord, brainstem, and cerebral cortex have the ability to modulate the pain impulse through a blocking mechanism. The gate-control theory of pain helps explain the way hypnosis and pain relief techniques taught in childbirth preparation classes work to relieve the pain of labor. According to this theory, pain sensations travel along sensory nerve pathways to the brain, but only a limited number of sensations, or messages, can travel through these nerve pathways at one time. Using distraction techniques such as massage or stroking, music, and imagery reduces or completely blocks the capacity of nerve pathways to transmit pain. These distractions are thought to work by closing down a hypothetic gate in the spinal cord, thus preventing pain signals from reaching the brain. Perception of pain is thereby diminished.

In addition, when the laboring woman engages in neuromuscular and motor activity, activity within the spinal cord itself further modifies the transmission of pain. Cognitive work involving concentration on breathing and relaxation requires selective and directed cortical activity that activates and closes the gating mechanism as well. The gate-control theory therefore underscores the need for a supportive birth setting that allows the laboring woman to relax and use various higher mental activities.

Comfort

Although the predominant medical approach to labor is that it is painful and the pain must be removed, an alternative view is that labor is a natural process and women can experience comfort and transcend the discomfort or pain. Having needs and desires met engenders a feeling of comfort. Comfort may be viewed as strengthening; this represents a paradigm shift in the interpretation of pain in labor (Koechlin, 2000). The most helpful interventions in enhancing comfort are a caring nursing approach and a supportive presence.

Support

The pain occurring during childbirth and the management of this pain belong to the woman experiencing the pain; the nurse must engage in a cooperative effort to provide whatever external tools the woman requires to manage her pain experience. These tools include both nonpharmacologic and pharmacologic interventions. The presence of a person (e.g., doula, family member, friend) who provides physical, emotional, and psychologic support to the woman in labor is a beneficial form of care that significantly relieves pain, improves outcomes, decreases interventions (e.g., use of pharmacologic pain relief measures) and complication rates (e.g., cesarean births) associated with labor, and enhances overall maternal satisfaction (Hodnett, Gates, Hofmeyr, & Sakala, 2001; Righard, 2001; Simkin & O’Hara, 2002).
Environment

According to Lowe (2002), environment should be viewed in terms of the persons present (e.g., how they communicate, their philosophy of care, practice policies, and quality of support) and the physical space in which the labor occurs. The quality of the environment can influence a woman’s ability to cope with the pain of labor. Women prefer to be cared for by familiar caregivers in a comfortable, homelike setting (Hodnett, 2002). An environment should be safe and private, allowing a woman to feel free to be herself as she tries out different comfort measures. Stimuli including light, noise, and temperature should be adjusted according to the woman’s preferences. There should be space for movement, and equipment should be readily available for a variety of nonpharmacologic pain relief measures such as birth balls, comfortable chairs, tubs, and showers. The familiarity of the environment can be enhanced by bringing items from home such as pillows, objects for a focal point, music, and videos.

The alleviation of pain is important. Commonly, it is not the amount of pain the woman experiences, but whether she meets her goals for herself in coping with the pain that influences her perception of the birth experience as “good” or “bad.” The observant nurse looks for clues to the woman’s desired level of control in the management of pain and its relief.

The woman who chooses to deal with childbirth pain by using nonpharmacologic methods needs care and support from nurses and other care providers who are skilled in pain management. Many of the nonpharmacologic methods for relief of discomfort are taught in different types of prenatal preparation classes, or the woman or couple may have read various books and magazine articles on the subject in advance. Many of these methods require practice for best results (e.g., hypnosis, patterned breathing and controlled relaxation techniques, biofeedback), although the nurse may use some of them successfully without the woman or couple having prior knowledge (e.g., slow paced breathing, massage and reach, effleurage, counterpressure). Women should be encouraged to try a variety of methods and to seek alternatives, including pharmacologic methods, if the measure being used is no longer effective (Box 12-1).

Childbirth Preparation Methods

Historically, the major childbirth methods taught in the United States were the Dick-Read method, or natural childbirth method; the Lamaze method, or psychoprophylactic method; and the Bradley method, or husband-coached childbirth. In current practice the method of preparation has less emphasis; instead, emphasis is placed on getting expectant parents to attend childbirth preparation classes (U.S. Department of Health and Human Services [USDHHS], 2000).

How childbirth education influences a woman’s response to pain is not completely understood. However, results of a number of studies suggest that not only is confidence greater after childbirth preparation but that this confidence increases the woman’s ability to cope with labor and birth (Koehn, 2002).

Most proponents of prepared childbirth agree that the major causes of pain in labor are fear and tension. All childbirth methods attempt to reduce fear, tension, and pain by increasing the woman’s knowledge of the labor and birth process, enhancing her self-confidence and sense of control, preparing a support person, and training the woman in physiological conditioning and relaxation breathing. Women or couples should not expect a pain-free childbirth but rather a childbirth in which pain is controlled using a variety of methods including prepared childbirth techniques. No one approach can meet all needs.

Dick-Read method

To replace fear of the unknown with understanding and confidence, the Dick-Read method (Dick-Read, 1987) provides information on labor and birth, as well as nutrition, hygiene, and exercise. Classes include practice in three
techniques: physical exercise to prepare the body for labor, conscious relaxation, and breathing patterns.

Conscious relaxation involves progressive relaxation of muscle groups in the entire body. With practice many women can relax on command, both during and between contractions. Some woman actually sleep between contractions. Breathing patterns include deep abdominal respirations for most of labor, shallow breathing toward the end of the first stage, and, until recently, breath holding for the second stage of labor.

Teachers of the Dick-Read method also contend that the weight of the abdominal musculature of the contracting uterus increases pain. The woman is taught to relax her abdominal muscles to rise as the uterus rises forward during a contraction, thus lifting the abdominal muscles off the contracting uterus.

Lamaze method

The Lamaze (psychoprophylaxis) method grew out of Pavlov’s work on classical conditioning. According to Lamaze, pain is a conditioned response. Therefore women can also be conditioned not to experience pain in labor. The Lamaze method does this by conditioning women to respond to mock uterine contractions with controlled muscular relaxation and breathing patterns instead of crying out and losing control (Lamaze, 1972). Coping strategies also include concentrating on a focal point, such as a favorite picture or pattern, to keep nerve pathways occupied so that they cannot respond to painful stimuli.

The woman is taught to relax uninvolved muscle groups while she contracts a specific muscle group (Fig. 12-2). She applies this during labor by relaxing uninvolved muscles while her uterus contracts. The perception of maintaining control has also been found to be closely associated with satisfaction with the birth experience.

Lamaze teachers believe that chest breathing lifts the diaphragm off the contracting uterus, thus giving it more room to expand. The chest-breathing patterns are varied according to the intensity of the contractions and the progress of labor. Teachers also seek to eliminate fear by increasing the woman’s understanding of her body functions and the neurophysiology of pain. Support in labor is provided by the woman’s partner or other support person or by a specially trained labor attendant.

Bradley method

The Bradley method, also called husband-coached childbirth, was devised based on observations of animal behavior during birth. It emphasizes working in harmony with the body, using breath control and abdominal breathing, and promoting general body relaxation (Bradley, 1981). The husband or partner takes an active role in assisting the woman to relax and use correct breathing techniques. This method also stresses environmental factors such as darkness, solitude, and quiet to make childbirth a more natural experience.

Specific Strategies

Focusing and relaxation

By reducing tension and stress, focusing and relaxation techniques allow a woman in labor to rest and to conserve energy for the task of giving birth. Attention-focusing and distraction techniques are forms of care likely to be beneficial in relieving labor pain (Enkin et al., 2000). Some women bring a favorite object such as a photograph or stuffed animal to the labor room and focus their attention on this object during contractions. Others choose to fix their attention on some object in the labor room. As the contraction begins, they focus on their chosen object and perform a breathing technique to reduce their perception of pain.

With imagery, the woman focuses her attention on a pleasant scene, a place where she feels relaxed, or an activity she enjoys. She can imagine walking through a restful garden or breathing in light, energy, and healing color and breathing out worries and tension. Choosing the subject for the imagery and practicing the technique during pregnancy will enhance effectiveness during labor (Koehn, 2000). These techniques, coupled with feedback relaxation, help the woman work with her contractions rather than against them.

The support person monitors this process, telling the woman when to begin the breathing techniques (Fig. 12-3).

During childbirth preparation classes, the partner or coach can learn how to palpate a woman’s body to detect tense and contracted muscles. The woman then learns how to relax the tense muscle in response to the gentle stroking of the muscle by the coach (see Fig. 12-2). In a common feedback mechanism, the woman and her coach say the word “relax” at the onset of each contraction and throughout it as needed. With practice the coach can effectively use support, feedback, and touch to facilitate the woman’s relaxation and thereby reduce tension and stress and enhance the progress of labor (Humenick, Schrock, & Libresco, 2000). The nurse can assist the woman by providing a quiet environment and offering cues as needed.
Breathing techniques

Different approaches to childbirth preparation stress varying breathing techniques to provide distraction, thereby reducing the perception of pain and helping the woman maintain control throughout contractions. In the first stage of labor, such breathing techniques can promote relaxation of the abdominal muscles and thereby increase the size of the abdominal cavity. This lessens discomfort generated by friction between the uterus and abdominal wall during contractions. Because the muscles of the genital area also become more relaxed, they do not interfere with fetal descent. In the second stage, breathing is used to increase abdominal pressure and thereby assist in expelling the fetus. Breathing also can be used to relax the pudendal muscles to prevent precipitate expulsion of the fetal head.

For couples who have prepared for labor by practicing relaxing and breathing techniques, occasional reminders may be all that are necessary to help them along. For those who have had no preparation, instruction in simple breathing and relaxation can be given early in labor and often is surprisingly successful. Motivation is high, and readiness to learn is enhanced by the reality of labor.

Paced breathing. There are various breathing techniques for controlling pain during contractions (Box 12-2). The nurse needs to ascertain what, if any, techniques the laboring couple knows before giving them instruction. Simple patterns are more easily learned. Paced breathing is the technique most associated with prepared childbirth and includes slow-paced, modified-paced, and patterned-paced breathing techniques. Each labor is different, and nursing support includes assisting couples to adapt breathing techniques to their individual labor experience.

All patterns begin with a routine deep relaxing cleansing breath to “greet the contraction” and end with another deep breath exhaled to “gently blow the contraction away.” In general, slow-paced breathing, at approximately half the woman’s normal breathing rate, is initiated when the woman can no longer walk or talk through contractions. She should continue to use this technique for as long as it is effective in reducing the perception of pain and maintaining control. As contractions increase in frequency and intensity, the woman often needs to change to a more complex breathing technique, which is shallower and approximately twice her normal rate of breathing. This modified-paced pattern requires more concentration and therefore blocks more painful stimuli than the simpler slow-paced breathing pattern (Nichols, 2000; Perinatal Education Associates, 2003).

The most difficult time to maintain control during contractions comes when the cervix dilates from 8 cm to 10 cm. This phase is called the transition phase of the first stage of labor. Even for the woman who has prepared for labor, concentration on breathing techniques is difficult to maintain. The patterned-paced breathing technique is suggested for use during this phase. It may be the 4:1 pattern: breath, breath, breath, breath, blow (as though gently blowing out a candle).

**BOX 12-2**

**Paced Breathing Techniques**

<table>
<thead>
<tr>
<th>CLEANSING BREATH</th>
<th>breathed in through nose and out mouth. Used at the beginning and end of each contraction.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLOW-PACED BREATHING (APPROXIMATELY 6 TO 8 BREATHS PER MINUTE)</td>
<td>Not less than half normal breathing rate (number of breaths per minute divided by 2)</td>
</tr>
<tr>
<td>MODIFIED-PACED BREATHING (APPROXIMATELY 32 TO 40 BREATHS PER MINUTE)</td>
<td>Not more than twice normal breathing rate (number of breaths per minute multiplied by 2)</td>
</tr>
<tr>
<td>PATTERNED-PACED BREATHING (SAME RATE AS MODIFIED)</td>
<td>Enhances concentration</td>
</tr>
</tbody>
</table>

For more flexibility and variety the woman may combine the slow and modified breathing by using the slow breathing for beginnings and ends of contractions and modified breathing for more intense peaks. This technique conserves energy, lessens fatigue, and reduces risk for hyperventilation.

music because other sounds will be shut out. Live music provided at the bedside by a support person may also be very helpful in transmitting energy that decreases tension and elevates mood (Gentz, 2001). Changing the tempo of the music to coincide with the rate and rhythm of each breathing technique may facilitate proper pacing (Gentz, 2001).

**Water therapy (hydrotherapy)**

Bathing, showering, and jet hydrotherapy (whirlpool baths) with warm water (e.g., at or below body temperature) are nonpharmacologic measures that can be used to promote comfort and relaxation during labor (Fig. 12-4). Sitting in a tub of water up to the shoulders or lower for 1 to 2 hours has several immediate benefits. Buoyancy in the water results in general body relaxation and temporary relief from discomfort and pain (Nikodem, 2003). This reduces the woman’s anxiety and enhances a feeling of well-being. Catecholamine production decreases. This triggers an increase in the levels of oxytocin (to stimulate uterine contractions) and endorphins (to reduce pain perception). In addition, the bubbles and gentle lapping of the water stimulate the nipples, also triggering an increase in oxytocin production; this has not been observed to cause uterine hyperstimulation. The cervix has often been observed to dilate 2 to 3 cm in 30 minutes of whirlpool therapy. Whirlpool baths in labor also have been found to have positive effects on analgesia requirements, instrumentation rates, condition of the perineum, and personal satisfaction with labor (Simkin & O’Hara, 2002). However, there is no clear evidence that these effects can be attributed solely to hydrotherapy (Benfield, 2002).

If the woman is having “back labor” as the result of an occiput posterior or transverse position, she is encouraged to assume the hands-and-knees or the side-lying position in the tub. Because these positions decrease pain and increase relaxation and production of oxytocin, the fetus can then rotate spontaneously to the occiput anterior position. Less effort is required when changing positions in water. In some settings, jet hydrotherapy should be approved by the woman’s primary health care provider. The woman’s vital signs must be within normal limits, and she should be in the active phase of the first stage of labor (e.g., cervix at least 5 cm dilated). If she is in the latent phase, her contractions could slow (Mackey, 2001).

Fetal heart rate (FHR) monitoring is done by Doppler device, fetoscope, or wireless external monitor device (see Fig. 12-4, C). Placement of internal electrodes is contraindicated for jet hydrotherapy. The woman’s membranes may be intact or ruptured. If they are ruptured, the fluid must be clear or only lightly stained with meconium (Mackey, 2001). There is no limit to the time women can stay in the bath, and often women are encouraged to stay in it as long as desired. However, most women use jet hydrotherapy for 30 to 60 minutes at a time. During the bath, if the woman’s temperature and the FHR increase, if the labor process becomes less effective (e.g., slows or becomes too intense), or if relief of pain is reduced, the woman can come out of the bath and
return at a later time. Repeated baths with occasional breaks may be more effective in relieving pain in long labors than extended amounts of time in the water. Flu- ids to maintain hydration and a cool face cloth for com- fort are offered during the bath (Mackey, 2001; Simkin & O’Hara, 2002). The recommended temperature for the bath is between 36° and 38° C to avoid harmful effects (Florence & Palmer, 2003).

**Transcutaneous electrical nerve stimulation**

Transcutaneous electrical nerve stimulation (TENS) involves the placing of two pairs of flat electrodes on either side of the woman’s thoracic and sacral spine (Fig. 12-5). These electrodes provide continuous low-intensity electrical impulses or stimuli from a battery-operated device. During a contraction the woman increases the stimulation from low to high intensity by turning control knobs on the device. High intensity should be maintained for at least 1 minute to facilitate release of endorphins. Women describe the resulting sensation as a tingling or buzzing and the pain relief as good or very good. TENS is most useful for lower back pain during the early first stage of labor. Using TENS poses no risk to the mother or fetus, and it is credited with reducing or eliminating the need for analgesia and with increasing the woman’s perception of control over the experience. It may be effective because of the placebo effect; that is, confidence in the effectiveness of TENS may stimulate the release of endogenous opiates (endorphins) in the woman’s body and thus alleviate the discomfort (Gentz, 2001). TENS is now considered a form of care with insufficient quality data.

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**Critical Thinking Exercise**

Yvonne is pregnant for the first time and is at term and in active labor. Her cervix is dilated 5 cm and her mem- branes are intact. She has declined pain medication but is somewhat uncomfortable during contractions. She thinks she would like to try the Jacuzzi tub to see if being in the water would make her feel more comfortable. However, she has concerns about the safety of being in the whirlpool bath during labor. She asks the nurse for information to help her decide what to do.

1. **Evidence**—Is there sufficient evidence to draw con- clusions about what advice the nurse should give to Yvonne about hydrotherapy in labor?
2. **Assumptions**—What assumptions can be made about the following issues related to hydrotherapy: a. Degree of pain relief expected by the woman b. Effect on promotion of comfort c. Safety of hydrotherapy
3. **What implications and priorities for nursing care can be drawn at this time?**
4. **Does the evidence objectively support your conclu- sion?**
5. **Are there alternative perspectives to your conclusion?**

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**Fig. 12-4** Water therapy during labor. **A,** Use of shower during labor. **B,** Woman experiencing back labor relaxes as partner sprays warm water on her back. **C,** Laboring woman relaxes in Jacuzzi. Note that fetal monitoring can continue during time in the Jacuzzi. (Courtesy Marjorie Pyle, RNC, Lifecircle, Costa Mesa, CA; Courtesy Spacelabs Medical, Redmond, WA.)
EVIDENCE-BASED PRACTICE

Water Immersion during Labor

BACKGROUND
- During labor, the buoyancy of water immersion may relieve pressure and tension, may decrease catecholamines and pain, may decrease maternal anxiety, may speed cervical dilation, and may increase uterine perfusion. The mother may benefit from decreased blood pressure and improved placental perfusion.
- Adverse maternal effects may include restricted mobilization of the birth canal, resulting in fewer tears and episiotomies.
- Adverse neonatal effects may include inhalation of water, possibly leading to hemodilution, or pneumonitis because of additives.

OBJECTIVES
- Research questions included evidence of benefits and risks of water immersion during pregnancy, early and late first-stage labor, and second-stage labor.
- The reviewers also questioned whether any difference in outcomes occurred in moving versus still water or if water additives, such as essential oils or salt, were present.
- Reviewers looked for the following outcomes in trials: maternal satisfaction, pain, use of analgesia and anesthesia, labor augmentation, maternal blood pressure and pulse, duration of labor and delivery, mode of delivery, perineal trauma, blood loss, postnatal infection, maternal self-esteem, postpartum depression, and breastfeeding.

METHODS
Search Strategy
- Search strategy involved searches in Cochrane Central Registry of Controlled trials, MEDLINE, hand searches in 30 journals, and a weekly alert service for 37 other journals. Keywords were not noted.
- Eight randomized, controlled trials were selected, for a total of 2839 women from Belgium, Australia, Sweden, South Africa, Canada, and the United States. The studies were published from 1993 to 2003. All studies used warm water immersion as their intervention, and standard institutional care for the controls.

Statistical Analyses
- Statistical analyses compared similar outcome measures. Interventions varied, such as water temperature (37°C to 38°C) and the intermittent or continuous presence of a 1:1 caregiver.

FINDINGS
- During first-stage labor, women using water immersion demonstrated a statistically significant decrease in perception of pain and use of epidural, spinal, and cervical analgesia or anesthesia when compared with controls. Blood pressure was significantly lower for the water immersion group. No difference was noted between groups in labor or birth duration, operative or assisted birth, perineal trauma, tears, or episiotomies. Infants of mothers using water immersion during first-stage labor had no difference from the controls in number of low Apgar scores or NICU admissions. This was true even when the gestation was less than 34 weeks.
- During second-stage labor, one trial reported that women in the immersion group had greater satisfaction in coping with their pushing efforts than the controls.
- One study showed an increase in epidural use and labor augmentation if the water immersion was used early in labor, when compared with use during more advanced labor.

CONCLUSIONS
- Small sample sizes limited all the studies. It is not possible to blind subjects or caregivers to the intervention. Comfort levels with the intervention differ across subjects and caregivers, which can bias pain perception, analgesia use, maternal satisfaction, self-esteem, and postpartum depression. Subjects did not always comply with the protocol to which they were randomized. One study found that 46% of its “immersion” group never got into the water. All studies reported some crossover between groups.
- Researchers used different definitions of labor, which can influence length and progression data. Trials varied on their tolerance of ruptured membranes; some required it and some excluded it, which can affect pain perception and analgesia use.
- Labor management varied across the trials, as did the presence of a 1:1 caregiver. There were differences in the pool shapes and differences in whether the water was still or moving, which may have affected comfort, position changes, and movement.

IMPLICATIONS FOR PRACTICE
- Water immersion can be used to provide comfort in first-stage labor. Use of immersion must occur after labor is well established. Nurses can advocate for equipment in their birthing or labor and delivery units to enable them to offer this option. Having 1:1 caregivers to monitor safety and progress of labor is important.

IMPLICATIONS FOR FURTHER RESEARCH
- Standardized definitions, protocols, and outcome measures should be used in future research. Infection, a major concern, was not addressed. More well-designed trials evaluating water immersion during second-stage labor are needed.

to recommend its use (Enkin et al., 2000). The nurse assists the woman in using TENS by explaining the device and its use, by carefully placing and securing the electrodes, and by closely evaluating its effectiveness.

**Acupressure and acupuncture**

Acupressure and acupuncture techniques can be used in pregnancy, in labor, and postpartum to relieve pain and other discomforts. Pressure, heat, or cold is applied to acupuncture points called *tsubos*. These points have an increased density of neuroreceptors and increased electrical conductivity. The effectiveness of acupressure has been attributed to the gate-control theory of pain and an increase in endorphin levels (Tiran & Mack, 2000). Acupressure is best applied over the skin without using lubricants. Pressure is usually applied with the heel of the hand, fist, or pads of the thumbs and fingers (Fig. 12-6). Tennis balls or other devices may be used to apply pressure. Pressure is applied with contractions initially and then continuously as labor progresses to the transition phase at the end of the first stage of labor (Koehn, 2000). Synchronized breathing by the caregiver and the woman is suggested for greater effectiveness. Acupressure points are found on the neck, shoulders, wrists, lower back including sacral points, hips, area below the kneecaps, ankles, nails on the small toes, and soles of the feet. Acupuncture is the insertion of fine needles into specific areas of the body to restore the flow of qi (energy) and to decrease pain, which is thought to be obstructing the flow of energy. It should be done by a trained certified therapist. Current evidence implies that acupuncture may be beneficial for relief of labor pain; however, further study is indicated (Florence & Palmer, 2003).

**Application of heat and cold**

Warmed blankets, warm compresses, heated rice bags, a warm bath or shower, or a moist heating pad can enhance relaxation and reduce pain during labor. Heat relieves muscle ischemia and increases blood flow to the area of discomfort. Heat application is effective for back pain caused by a posterior presentation or general backache from fatigue (Simkin & O’Hara, 2002).

Cold application such as cool cloths or ice packs may be effective in increasing comfort when the woman feels warm and may be applied to areas of pain. Cooling relieves pain by reducing the muscle temperature and relieving muscle spasms. Heat and cold may be used alternately for a greater effect. Neither heat nor cold should be applied over ischemic or anesthetized areas because tissues can be damaged.

**Touch and massage**

Touch and massage have been an integral part of the traditional care process for women in labor. They are likely to be beneficial in relieving labor pains (Enkin et al., 2000). Touch can be as simple as holding the woman’s hand, stroking her body, and embracing her. When using touch to communicate caring, reassurance, and concern, it is important that the woman’s preferences for touch (e.g., who can touch her, where they can touch her) and responses to touch be determined (Simkin & O’Hara, 2002). Touch also can involve very specialized techniques that require manipulation of the human energy field. Therapeutic touch (TT) uses the concept of energy fields within the body called *prana*. Prana are thought to be deficient in some people who are in pain. TT uses laying-on of hands by a specially trained person to redirect energy fields associated with pain (Scheiber & Selby, 2000). Research has demonstrated effectiveness of TT to enhance relaxation, reduce anxiety, and relieve pain (Marks, 2000); however, little is known about the use or effectiveness of TT for relieving labor pain.

Healing touch (HT) is another energy-based healing modality. Whereas TT emphasizes a single sequence of energy modulation, HT combines a variety of techniques from...
a series of disciplines. This gives the practitioner an array of "tools" to use with patients. Practitioners are taught energetic diagnosis and treatment forms and the means of documenting the patient’s response and progress. These techniques are said to align and balance the human energy field, thereby enhancing the body’s ability to heal itself. HT has been used in labor management, but no studies have been published about its effectiveness (Hover-Kramer, Mentgen, & Scandrett-Hibdon, 2001) (Fig. 12-7).

Head, hand, back, and foot massage may be very effective in reducing tension and enhancing comfort. Hand and foot massage may be especially relaxing in advanced labor when hyperesthesia limits a woman’s tolerance for touch on other parts of her body. The woman and her partner should be encouraged to experiment with different types of massage during pregnancy to determine what might feel best and be most relaxing during labor.

**Hypnosis**

Hypnosis, although not commonly used for pain management in the United States, is associated with shorter labors and less analgesia (Tiran & Mack, 2000). Hypnosis techniques used for labor and birth place an emphasis on enhancing relaxation and diminishing fear, anxiety, and perception of pain. The woman may be given direct suggestions about pain relief or indirect suggestions that she is experiencing diminished sensations (Ketterhagen, VandeVusse, & Bemer, 2002). The woman receives posthypnotic suggestions, such as, "You will be able to push the baby out easily," to increase her confidence. To be successful, the woman must be educated regarding hypnosis and must practice the techniques during the prenatal period (Gentz, 2001).

**Biofeedback**

Biofeedback may provide another relaxation technique that can be used for labor. Biofeedback is based on the theory that if a person can recognize physical signals, certain internal physiologic events can be changed (e.g., whatever physical signs the woman has that are associated with her pain). During the prenatal period, the woman must be educated to become aware of her body and its responses and how to relax for biofeedback to be effective. The woman must learn how to use thinking and mental processes (e.g., focusing) to control body responses and functions. Informational biofeedback helps couples develop awareness of their bodies and use strategies to change their responses to stress. If the woman responds to pain during a contraction with tightening of muscles, frowning, moaning, and breath holding, her partner uses verbal and touch feedback to help her relax. Formal biofeedback, which uses machines to detect skin temperature, blood flow, or muscle tension, also can prepare women to intensify their relaxation responses (DiFranco, 2000; Gentz, 2001; Snyder & Lindquist, 2000).

**Aromatherapy**

Aromatherapy uses oils distilled from plants, flowers, herbs, and trees to promote health and well-being and treat illnesses. The use of herbal teas and vapors is reported to have good effects in pregnancy and labor for some women (Tiran & Mack, 2000). Lavender, clary sage, and bergamot promote relaxation and can be used by adding a few drops to a warm bath, to warm water used for soaking compresses that can be applied to the body, to an aromatherapy lamp to vaporize a room, or to oil for a back massage (Tiran & Mack, 2000).

**Caution:** Never apply the essential oils used for aromatherapy in full strength directly to the skin. Most oils should be diluted in a vegetable oil base before use. In addition, essential oils vary in terms of safe use during pregnancy (Gentz, 2001).

**Intradermal water block**

An intradermal water block involves the injection of small amounts of sterile water (e.g., 0.05 to 0.1 ml) by using a fine needle (e.g., 25 gauge) into four locations on the lower back to relieve back pain. It may be effective in early labor and in an effort to delay the initiation of pharmacologic pain management.
relief measures. Stinging will occur for about 20 to 30 seconds after injection, but back pain will be relieved for approximately 45 minutes to 2 hours. Effectiveness of this method may be related to the mechanisms of counterirritation (i.e., reducing localized pain in one area by irritating the skin in an area nearby), gate control, or an increase in the level of endogenous opioids (endorphins). When the effect wears off, the treatment can be repeated, or another method of pain relief can be used (Gentz, 2001; Simkin & O’Hara, 2002).

Pharmacologic measures for pain management should be implemented before pain becomes so severe that catecholamines increase and labor is prolonged. Pharmacologic and nonpharmacologic measures, when used together, increase the level of pain relief and create a more positive labor experience for the woman and her family. Nonpharmacologic measures can be used for relaxation and for pain relief, especially in early labor. Pharmacologic measures can be implemented as labor becomes more active and discomfort and pain intensify. Less pharmacologic intervention often is required because nonpharmacologic measures enhance relaxation and potentiate the analgesic’s effect (Faucher & Brucker, 2000).

Sedatives
Sedatives relieve anxiety and induce sleep and may be given to a woman experiencing a prolonged latent phase of labor and when there is a need to decrease anxiety or promote sleep. They may also be given to augment analgesia and reduce nausea when an opioid is used. Barbiturates such as secobarbital sodium (Seconal) can cause undesirable side effects including respiratory and vasomotor depression affecting the woman and newborn. These effects are increased if a barbiturate is administered with another central nervous system (CNS) depressant such as an opioid analgesic. Because of these disadvantages, barbiturates are seldom used (Faucher & Brucker, 2000; Hawkins, Chestnut, & Gibbs, 2002). Phenothiazines (e.g., promethazine [Phenergan], hydroxyzine [Vistaril]) do not relieve pain but decrease anxiety and apprehension, increase sedation, and may potentiate opioid analgesic effects (Florence & Palmer, 2003). Metoclopramide (Reglan) is an antiemetic that also can be used for this purpose.

Analgesia and Anesthesia
The use of analgesia and anesthesia was not generally accepted as part of obstetric management until Queen Victoria used chloroform during the birth of her son in 1853. Since then, much study has gone into the development of pharmacologic measures for controlling discomfort during the birth period. The goal of researchers is to develop methods that will provide adequate pain relief to women without increasing maternal or fetal risk or affecting the progress of labor.

Nursing management of obstetric analgesia and anesthesia combines the nurse’s expertise in maternity care with a knowledge and understanding of anatomy and physiology and of medications and their therapeutic effects, adverse reactions, and methods of administration. Anesthesia encompasses analgesia, amnesia, relaxation, and reflex activity. Anesthesia abolishes pain perception by interrupting the nerve impulses to the brain. The loss of sensation may be partial or complete, sometimes with the loss of consciousness.

The term analgesia refers to the alleviation of the sensation of pain or the raising of the threshold for pain perception without loss of consciousness. The type of analgesic or anesthetic chosen is determined in part by the stage of labor of the woman and by the method of birth planned (Box 12-3).

Pharmacologic Control of Discomfort by Stage of Labor and Method of Birth

**FIRST STAGE**
- Systemic analgesia
- Opioid agonist analgesics
- Opioid agonist-antagonist analgesics
- Epidural (block) analgesia
- Combined spinal-epidural (CSE) analgesia
- Paracervical block (rarely used)
- Nitrous oxide

**SECOND STAGE**
- Nerve block analgesia and anesthesia
- Local infiltration anesthesia
- Pudendal block
- Spinal (block) anesthesia
- Epidural (block) analgesia
- Combined spinal-epidural (CSE) analgesia
- Nitrous oxide

**VAGINAL BIRTH**
- Local infiltration anesthesia
- Pudendal block
- Epidural (block) analgesia and anesthesia
- Spinal (block) anesthesia
- Combined spinal-epidural (CSE) analgesia and anesthesia
- Nitrous oxide

**CESAREAN BIRTH**
- Spinal (block) anesthesia
- Epidural (block) anesthesia
- General anesthesia
**Systemic Analgesia**

Systemic analgesia remains the major pharmacologic method for relieving the pain of labor when personnel trained in regional analgesia (e.g., epidural analgesia) are not available (Bricker & Lavender, 2002; Caton et al., 2002). It is a form of care with a trade-off between beneficial and adverse effects (Enkin et al., 2000). Systemic analgesics cross the maternal blood-brain barrier to provide central analgesic effects. They also cross through the placenta. Once transferred to the fetus, analgesics cross the fetal blood-brain barrier more readily than the maternal blood-brain barrier. The duration of action also will be longer because the systemic analgesics used during labor have a significantly longer half-life in the fetus and newborn. Effects on the fetus and newborn can be profound (e.g., respiratory depression, decreased alertness, delayed suckling), depending on the characteristics of the specific systemic analgesic used, the dosage given, and the route and timing of administration. IV administration is preferred to IM administration because the medication’s onset of action is faster and more predictable; as a result, a higher level of pain relief usually occurs. IV patient-controlled analgesia (PCA) is now available for use during labor. With this method the woman self-administers small doses of an opioid analgesic by using a pump programmed for dose and frequency. Overall, a lower total amount of analgesic is used, and maternal satisfaction is high (Bricker & Lavender, 2002). Classifications of analgesic drugs used to relieve the pain of childbirth include opioid (narcotic) agonists and opioid (narcotic) agonist-antagonists.

### Opioid Analgesics for Labor

**MEPERIDINE (DEMEROL)**

**Action**
Opioid agonist analgesic; stimulates mu and kappa opioid receptors to decrease transmission of pain impulses

**Indication**
Labor pain; postoperative pain after cesarean birth

**Dosage and Route**
25 mg IV; 50-75 mg IM or SC. May repeat in 1-3 hr; use of ataractic or antiemetic drugs may potentiate analgesic effect and decrease nausea and vomiting

**Adverse Effects**
Nausea and vomiting, sedation, confusion, drowsiness, tachycardia or bradycardia, hypotension, dry mouth, pruritus, urinary retention, respiratory depression (woman and newborn), decreased fetal heart rate (FHR) variability, decreased uterine activity if given in early labor

**Nursing Considerations**
Assess FHR and uterine activity; observe for respiratory depression; if birth occurs within 1-4 hr of dose, observe newborn for respiratory depression; have naloxone available as antidote; keep side rails up; continue use of nonpharmacologic pain relief measures

**BUTORPHANOL TARTRATE (STADOL)**

**Action**
Mixed agonist-antagonist analgesic; stimulates kappa opioid receptor and blocks mu opioid receptor

**Indication**
Labor pain; postoperative pain after cesarean birth

**Dosage and Route**
1 mg IV q3-4h; 2 mg IM q3-4h

**Adverse Effects**
Confusion, sedation, sweating; transient sinusoidal-like FHR rhythm; less respiratory depression than with meperidine, nausea, and vomiting

**Nursing Considerations**
See meperidine; may precipitate withdrawal symptoms in opioid-dependent women and their newborns

**NALBUPHINE (NUBAIN)**

**Action**
Mixed agonist-antagonist analgesic; stimulates kappa opioid receptor and blocks mu opioid receptor

**Indication**
Labor pain; postoperative pain after cesarean birth

**Dosage and Route**
10 mg IV; 10-20 mg IM q3-6h

**Adverse Effects**
See butorphanol

**Nursing Considerations**
See butorphanol

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*IM, intramuscular; IV, intravenous; SC, subcutaneous.*
**Medication Guide**

Fentanyl (Sublimaze) and Sufentanil (Sufenta)

**Action**

Opioid analgesics, rapid action with short duration (1-2 hr IM; 1/2-1 hr IV)

**Indication**

For epidural or intrathecal analgesia, alone or in combination with a local anesthetic.

**Dosage and Route**

Fentanyl: IM 50 to 100 mcg, IV 25 to 50 mcg; epidural fentanyl: 1 to 2 mcg with 0.125% bupivacaine at rate of 8 to 10 ml/hr; sufentanil: 1 mcg with 0.125% bupivacaine at rate of 10 ml/hr; dosage regimens vary

**Adverse Effects**

Dizziness, drowsiness, allergic reactions, rash, pruritus, respiratory depression, nausea and vomiting, urinary retention

**Nursing Considerations**

Assess for respiratory depression; naloxone should be available as antidote

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**Opioid (narcotic) agonist-antagonist analgesics.** Opioid (narcotic) antagonists can promptly reverse the CNS depressant effects, especially respiratory depression. In addition, the antagonist counters the effect of the stress-induced levels of endorphins. An opioid antagonist is especially valuable if labor is more rapid than expected and birth is anticipated when the opioid is at its peak effect. The antagonist may be given through the woman’s IV line, or it can be administered intramuscularly (see Medication Guide). The woman should be told that the pain that was relieved with the use of the opioid analgesic will return with the administration of the opioid antagonist. Some authorities believe that unless maternal CNS depression is severe enough to affect her well-being and that of her fetus, the woman should not receive naloxone just before birth in an attempt to prevent neonatal CNS depression. Placental transfer of naloxone is unpredictable; the newborn may not require treatment with an opioid antagonist; and the sudden return of severe pain could have adverse physiologic and psychologic effects on the mother (Hawkins et al., 2002; Lehne, 2001).
4 days after birth. Some depression of attention and social
life of opioids. Alterations in neurologic and behavioral re-
may be required because its half-life is shorter than the half-
reverse CNS depression. More than one dose of naloxone
stimulation. Naloxone is administered, if still required, to
volunteer, administration of oxygen, and gentle
neonatal narcosis is not treated promptly. Treatment in-
Risk for hypoxia, hypercarbia, and acidosis increases if
potonia, lethargy, and a delay in temperature regulation.
Affected infants may exhibit respiratory depression, hy-
Prophylactic administration of naloxone is controversial.
Narcotic-induced depression: Initial dose is 0.01 mg/kg IV,
Newborn
Narcotic-induced depression: Initial dose is 0.01 mg/kg IV,
IM, or SC; may be repeated at 2- to 3-min intervals until
Adverse Effects
Maternal: hypotension and hypertension, tachycardia, nausea and vomiting, sweating, and tremulousness
Nursing Considerations
Woman should delay breastfeeding until medication is
out of system; do not give if woman is opioid depen-
dent—may cause abrupt withdrawal; if given to woman
for reversal of respiratory depression caused by opioid
analgesic, pain will return suddenly
NURSE ALERT An opioid antagonist must be adminis-
tered cautiously to an opioid-dependent woman be-
cause it may precipitate abstinence syndrome (with-
drawal symptoms) in both the mother and her newborn
(see Signs of Potential Complications box).
An opioid antagonist can be given to the newborn as one
part of the treatment for neonatal narcosis, which is a state
of CNS depression in the newborn produced by an opioid.
Prophylactic administration of naloxone is controversial.
Affected infants may exhibit respiratory depression, hy-
potonia, lethargy, and a delay in temperature regulation.
Risk for hypoxia, hypercarbia, and acidosis increases if
neonatal narcosis is not treated promptly. Treatment in-
volves ventilation, administration of oxygen, and gentle
stimulation. Naloxone is administered, if still required, to
reverse CNS depression. More than one dose of naloxone
may be required because its half-life is shorter than the half-
life of opioids. Alterations in neurologic and behavioral re-
sponses may be evident in the newborn for as long as 2 to
4 days after birth. Some depression of attention and social
responsiveness can be evident for up to 6 weeks after birth.
The significance of these neurobehavioral changes is un-
known (Hawkins et al., 2002; Lehne, 2001).

Nerve block analgesia
A variety of local anesthetic agents are used in obstetrics
to produce regional analgesia (some pain relief and motor
block) and anesthesia (complete pain relief and motor block).
Most of these agents are related chemically to cocaine and
end with the suffix -caine. This helps to identify a local anes-
thetic.

The principal pharmacologic effect of local anesthetics is
the temporary interruption of the conduction of nerve im-
pulses, notably pain. Examples of common agents are bu-
pivacaine, lidocaine, meptivacaine, ropivacaine, and chloro-
proacaine. The solution strength of the local anesthetic agent
and the amount used will depend on the type of nerve block
being performed (Florence & Palmer, 2003).

Rarely, people are sensitive (allergic) to one or more lo-
cal anesthetics. Such a reaction may include respiratory de-
pression, hypotension, and other serious adverse effects. Epi-
phrine, antihistamines, oxygen, and supportive measures
should reverse these effects. Sensitivity may be identified by
administering minute amounts of the drug to be used to test
for an allergic reaction.

Local perineal infiltration anesthesia. Local
perineal infiltration anesthesia may be used when an epis-
iotomy is to be performed or when lacerations need to be
sutured after the birth in a woman who does not have re-
gional anesthesia. Rapid anesthesia is produced by injecting
approximately 10 to 20 ml of 1% lidocaine or 2% chloro-
proacaine into the skin and then subcutaneously into the re-

gion to be anesthetized. Epinephrine often is added to the
solution to localize and intensify the effect of the anesthe-
sia in a region and to prevent excessive bleeding and systemic
absorption by constricting local blood vessels (Lehne, 2001).
Repeated injections will prolong the anesthesia as long as
needed.

Pudendal nerve block. Pudendal nerve block
is useful for the second stage of labor, episiotomy, and birth.
Although it does not relieve the pain from uterine con-
tractions, it does relieve pain in the lower vagina, vulva, and
perineum (Fig. 12-8, A). A pudendal nerve block should be
administered 10 to 20 minutes before perineal anesthesia is
needed.

The pudendal nerve traverses the sacrosciatic notch just
medial to the tip of the ischial spine on each side. Injection
of an anesthetic solution at or near these points anesthetizes
the pudendal nerves peripherally (Fig. 12-9). The transvagi-
nal approach is generally used because it is less painful for
the woman, has a higher rate of success in blocking pain, and
tends to cause fewer fetal complications (Hawkins et al.,
2002). Pudendal block does not change maternal hemody-
namic or respiratory functions, vital signs, or the FHR. How-
ever, the bearing-down reflex is lessened or lost completely.
Spinal anesthesia. In spinal anesthesia (block) an anesthetic solution containing a local anesthetic alone or in combination with fentanyl is injected through the third, fourth, or fifth lumbar interspace into the subarachnoid space (Fig. 12-10), where the anesthetic solution mixes with cerebrospinal fluid (CSF). This technique is commonly used for cesarean births. Low spinal anesthesia may be used for vaginal birth, but it is not suitable for labor. Spinal anesthesia used for cesarean birth provides anesthesia from the nipple (T6) to the feet. If it is used for vaginal birth, the anesthesia level is from the hips (T10) to the feet (Fig. 12-10, C).

For spinal anesthesia, the woman is sitting or lying on her side (e.g., modified Sims position) with back curved to widen the intervertebral space to facilitate insertion of a small-gauge spinal needle and injection of the anesthetic solution. The nurse supports the woman because she must remain still during the placement of the spinal needle. The insertion is made between contractions. After the anesthetic solution has been injected, the woman may be positioned upright to allow the heavier (hyperbaric) anesthetic solution to flow downward to obtain the lower level of anesthesia suitable for a vaginal birth. She may be positioned supine with head and shoulders slightly elevated and the uterus displaced with a wedge under one of her hips to obtain the higher level of anesthesia desired for cesarean birth. The anesthetic effect usually begins 1 to 2 minutes after the anesthetic solution is injected and lasts 1 to 3 hours, depending on the type of agent used (Hawkins et al., 2002) (Fig. 12-11).

Marked hypotension, impaired placental perfusion, and an ineffective breathing pattern may occur during spinal anesthesia. Before induction of the spinal anesthetic, the woman’s fluid balance is assessed and IV fluid usually is administered to decrease the potential for hypotension caused by sympathetic blockade (vasodilation with pooling of blood in the lower extremities). After induction of the anesthetic, maternal blood pressure, pulse, and respirations and FHR and fetal heart pattern must be checked and documented every 5 to 10 minutes. If signs of serious maternal hypotension or fetal distress develop, emergency care must be given (see Emergency box).

Because the woman is unable to sense her contractions, she must be instructed when to bear down during a vaginal birth. If the birth occurs in a delivery room (rather than a labor-delivery-recovery room), the woman will need assistance in the transfer to a recovery bed after expulsion of the placenta.

Advantages of spinal anesthesia include ease of administration and absence of fetal hypoxia with maintenance of normotension. Maternal consciousness is maintained, excellent muscular relaxation is achieved, and blood loss is not excessive.
Fig. 12-10  A, Membranes and spaces of spinal cord and levels of sacral, lumbar, and thoracic nerves. B, Cross-section of vertebra and spinal cord. C, Level of anesthesia necessary for cesarean birth and for vaginal births.
Disadvantages of spinal anesthesia include medication reactions (e.g., allergy), hypotension, and an ineffective breathing pattern; cardiopulmonary resuscitation may be needed. When a spinal anesthetic is given, the need for operative birth (e.g., episiotomy, forceps-assisted birth, vacuum-assisted birth) tends to increase because voluntary expulsive efforts are reduced or eliminated. After birth the incidence of bladder and uterine atony, as well as postspinal headache, is higher.

Leakage of CSF from the site of puncture of the dura mater (membranous covering of the spinal cord) is thought to be the major causative factor in postdural puncture headache (PDPH). Presumably postural changes cause the diminished volume of CSF to exert traction on pain-sensitive CNS structures. Characteristically, assuming an upright position triggers or intensifies the headache, whereas assuming a supine position achieves relief in 30 minutes or less (Govenar, 2000). The resulting headache, auditory problems (e.g., tinnitus), and visual problems (e.g., blurred vision, photophobia) begin within 2 days of the puncture and may persist for days or weeks.

The likelihood of headache after dural puncture can be reduced, however, if the anesthesiologist uses a small-gauge spinal needle and avoids making multiple punctures of the meninges. Positioning the woman flat in bed (with only a

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**EMERGENCY**

**Maternal Hypotension with Decreased Placental Perfusion**

**SIGNS AND SYMPTOMS**
- Maternal hypotension (20% decrease from preblock baseline level or 100 mm Hg systolic)
- Fetal bradycardia
- Decreased beat-to-beat FHR variability

**INTERVENTIONS**
- Turn woman to lateral position or place pillow or wedge under hip (see Fig. 14-6) to deflect uterus.
- Maintain IV infusion at rate specified, or increase “as needed” administration per hospital protocol.
- Administer oxygen by face mask at 10-12 L/min or per protocol.
- Elevate the woman’s legs.
- Notify the primary health care provider, anesthesiologist, and/or nurse anesthetist.
- Administer IV vasopressor (e.g., ephedrine 5-10 mg) per protocol if previous measures are ineffective.
- Remain with woman; continue to monitor maternal blood pressure and FHR every 5 minutes until her condition is stable or per primary health care provider’s order.

FHR, fetal heart rate; IV, intravenous.
Evidence—Is there sufficient evidence to draw conclusions about your observations and assumptions?
Assumptions—What assumptions can be made about your conclusions?
Are there alternative perspectives to your conclusion?
What implications and priorities for nursing care can be drawn from your findings?
Does the evidence objectively support your conclusions?

Small, flat pillow for her head) for at least 8 hours after spinal anesthesia also has been recommended to prevent headache, but no definitive evidence shows that this measure is effective. Positioning the woman on her abdomen, a difficult if not impossible position after a cesarean birth, is thought to decrease the loss of CSF through the puncture site. Hydration has been claimed to be of value in preventing and treating headache, but no compelling evidence supports its use (Cunningham et al., 2005). Initial treatment for a postdural puncture headache usually includes oral analgesics, bed rest in a quiet dimly lit or dark room, caffeine, and increased fluid intake (Govenar, 2000; Hawkins et al., 2002).

An autologous epidural blood patch is the most rapid, reliable, and beneficial relief measure for PDPH. The woman’s blood (i.e., 10 to 20 ml) is injected slowly into the lumbar epidural space, creating a clot that patches the tear or hole in the dura mater around the spinal cord. It is considered if the headache does not resolve spontaneously or after use of more conservative, noninvasive techniques (Govenar, 2000) (Fig. 12-12).

After the blood patch procedure the woman should be observed for alteration of vital signs, pallor, clammy skin, and leakage of CSF. A bandage and cold pack are placed on the puncture site, and the woman rests in bed for approximately 1 hour. Discharge instructions include resting in bed for 24 to 48 hours, applying cold packs to the site as needed for comfort, avoiding analgesics that affect platelet aggregation (e.g., nonsteroidal antiinflammatory drugs [NSAIDs]) for 2 days, drinking plenty of fluids, and observing for signs of infection at the site and for neurologic symptoms such as pain, numbness and tingling in legs, and difficulty with walking or elimination. The woman should be cautioned to avoid lifting, straining at stool, coughing, tub bathing, or swimming for at least 2 days (Govenar, 2000; Hawkins et al., 2002).

**Epidural anesthesia or analgesia (block).** Relief from the pain of uterine contractions and birth (vaginal and cesarean) can be relieved by injecting a suitable local anesthetic agent (e.g., bupivacaine, ropivacaine), an opioid analgesic (e.g., fentanyl, sufentanil), or both into the epidural (periadural) space. Injection is made between the fourth and fifth lumbar vertebrae for a lumbar epidural block (see Figs. 12-8, 12-9, and 12-10, A and D) and infrequently through the sacral hiatus for a caudal epidural block. Depending on the type and amount of medication(s) used, an anesthetic or analgesic effect will occur with varying degrees of motor impairment.

**Lumbar epidural anesthesia and analgesia.** Lumbar epidural anesthesia and analgesia is the most effective pharmacologic pain relief method for labor currently available. As a result, it is the most commonly used method for relieving pain during labor in the United States. More than half of the women giving birth each year choose epidural analgesia (Lieberman & O’Donoghue, 2002). For relieving the discomfort of labor and vaginal birth, a block from T10 to S5 is required. For cesarean birth, a block from at least T8 to S1 is essential. The diffusion of epidural anesthesia depends on the location of the catheter tip, the dose and volume of the anesthetic agent used, and the woman’s position (e.g., horizontal or head-up position) (Cunningham et al., 2005).

For the induction of a lumbar epidural block, the woman is positioned as for a spinal block. She may sit with her back curved or she may assume a modified Sims position with her shoulders parallel, legs slightly flexed, and back arched (see Fig. 12-10).

After the epidural has been started, the woman is positioned preferably on her side so that the uterus does not compress the ascending vena cava and descending aorta, which can impair venous return, reduce cardiac output and
blood pressure, and decrease placental perfusion. Her position should be alternated from side to side every hour. Up-right positions and ambulation may be encouraged, depending on the degree of motor impairment. Oxygen should be available if hypotension occurs despite maintenance of hydration with IV fluid and displacement of the uterus to the side. Ephedrine (a vasopressor used to increase maternal blood pressure) and increased IV fluid infusion may be needed (see Emergency Box). The FHR, fetal heart pattern, and progress in labor must be monitored carefully because the woman in labor may not be aware of changes in the strength of the uterine contractions or the descent of the presenting part.

Several methods can be used for an epidural block. An intermittent block is achieved by using repeated injections of anesthetic solution; it is the least common method. The most commonly used method is the continuous block, achieved by using a pump to infuse the anesthetic solution through an indwelling plastic catheter. Patient-controlled epidural analgesia (PCEA) is the newest method; it uses an indwelling catheter and a programmed pump that allows the woman to control the dosing. The advantages of an epidural block are numerous: the woman remains alert and able to participate, good relaxation is achieved, airway reflexes remain intact, only partial motor paralysis develops, gastric emptying is not delayed, and blood loss is not excessive. Fetal complications are rare but may occur in the event of rapid absorption of the medication or marked maternal hypotension. The dose, volume, and type of medication(s) used can be modified to allow the woman to push and to assume upright positions and even walk, to produce perineal anesthesia, and to permit forceps-assisted, vacuum-assisted, or cesarean birth if required (Cunningham et al., 2005).

The disadvantages of epidural block also are numerous. The woman’s ability to move freely is limited, related to the use of an IV infusion and electronic monitoring, orthostatic hypotension and dizziness, sedation, and weakness of the legs. CNS effects such as excitation, bizarre behavior, tinnitus, disorientation, paresthesia, and convulsions can occur if a solution containing a local anesthetic agent is accidentally injected into a blood vessel. Respiratory arrest can occur if the relatively high dosage used with an epidural block is accidently injected into the subarachnoid space. Women who receive an epidural have a higher rate of fever (i.e., intrapartum temperature of 38°C or higher), especially when labor lasts longer than 12 hours; the temperature elevation most likely is related to thermo regulatory changes, although infection cannot be ruled out. The elevation in temperature can result in fetal tachycardia and neonatal workup for sepsis, whether or not signs of infection are present. Hypotension as a result of sympathetic blockade can be an outcome of an epidural block (see Emergency Box). Urinary retention and stress incontinence can occur in the immediate postpartum period. This temporary difficulty in urinary elimination could be related not only to the effects of the epidural block but also to the increased duration of labor and need for instrumental birth associated with the block (Lieberman & O’Donoghue, 2002). Frustration (itching) is a side effect associated with the use of an opioid, especially fentanyl. A relation between epidural analgesia and longer second-stage labor, increased incidence of fetal malposition, use of oxytocin, and forceps-assisted or vacuum-assisted birth has been documented. Current research findings have been unable to demonstrate a significant increase in cesarean birth associated with epidural analgesia (Lieberman & O’Donoghue, 2002; Sharma & Leveno, 2003).

Occasionally a PDPH can occur after accidental perforation of the dura mater during the administration of the epidural block. Because a larger needle is used for an epidural block, the risk for severe headache is high as a result of greater CSF loss (Hawkins et al., 2002). For some women, the epidural block is not effective, and a second form of analgesia is required to establish effective pain relief. When women progress rapidly in labor, pain relief may not be obtained before birth occurs.

Combined spinal-epidural analgesia. Using opioids such as fentanyl and sufentanil to potentiate the effects of local anesthetic agents has resulted in the reduction of the amount of the local anesthetic used, thereby reducing motor blockade. A combined spinal-epidural (CSE) technique is an increasingly popular approach that can be used to block pain transmission without compromising motor ability. There is a high concentration of opioid receptors along the pain pathway in the spinal cord, in the brainstem, and in the thalamus. Because these receptors are highly sensitive to opioid agonists, a small quantity of an opioid agonist-anesthetic produces marked pain relief lasting for several hours. The opioid is injected into the subarachnoid space for rapid activation of the opioid receptors. A catheter is placed in the epidural space to extend the duration of the analgesia by using a lower dose of a local anesthetic agent (Hawkins et al., 2002). Although women can walk (hence the term “walking epidural”), they often choose not to do so because of sedation and fatigue, abnormal sensations perceived in their legs, weakness of the legs, and a feeling of insecurity. Often health care providers are reluctant to encourage or assist women to ambulate for fear of injury (Mayberry, Clemmens, & Dr., 2002). However, women can be assisted to change positions and use upright positions during labor and birth (Mayberry, Strange, Supple, & Gennaro, 2003).

CSE analgesia may be associated with fetal bradycardia, necessitating close assessment of FHR and fetal heart pattern (Lieberman & O’Donoghue, 2002). Epidural and intrathecal opioids. Opioids also can be used alone, eliminating the effect of a local anesthetic altogether. The use of epidural or intrathecal (spinal) opioids without the addition of a local anesthetic agent during labor has several advantages. Opioids administered in this manner do not cause maternal hypotension or affect vital signs. The woman feels contractions but not pain. Her ability to bear down during the second stage of labor is preserved because the pushing reflex is not lost, and her motor power remains intact.

**CHAPTER 7 Management of Discomfort**

357
Fentanyl, sufentanil, or preservative-free morphine may be used. Fentanyl and sufentanil produce short-acting analgesia (i.e., 1.5 to 3.5 hours), and morphine may provide pain relief for 4 to 7 hours. Morphine may be combined with fentanyl or sufentanil. For most women, intrathecal opioids do not provide adequate analgesia for second-stage labor pain, epidural anesthesia, or birth (Cunningham et al., 2005). Pudendal nerve blocks or local perineal infiltration anesthesia may be necessary.

A more common indication for the administration of epidural or intrathecal analgesics is the relief of postoperative pain. For example, women who give birth by cesarean can receive fentanyl or morphine through a catheter. The catheter may then be removed, and the women are usually free of pain for 24 hours. Occasionally the catheter is left in place in the epidural space in case another dose is needed.

Women receiving epidurally administered morphine after the cesarean birth are up soon after surgery with surprising ease and are able to care for their newborns. The early ambulation and freedom from pain also facilitate bladder emptying, enhance peristalsis, and prevent clot formation in the lower extremities (e.g., thrombophlebitis). To those women who have had a previous cesarean birth and have had the usual postoperative pain, the effects of this approach seem miraculous. However, the mother may not understand why she may have pain after the opioid effect wears off.

Side effects of opioids administered by the epidural and intrathecal routes include nausea, vomiting, pruritus, urinary retention, and delayed respiratory depression. These side effects are more common when morphine is administered. Antiemetics, antipruritics, and opioid antagonists are used to relieve these symptoms. For example, naloxone (Narcan), promethazine (Phenergan), or metoclopramide (Reglan) may be administered. Hospital protocols should provide specific instructions for the treatment of these side effects. Use of epidural opioids is not without risks. Respiratory depression is a serious concern; for this reason the woman’s respiratory rate should be assessed and documented every hour for 24 hours. Occasionally the catheter is left in place in the epidural space in case another dose is needed.

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Active antepartum hemorrhage. Acute hypovolemia leads to increased sympathetic tone to maintain the blood pressure. Any anesthetic technique that blocks the sympathetic fibers can produce significant hypertension that can endanger the mother and baby.

Anticoagulant therapy or bleeding disorder. If a woman is receiving anticoagulant therapy or has a bleeding disorder, injury to a blood vessel may cause the formation of a hematoma that may compress the cauda equina or the spinal cord and lead to serious CNS complications.

Infection at the injection site. Infection can be spread through the peridural or subarachnoid spaces if the needle traverses an infected area.

Allergy to the anesthetic drug.

Maternal refusal.

Some types of maternal cardiac conditions.

**Epidural block effects on neonate.** Debate persists concerning the effects of epidural anesthesia and analgesia on the newborn’s neurobehavioral responses. Findings from studies that examine associations between neurobehavioral outcome and epidural block are far from consistent. For example, studies comparing the neonatal neurobehavioral scores for infants born to mothers who did and mothers who did not receive epidural analgesia either have shown little or no difference in the scores or have shown that the infants of mothers who received epidural anesthesia did not score as well on neurobehavioral tests. In one research study, infants exposed to an epidural block tended to have less muscle tone but were better able to orient and habituate to sound when compared with infants whose mother received opioids during labor (Lieberman & O’Donoghue, 2002).

**Nitrous oxide for analgesia.**

Nitrous oxide mixed with oxygen can be inhaled in a low concentration (50% or less) to reduce but not eliminate pain during the first and second stages of labor. At the lower doses used for analgesia, the woman remains awake, and the danger of aspiration is avoided because the laryngeal reflexes are unaffected. It can be used in combination with other non-pharmacologic and pharmacologic measures for pain relief. A face mask or mouthpiece is used to self-administer the gas. The woman should place the mask over her mouth and nose and insert the mouthpiece 30 seconds before the onset of a contraction (if regular) or as soon as a contraction begins (if irregular). When she inhales, a valve opens, and the gas is released. She should continue to inhale the gas slowly and deeply until the contraction starts to subside. When inhalation stops, the valve closes. Onset of action is 50 sec- onds; therefore beginning the inhalation process 30 seconds before the onset of a contraction provides the best pain re- lief. During the interval between contractions, the woman should remove the device and breathe normally (Rosen, 2002).

Most women who use nitrous oxide obtain adequate pain relief and are satisfied with the method. The nurse should observe the woman for nausea and vomiting, dizziness, hazy memory, and loss of consciousness. Loss of consciousness is more likely to occur if opioids are used with the nitrous oxide. The use of nitrous oxide does not appear to depress uterine contractions or cause adverse reactions in the fetus and newborn (Rosen, 2002).

Nitrous oxide for pain relief during labor is more readily available in Canada and European countries than in the United States (Caton et al., 2002).
General anesthesia

General anesthesia rarely is used for uncomplicated vaginal birth and is infrequently used for cesarean birth. It may be necessary if there is a contraindication to a spinal or epidural block or if indications necessitate rapid birth (vaginal or cesarean) without sufficient time to perform a block. In addition, being awake and aware during major surgery may be unacceptable for some women having a cesarean birth.

If general anesthesia is being considered, the nurse gives the woman nothing by mouth and ensures that an IV infusion is in place. If time allows, the nurse premedicates the woman with a nonparticulate (clear) oral antacid (e.g., sodium citrate, Bicitra, Alka-Seltzer) to neutralize the acidic contents of the stomach. Aspiration of highly acidic gastric contents will damage lung tissue. Some anesthesiologists and physicians also order the administration of a histamine (H2) receptor blocker such as cimetidine (Tagamet) to decrease the production of gastric acid and metoclopramide (Reglan) to increase gastric emptying (Hawkins et al., 2002). Before the anesthesia is given, a wedge should be placed under one of the woman’s hips to displace the uterus. Uterine displacement prevents aortocaval compression, which interferes with placental perfusion.

Thiopental, a short-acting barbiturate, or ketamine is administered intravenously to render the woman unconscious, and then succinylcholine, a muscle relaxer, is administered to facilitate passage of an endotracheal tube. Sometimes the nurse is asked to assist with applying cricoid pressure before intubation as the woman begins to lose consciousness. This maneuver blocks the esophagus and prevents aspiration should the woman vomit or regurgitate (Fig. 12-13). Pressure is released once the endotracheal tube is securely in place. After the woman is intubated, nitrous oxide and oxygen in a 50:50 mixture are administered. A low concentration of a volatile halogenated agent (e.g., isoflurane) also may be administered to increase pain relief and to reduce maternal awareness and recall (Hawkins et al., 2002). In higher concentrations, isoflurane or methoxyflurane relaxes the uterus quickly and facilitates intrauterine manipulation, version, and extraction. However, at higher concentrations, these agents cross the placenta readily and can produce narcosis in the fetus and could reduce uterine tone after birth, increasing the risk for hemorrhage.

Priorities for recovery room care are to maintain an open airway and cardiopulmonary function and to prevent postpartum hemorrhage. Routine postpartum care is organized to facilitate parent-child attachment as soon as possible and to answer the mother’s questions. When appropriate, the nurse assesses the mother’s readiness to see the baby, as well as her response to the anesthesia and to the event that necessitated general anesthesia (e.g., emergency cesarean birth when vaginal birth was anticipated).

CARE MANAGEMENT

The choice of pain relief depends on a combination of factors, including the woman’s special needs and wishes, the availability of the desired method(s), the knowledge and expertise in nonpharmacologic and pharmacologic methods of the health care providers involved in the woman’s care, and the phase and stage of labor. The nurse is responsible for assessing maternal and fetal status, establishing mutual goals with the woman (and her family), formulating nursing diagnoses, planning and implementing nursing care, and evaluating the effects of care. It is essential for the nurse to document carefully all aspects of care management.

Assessment and Nursing Diagnoses

The assessment of the woman, her fetus, and her labor is a joint effort of the nurse and the primary health care providers, who consult with the woman regarding their findings and recommendations. The needs of each woman are different, and
Do you want pain medication?

You should not be able to feel the contraction pain.

The epidural is a stronger method of pain relief.

Los efectos de esta medicina son de corta duración.

No debe de sentir el dolor de las contracciones.

This is a pain reliever called Demerol/Stadol/Nubain.

Le voy a dar la medicina para el dolor por inyección.

I am going to give you the pain medicine in an injection.

I am going to give you the pain medicine through an IV.

¿Desea levantarse y caminar?

We take the woman’s perception of discomfort and her experience because the woman is able to describe the sensory and emotional or affective dimensions of her pain rather than just its intensity (Lowe, 2002). Self-assessment is recommended to ensure that pain management is based on the subjective nature of the woman’s pain rather than just on the nurse’s judgment. It is not unusual for a nurse to overestimate or underestimate the pain being experienced by the patient.

Baker, Ferguson, Roach, and Drowning (2001) found that nurse-midwives consistently underestimated pain intensity that women described as severe. When there are major cultural differences between the health care provider and the patient, inaccurate interpretation of pain intensity often occurs (Lowe, 2002) (see Guidelines/Guías box).

History
The woman’s prenatal record is read and relevant information identified. This includes the woman’s parity, estimated date of birth, and complications and medications during pregnancy. If the woman has a history of allergies, this is noted, and a warning is displayed in a prominent place (Mahlmeister, 2003). A history of smoking and neurologic and spinal disorders also is noted.

Interview
Interview data consist of the time of the woman’s last meal and type of food and fluid consumed; the nature of any existing respiratory condition (e.g., cold, allergy); and unusual reactions (e.g., allergy) to medications, cleansing agents, latex, or tape. The woman is asked whether she attended childbirth preparation classes. The extent of her preparation and her preferences for management of discomfort including a birth plan are reviewed. Her knowledge of the options for the management of discomfort also is assessed. Information on the woman’s perception of discomfort and her expressed need for medication is added to the database. Relevant events that have occurred since the woman’s last contact with her primary health care provider also are reviewed (e.g., infections, diarrhea, a change in fetal movement patterns). If verbal and physical signs indicate the existence of substance abuse (e.g., opioids, alcohol), the nurse should ask the woman to identify the type of substance used, the last time it was taken, and the method of administration.

GUIDELINES/GUÍAS

Pain Management

• Do you want pain medication?
• ¿Desea medicina para el dolor?
• I am going to give you the pain medicine in an injection.
• Le voy a dar la medicina para el dolor por inyección.
• I am going to give you the pain medicine through an IV.
• Le voy a dar la medicina para el dolor por el suero.
• This is a pain reliever called Demerol/Stadol/Nubain.
• Esta es una medicina para aliviar el dolor que se llama Demerol/Stadol/Nubain.
• The effects of this medicine are relatively short.
• Los efectos de esta medicina son de corta duración.
• The epidural is a stronger method of pain relief.
• La anestesia epidural es un método más potente para aliviar el dolor.
• You should not be able to feel the contraction pain.
• No debe de sentir el dolor de las contracciones.

Physical examination
The character and status of the labor and fetal response are assessed during a physical examination. The nurse evaluates the woman’s hydration status by assessing intake and output measurements, the moistness of the mucous membranes, skin turgor, and concentration of urine. Bladder distention is noted. Any evidence of skin infection near sites of possible needle insertion is recorded and reported. Signs of apprehension such as fist clenching and restlessness also are noted.

If the woman is in labor, the status of maternal vital signs, FHR and fetal heart pattern, uterine contractions, amniotic membranes and fluid, cervical effacement and dilation, and fetal descent is determined. The anticipated time until birth is estimated if possible. The length of labor and degree of fatigue are other important considerations. If pharmacologic methods are to be used, the type of analgesia or anesthesia chosen will vary depending on the status of the maternal-fetal unit, the progress of labor, and the method of birth planned (see Box 12-3).

Laboratory tests
The results of laboratory tests are reviewed to determine whether the woman is experiencing anemia (hemoglobin and hematocrit), a coagulopathy or bleeding disorder (prothrombin time and platelet count), or infection (white blood cell count and differential).

Signs of potential problems
Any medication can cause a minor or severe allergic reaction. As part of the assessment for such allergic reactions, the nurse should monitor the woman’s vital signs,
Complications may occur with epidural analgesia, including injection-related emergencies and compression problems. These complications can require immediate interventions. Nurses must be prepared to provide safe and effective care during the emergency situation. Clear procedures or protocols should be in place in labor and birth units delineating responsibilities and actions needed (Mahlmeister, 2003).

The nurse also must be alert for changes in fetal well-being; nonreassuring changes in FHR and fetal heart pattern should be noted and reported to the primary health care provider.

The following nursing diagnoses are relevant in the management of discomfort during labor and birth:

- Acute pain related to processes of labor and birth
- Risk for ineffective tissue perfusion related to effects of analgesia or anesthesia
- Risk for maternal injury related to effect of analgesia and anesthesia on sensation and motor control
- Hypothemia related to situational low self-esteem
- Situational low self-esteem related to negative perception of the woman's (or her family's) behavior
- Fear related to deficient knowledge of procedure for epidural analgesia
- Fear related to deficient knowledge of expected sensation during spinal anesthesia
- Risk for maternal injury related to effect of analgesia and anesthesia on sensation and motor control
- Nurse ALERT Complications may occur with epidural analgesia, including injection-related emergencies and compression problems. These complications can require immediate interventions. Nurses must be prepared to provide safe and effective care during the emergency situation. Clear procedures or protocols should be in place in labor and birth units delineating responsibilities and actions needed (Mahlmeister, 2003).

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- Fear related to deficient knowledge of expected sensation during spinal anesthesia
- Risk for maternal injury related to effect of analgesia and anesthesia on sensation and motor control

Expected Outcomes of Care

The expected outcomes of nursing care in the management of the discomfort of labor and birth include the following:

- The woman will promptly report the characteristics of her pain and discomfort.
- The woman will verbalize understanding of her needs and rights with regard to pain relief management that uses a variety of nonpharmacologic and pharmacologic methods reflecting her preferences.
- The woman will have adequate pain relief without adding maternal risk (e.g., through the use of appropriate nonpharmacologic methods and appropriate medication, including the appropriate dose, timing, and route of administration).
- The fetal status will remain reassuring, and the newborn will adjust to extraterine life without problems related to management of maternal pain.

Plan of Care and Interventions

A plan of care is developed for each woman to address her particular clinical and nursing problems. The nurse collaborates with the primary health care provider and laboring woman in selecting those aspects of care relevant to the woman and her family.

Nonpharmacologic interventions

The nurse supports and assists the woman as she uses nonpharmacologic interventions for pain relief and relaxation during labor. During labor, the nurse should ask the woman how she feels, to evaluate the effectiveness of the specific pain management techniques used. Appropriate interventions can then be planned or continued for effective care, such as trying other nonpharmacologic methods or combining nonpharmacologic methods with medications (see Plan of Care).

The woman’s perception of her behavior during labor is of utmost importance. If she planned a nonmedicated birth but then needs and accepts medication, her self-esteem may falter. Verbal and nonverbal acceptance of her behavior is given as necessary by the nurse and reinforced by discussion and reassurance after birth. Providing explanations about the fetal response to maternal discomfort, the effects of maternal stress and fatigue on the progress of labor, and the medication itself is a supportive measure. The woman also may experience anxiety and stress related to anticipated or actual pain. Stress can cause increased maternal catecholamine production. Increased levels of catecholamines have been linked to dysfunctional labor and fetal and neonatal distress and illness. Nurses must be able to implement strategies aimed at reducing this stress (Hodnett, 2002; Lowe, 2002).

Informed consent

The primary health care provider and anesthesia care provider are responsible for informing women of the alternative methods of pharmacologic pain relief available in the hospital. A description of the various anesthetic techniques
and what they entail is essential to informed consent, even if the woman received information about analgesia and anesthesia earlier in her pregnancy. The discussion of pain management options ideally should take place in the third trimester so the woman has time to consider alternatives. Nurses play a part in the informed consent by clarifying and describing procedures or by acting as the woman’s advocate and ensuring that the primary health care provider for further explanations. The procedure and its advantages and disadvantages must be thoroughly explained.

**LEGAL TIP**  Informed Consent for Anesthesia

The woman receives (in an understandable manner) the following:

- Explanation of alternative methods of anesthesia and analgesia available
- Description of anesthetic and procedure for administration
- Description of the benefits, discomforts, risks, and consequences for the mother and the fetus
- Explanation of how complications can be treated
- Information that the anesthetic is not always effective
- Indication that the woman may withdraw consent at any time

**NURSING DIAGNOSIS** Anxiety related to lack of confidence in ability to cope effectively with pain during labor

**Expected Outcome** Woman will express decrease in anxiety and experience satisfaction with her labor and birth performance.

**Nursing Interventions/Rationales**

- Assess whether woman and significant other have attended childbirth classes, her knowledge of labor process, and her current level of anxiety to plan supportive strategies.
- Encourage support person to remain with woman in labor to provide support and increase probability of responses to comfort measures.
- Teach or review nonpharmacologic techniques available to decrease anxiety and pain during labor (e.g., focusing and feedback, breathing techniques, effleurage, and sacral pressure) to enhance chances of success in using techniques.
- Explore other techniques that the woman or significant other may have learned in childbirth classes (e.g., hypnosis, yoga, acupressure, biofeedback, therapeutic touch, aromatherapy, imaging, music) to provide largest repertoire of coping strategies.
- Explore use of hydrotherapy if ordered by physician and if woman meets use criteria (i.e., vital signs within normal limits [WNL], cervix 4 to 5 cm dilated, active phase of first stage labor) to aid relaxation and stimulate production of natural oxytocin.
- Explore use of transcutaneous electrical nerve stimulation per physician order to provide an increased perception of control over pain and an increase in release of endogenous opiates.
- Assist woman to change positions and to use pillows to reduce stiffness, aid circulation, and promote comfort.
- Provide emotional support and ongoing positive feedback to enhance positive coping mechanisms.

**LEGAL TIP** Informed Consent for Anesthesia

- Opportunity to have any question answered
- Opportunity to have components of the consent explained in the woman’s own words
- The consent form will be written or explained in the woman’s primary language
- Have the woman’s signature
- Have the date of consent
- Carry the signature of the anesthetic care provider, certifying that the woman has received and appears to understand the explanation

**Timing of administration**

It is often the nurse who notifies the primary health care provider that the woman is in need of pharmacologic measures to relieve her discomfort. Orders are often written for the administration of pain medication as needed by the woman and based on the nurse’s clinical judgment. Generally, pharmacologic measures for pain relief are not implemented until labor has advanced to the active phase of the first stage of labor and the cervix is dilated approximately 4 to 5 cm to avoid suppressing the progress of labor (see Box 12-3). Conversely, nonpharmacologic measures can be used to relieve pain in early labor while relieving stress and enhancing progress.

**NURSING DIAGNOSIS** Health-seeking behavior (labor) related to desire for a healthy outcome of labor and birth

**Expected Outcome** Woman will participate in care planning for labor

**Nursing Interventions/Rationales**

- Discuss woman’s birth plan and knowledge about the birth process.
- Provide information about the labor process to correct any misconceptions.
- Inform woman about her labor status and fetus’s well-being.
- Discuss rationale for all interventions to incorporate woman into plan of care.
- Incorporate nonpharmacologic interventions into plan of care to increase woman’s sense of control during labor.
- Provide emotional support and ongoing positive feedback to enhance positive coping mechanisms.
Preparation for procedures

The methods of pain relief available to the woman are reviewed, and information is clarified as necessary. The procedure and what will be asked of the woman (e.g., to maintain a flexed position during insertion of epidural needle) must be explained. The woman also can benefit from knowing the way that the medication is to be given, the interval before the medication takes effect, and the expected pain relief from the medication. Skin-preparation measures are described, and an explanation is given for the need to empty the bladder before the anesthetic or anesthetic is administered and the reason for keeping the bladder empty. When an indwelling catheter is to be threaded into the epidural space, the woman should be told that she may have a momentary twinge down her leg, hip, or back, and that this feeling is not a sign of injury.

Administration of medication

Accurate monitoring of the progress of labor forms the basis for the nurse’s judgment that a woman needs pharmacologic control of discomfort. Knowledge of the medications used during childbirth is essential. The most effective route of administration is selected for each woman; then the medication is prepared and administered correctly.

Intravenous route. The preferred route of administration of medications such as meperidine, fentanyl, or nalbuphine is through IV tubing, administered into the port nearest the woman while the infusion of the IV solution is stopped. The medication is given slowly in small doses during a contraction. It may take up to five consecutive contractions if needed to complete the dose. It is given during contractions to decrease fetal exposure to the medication because uterine blood vessels are constricted during contractions, and the medication stays within the maternal vascular system for several seconds before the uterine blood vessels reopen. When the medication is infused, the IV infusion is then restarted slowly to prevent a bolus of medication from being administered. With this method of injection, along with smaller but more frequent dosing, the amount of medication crossing the placenta to the fetus is restricted during contractions, and the medication stays within the maternal vascular system for several seconds before the uterine blood vessels reopen. When the medication is infused, the IV infusion is then restarted slowly to prevent a bolus of medication from being administered. With this method of injection, along with smaller but more frequent dosing, the amount of medication crossing the placenta to the fetus is reduced while the woman’s degree of pain relief is maximized. The IV route is associated with the following advantages:

- The onset of pain relief is more predictable.
- Pain relief is obtained with small doses of the drug.
- The duration of effect is more predictable.

Intramuscular route. IM injections of analgesics, although still used, are not the preferred route for administration in women in labor. Identified disadvantages of the IM route include the following:

- The onset of pain relief is delayed.
- Higher doses of medication are required.
- Medication from muscle tissue is released at an unpredictable rate and is available for transfer across the placenta to the fetus.

IM injections given in the upper arm (deltoid muscle) seem to result in more rapid absorption and higher blood levels of the medication (Bricker & Lavender, 2002). If regional anesthesia is planned later in labor, the autonomic blockade from the regional (e.g., epidural) anesthesia increases blood flow to the gluteal region and accelerates absorption of medication that may be sequestered there. The maternal plasma level of the medication necessary to bring pain relief usually is reached 45 minutes after IM injection, followed by a decline in plasma levels. The maternal medication levels (after IM injections) also are unequal because of uneven distribution (maternal uptake) and metabolism. The primary advantage of using the IM route is quick administration by the health care provider.

Spinal nerve blocks. An IV infusion is usually established before the induction of spinal nerve blocks (e.g., epidural, subarachnoid). Anesthesia protocols often include the prophylactic administration of IV fluid before epidural and spinal anesthesia for blood volume expansion to prevent maternal hypotension. However, routine preloading with IV fluids before epidural analgesia is a form of care with a trade-off between beneficial and adverse effects (Enkin et al., 2000).

Lactated Ringer’s and normal saline solutions are commonly used infusion solutions. Infusion solutions without dextrose are preferred, especially when the solution must be infused rapidly (e.g., to treat dehydration or to maintain blood pressure) because solutions containing dextrose rapidly increase maternal blood glucose levels. The fetus responds to high blood glucose levels by increasing insulin production; neonatal hypoglycemia may result. In addition, dextrose changes the osmotic pressure so that fluid is excreted from the kidneys more rapidly.

Because spinal nerve blocks can reduce bladder sensation, resulting in difficulty voiding, the woman should empty her bladder before the induction of the block and should be encouraged to void at least every 2 hours thereafter. The nurse should palpate for bladder distention and measure urinary output to ensure that the bladder is being completely emptied. A distended bladder can inhibit uterine contractions and fetal descent, resulting in a slowing of the progress of labor. The status of the maternal-fetal unit and the progress of labor must be established before the block is performed. The nurse or the woman’s partner must assist the woman to assume and maintain the correct position for induction of epidural and spinal anesthesia (see Fig. 12-11).

Safety and general care

After a spinal nerve block is administered, the woman is protected from injury by raising the side rails and placing a call bell within easy reach when the nurse is not in attendance. Oxygen and suction should be readily available at the bedside. The nurse must make sure there is no prolonged pressure on an anesthetized part (e.g., lying on one side with weight on one leg, tight linen on feet). If stirrups are used for birth, the nurse should pad them, adjust both stirrups to the same level and angle, place both of the woman’s legs into them simultaneously while avoiding putting pressure on the popliteal angle, and apply restraints (if used) without restricting circulation.
Depending on the level of motor blockade, the woman should be assisted to remain as mobile as possible. When in bed, her position should be alternated from side to side every hour to ensure adequate distribution of the anesthetic solution and to maintain circulation to the uterus and placenta. Assisting the woman to assume upright positions such as sitting (e.g., modified throne position in which the woman sits on the bed with the bottom part lowered to place her feet below her body) (Fig. 12-14), tug-of-war position (woman tugs on towel or sheet that is tied to the bar on the bed or held by the nurse), and squatting by using the head of the bed for support will facilitate fetal descent and enhance bearing-down efforts (Gilder, Mayberry, Gennaro, & Clemmons, 2002). Upright positions are very important in the prevention of operative births (e.g., forceps-assisted or vacuum-assisted birth) and should be encouraged when the woman has a low-dose epidural or CSE (Mayberry et al., 2003). To prevent injury, the nurse must assess the level of motor function (e.g., woman takes three unassisted steps with accompaniment, woman stands and closes eyes while nurse notes degree of unsteadiness, woman is able to flex legs or rise from a supine position), level of sensation in legs (e.g., degree of numbness), and level of sedation before the woman is assisted out of bed and periodically thereafter (Mayberry, Clemmens, & De, 2002). The woman should sit on the side of the bed before standing to determine if orthostatic hypotension occurs. If she is not dizzy or light-headed, then she can stand at the side of the bed and even walk.

Health care providers should recognize that the second stage of labor is often prolonged in women who use epidural analgesia for pain management. Research evidence indicates that as long as the well-being of the maternal-fetal unit is established, a period of “laboring down” to allow the fetus to descend and rotate with uterine contractions and the use of open-glottis pushing techniques when the fetus has reached a 1+ station and is rotating to an anterior position are the best approaches to use for the management of second-stage labor (Mayberry, Clemmens, & De, 2002). Use of upright positions for second stage labor can be encouraged, including squatting and sitting upright (Mayberry, Clemmens, & De, 2003) (see Chapter 14 for a full discussion of second stage labor management).

The nurse monitors and records the woman’s response to nonpharmacologic pain relief methods and to medication(s). This includes the degree of pain relief, the level of apprehension, the return of sensations and perception of pain, and allergic or adverse reactions (e.g., hypotension, respiratory depression, hypothermia, fever, pruritus, nausea, and vomiting). The nurse continues to monitor maternal vital signs, blood pressure, the strength and frequency of uterine contractions, changes in the cervix and station of the presenting part, the presence and quality of the bearing-down reflex, bladder filling, and state of hydration. Determining the fetal response after administration of analgesia or anesthesia is vital. The woman is asked if she (or the family) has any questions. The nurse also assesses the woman’s and her family’s understanding of the need for ensuring her safety (e.g., keeping side rails up, calling for assistance as needed).

The time that elapses between the administration of an opioid and the baby’s birth is documented. Medications given to the newborn to reverse opioid effects are recorded. After birth the woman who has had spinal, epidural, or general anesthesia is assessed for return of sensation and motor function in addition to the usual postpartum assessments. Both the nurse and the anesthesia provider are responsible for documenting assessments and care in relation to the epidural (Mahlmeister, 2003).

**Evaluation**

Evaluation of the effectiveness of care of the woman needing management of discomfort during labor and birth is based on the previously stated outcomes.

**COMMUNITY ACTIVITY**

1. Attend a childbirth education class session on pain management during labor and birth. Answer the following questions, and perform the following evaluations:
   a. What nonpharmacologic methods were discussed?
   b. What pharmacologic methods were discussed?
   c. Was the information presented in a nonbiased manner?
   d. Was the information evidence based?
   e. Evaluate the session in terms of the goals stated for the class.

2. **Fig. 12-14** Modified throne position for labor. (Courtesy Julie Perry Nelson, Gilbert, AZ.)
f. Evaluate how well the participants could demonstrate nonpharmacologic methods (e.g., breathing techniques).
g. Was the information culturally appropriate for all participants? How so or why not?
h. How could the class have been improved?

<table>
<thead>
<tr>
<th>Identify sources in your area for childbirth education classes. Your analysis should address the following points:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Ways in which pregnant women can find out about classes in the area (e.g., how and where advertised)</td>
</tr>
<tr>
<td>b. Convenience of location; times of classes</td>
</tr>
<tr>
<td>c. Costs</td>
</tr>
<tr>
<td>d. Choices of classes offered (e.g., number of sessions, topics, target audiences, languages)</td>
</tr>
<tr>
<td>e. Suggestions for improving any of the above</td>
</tr>
</tbody>
</table>

**Key Points**

- The expected outcome of preparation for childbirth and parenting is "education for choice.
- Nonpharmacologic pain and stress management strategies are valuable for managing labor discomfort alone or in combination with pharmacologic methods.
- The gate-control theory of pain and the stress response are the bases for many of the nonpharmacologic methods of pain relief.
- The type of analgesic or anesthetic to be used is determined in part by the stage of labor and the method of birth.
- Sedatives may be appropriate for women in prolonged early labor when there is a need to decrease anxiety or to promote sleep or therapeutic rest.
- Naloxone (Narcan) is an opioid antagonist that can reverse opioid effects, especially respiratory depression.
- The nurse must understand medications, their expected effects, their potential adverse reactions, and their methods of administration.
- Maintenance of maternal fluid balance is essential during spinal and epidural nerve blocks.
- Maternal analgesia or anesthesia potentially affects neonatal neurobehavioral response.
- The use of opioid agonist-antagonist analgesics in women with preexisting opioid dependence may cause symptoms of abstinence syndrome (opioid withdrawal).
- General anesthesia is rarely used for vaginal birth but may be used for cesarean birth or whenever rapid anesthesia is needed in an emergency.

**Answer Guidelines to Critical Thinking Exercise**

**Hydrotherapy**

1. Yes, there is sufficient evidence to draw conclusions about what advice to give Yvonne about hydrotherapy.
2. a. Most women desire pain relief in labor. Satisfaction with their experience of labor is related to how well their expectations met reality, not necessarily how much pain they experienced. Nurses need to support the laboring woman to make informed choices that meet the woman’s expectations but also ensure the safety of the woman and infant.
   b. Studies on the effect of hydrotherapy on labor pain (Benfield, 2002; Niskioka, 2001; Simkin & O’Hara, 2002) suggest that hydrotherapy can affect the perception of pain in labor. Women may relax in the warmth and buoyancy of the water; vasodilation is promoted, and catecholamine production is reduced. Increased relaxation and decreased pain have been noted in study participants.
   c. Potential harmful effects of hydrotherapy include hyperthermia, hypothermia, and infection (especially if membranes are ruptured). Water temperature in the range of 36° to 38°C has been suggested to avoid potentially adverse effects. Increased risk of infection in low risk women with or without ruptured membranes or their infants has not been established.
   d. Pharmacologic control of discomfort during labor requires collaboration among the health care providers and the laboring woman.
   e. The nurse must understand medications, their expected effects, their potential adverse reactions, and their methods of administration.
   f. Maintenance of maternal fluid balance is essential during spinal and epidural nerve blocks.
   g. Maternal analgesia or anesthesia potentially affects neonatal neurobehavioral response.
   h. The use of opioid agonist-antagonist analgesics in women with preexisting opioid dependence may cause symptoms of abstinence syndrome (opioid withdrawal).
   i. General anesthesia is rarely used for vaginal birth but may be used for cesarean birth or whenever rapid anesthesia is needed in an emergency.

**Epidurals and Labor Progress**

1. Yes, there is sufficient evidence to draw conclusions about what advice to give Dodie concerning epidurals and labor progress and the incidence of cesarean births.
2. a. Studies have demonstrated that both first and second stages of labor are lengthened with epidural analgesia, and oxytocin use and assisted vaginal births are increased (Sharma & Leveno, 2008).
2003). Combined spinal-epidural analgesia provides effective labor pain relief with little effect on uterine contractions or maternal pushing efforts (Florence and Palmer, 2003).

b. Studies on effects of epidurals on cesarean birth rates are difficult to interpret because many have flawed design problems; however, Sharma and Leveno (2003) conclude that cesarean rates are not increased.

c. Sharma and Leveno report that most studies conclude that there are few if any fetal or neonatal effects and none that were clinically significant. Harmful FHR patterns have not been related to epidural analgesia, although fetal bradycardia has been reported when combined spinal-epidural analgesia is used. Apgar scores and umbilical cord blood gas levels have shown no adverse effects on the neonate.

d. Mayberry and others (2003) studied the use of upright positions during second-stage labor in women who had been given low-dose epidural analgesia. In this descriptive study, the women were able to assume upright positions when provided with physical and emotional support. Upright positions and frequent position changes are recommended by AWHONN in the guidelines for second stage labor management; however, no specific suggestions were made for women who had epidurals because of a lack of research.

The priority is to assure Dodie that she will have support and encouragement during the second stage and that interventions will be implemented to promote a successful vaginal birth. Implications for care include position changes and continued fetal and maternal assessments to evaluate progress and to identify potential problems. Dodie may be encouraged to “labor down” until the fetus has moved down in the birth canal and pushing can be more effective.

3 The evidence does not strongly support the conclusion that use of upright positions prevents longer labors, but it is more objective in supporting giving Dodie assurance about having a successful vaginal birth.

4 Dodie may decide that she would like to let the analgesia wear off somewhat so that she can better feel the contraction and push more effectively.

Resources

Academy for Guided Imagery, Inc.
30765 Pacific Coast Hwy., Suite 369
Malibu, CA 90265
800-726-2070
www.academyforguidedimagery.com

American Academy of Husband-Coached Childbirth
(Bradley Method of Natural Childbirth)
P.O. Box 5224
Sherman Oaks, CA 91413
800-422-4784
www.bradleybirth.com

Birthworks, Inc.
P.O. Box 2943
Medford, NJ 08055
888-862-4784
www.birthworks.org

Childbirth and Postpartum Professional Association (CAPPA)
P.O. Box 491448
Lawrenceville, GA 30043
888-692-2772
www.mycapa.net

Cutting Edge Press (source for information and equipment regarding childbirth support measures by Polly Freez)
www.childbirth.org/CEP.html

Hypnobirthing Institute
P.O. Box 810
Epson, NH 03234
877-798-3286
www.hypnobirthing.com

Lamaze International
2025 M St., Suite 800
Washington, DC 20006-3309
800-368-4404
www.lamaze.org

Maternity Center Association
281 Park Ave., South, 5th Floor
New York, NY 10010
212-777-5000
www.maternitywise.org

Perinatal Education Associates, Inc.
98 E. Franklin St., Suite B
Cincinnati, OH 45219
1-866-882-4784
www.birthsource.com

Read Natural Childbirth Foundation
P.O. Box 150956
San Rafael, CA 94915
415-456-8462

Touch Research Institutes
University of Miami School of Medicine
P.O. Box 016820
Miami, FL 33101
305-243-6781
www.miami.edu/touch-research/home.html

References


Chapter 12
Management of Discomfort

367-368_CH12_Lowdermilk.qxd 11/1/05 5:31 PM Page 367