

## *The Pain and Discomfort of Labor and Birth*

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One unique aspect of childbirth is the association of this physiologic process with pain and discomfort. However, the experience of pain during labor is not a simple reflection of the physiologic processes of parturition. Instead, labor pain is the result of a complex and subjective interaction of multiple physiologic and psychosocial factors on a woman's individual interpretation of labor stimuli. An understanding of labor pain in a multidimensional framework provides the basis for a woman-centered approach to labor pain management that includes a broad range of pharmacologic and nonpharmacologic intervention strategies. *JOGNN*, 25, 82-92; 1996.

**I**ntervention for pain and discomfort during labor and birth is a major part of modern obstetric care of laboring women. During the late 19th and early 20th centuries, the goals of relief from pain during childbearing and increased maternal safety prompted many women to seek the services of physicians for childbirth. Although pain and discomfort are accepted as common parts of the experience of labor and birth, the wide range of its expression is well known to experienced clinicians. This characteristic of pain, its individuality, subjectivity, and intensely personal nature, is why nurses who care for laboring women must learn to sensitively understand, assess, and intervene for pain and discomfort according to the individual woman's needs and desires.

Pain generally is defined as having two basic components, a primary phenomenon consisting of afferent output from sensory receptors and a secondary phenomenon involving processing and reaction. The primary phenomenon is of physiologic origin, results from the stimulation and response of sensory receptors, and is presumably the same for a given stimulus in all physiologically intact people. This primary component overlaps with and leads to the secondary phenomenon, when the afferent stimulus erupts into consciousness. The secondary pain com-

ponent includes the recognition of, processing of, and reaction to the sensation.

A conceptual model proposed by Chapman (1977) and presented in Figure 1 is helpful in understanding this secondary component of the pain experience and the individuality of its expression. As represented by the inner circle of the model, a wide variety of unique emotional, motivational, social, cultural, and conceptual factors interact to determine how a woman interprets the noxious sensory stimuli transmitted to her central nervous system during labor. Access to this private experience of pain is available to the clinician only through assessments of observable behavior represented by the outer circle of the model. Chapman's model is consistent with a definition of acute pain by Bonica (1990b): "Acute pain is a complex constellation of unpleasant sensory, perceptual, and emotional experiences and certain associated autonomic, psychological, emotional, and behavioral responses" (p. 19).

Verbal report, a common method of pain assessment, primarily reflects the conceptual/judgmental processes of the private reality of pain. These processes are affected by all of the other internal influences in a dynamic and interactive manner. The "observable behavior" of verbal pain report reflects the conceptual/judgmental integration of varying quantities of noxious sensory stimuli, social/cultural stimuli, and emotional/motivational stimuli. Verbal report is but one behavior from which we infer an internal experience called pain. These multidimensional characteristics of pain and their subjective interaction are important to understand as a conceptual basis for intervention.

Similar to pain, childbirth is considered a multidimensional experience. Labor and birth include intense physical, emotional, psychological, developmental, social, cultural, and spiritual elements that may be critical to an individual woman's experience of this major life event. Although antenatal fear of labor pain may be common for many women, research data consistently suggest that the perceived painfulness of labor is not necessarily related

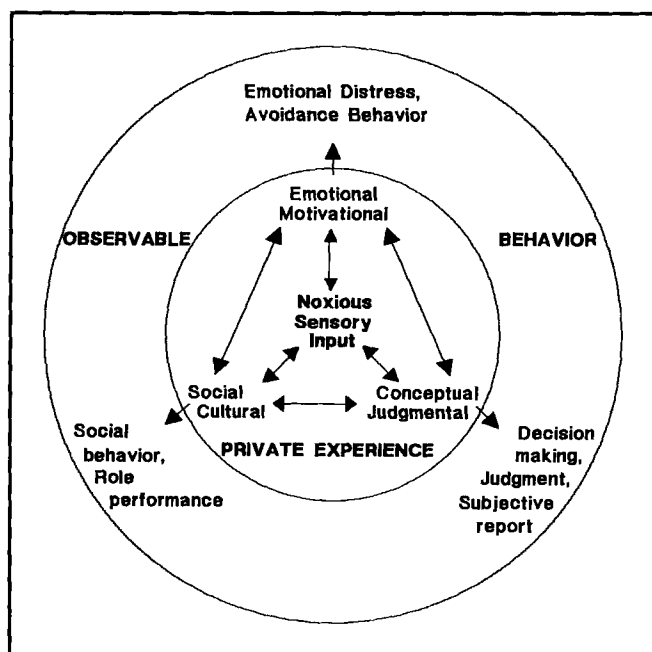


Figure 1. Chapman model of the human pain experience. From Chapman, C. R. (1977). *Sensory decision theory methods in pain research: A reply to Rollman*. *Pain*, 3, 295-305. Reprinted with permission.

to a woman's sense of satisfaction with her labor and birth experience (Brarnadat & Driedger, 1993; Norr, Block, Charles, Meyering, & Meyers, 1977; Salmon, Miller, & Drew, 1990). Rather, satisfaction with childbirth is related more to a woman's sense of mastery of her labor experience and is affected by many aspects of her experience (Brarnadat & Driedger, 1993; Humenick & Bugen, 1981; Simkin, 1991). From this perspective, the labor and birth process is viewed as a developmental event in a woman's life, the mastery of which leads to an increased sense of self-esteem and personal strength. Pain in this scheme is just one of many stressors with which a woman must deal during labor, and medical intervention for pain is just one of many aids a woman may access during labor (Humenick, 1981).

### ***Pain Physiology During Labor***

As depicted in the Chapman model, the perception of acute pain during labor originates with the transmission of noxious sensory input to the central nervous system (CNS). The stimuli that give rise to pain generally are those associated with actual or potential tissue damage, and the response to these stimuli involves reflex and cognition. The neurophysiology of pain can be briefly summarized as follows: (a) Noxious impulses originate in nociceptive receptors distributed throughout the skin, subcutaneous tissue, periosteum, joints, muscles, and viscera; (b) nociceptive stimuli are transmitted via primary afferent neurons that almost always are myelinated A delta or unmyelinated C fibers to the dorsal horn of the

spinal cord; (c) the stimuli are processed primarily in the substantia gelatinosa (laminae II) of the dorsal horn and transmitted by interneurons of the spinothalamic tract to the thalamus and cerebral cortex, where spatial and temporal analysis occurs, and to the hypothalamic and limbic systems, where emotional and autonomic responses originate; (d) transmission by the spinoreticular tract to the reticular formation of the brain mediates motor, autonomic, and sensory functions associated with pain per-

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**The perceived painfulness of labor is not necessarily related to a woman's sense of satisfaction with her labor and birth experience.**

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ception and discrimination and triggers arousal and the affective dimension of pain; and (e) at the level of the substantia gelatinosa, modulation of nociceptive impulse transmission occurs through several complex inhibitory systems that are activated at many supraspinal levels of the CNS (Bonica, 1990a).

In the reproductive system, both mechanical and chemical nociceptors have been found in the ovaries, uterus, and broad ligaments (Bonica & McDonald, 1990). The high-threshold mechanoreceptors are stimulated by intense pressure, such as that associated with uterine contractions. The increasing intensity of perceived pain commonly observed with the progression of labor may be attributable in part to a lowered response threshold in the mechanoreceptors produced by the repeated stimulation of uterine contractions. In addition, a number of substances released by myometrial cellular breakdown during repeated uterine contractions may lead to chemoreceptor stimulation. These liberated "pain-producing substances" include bradykinin, histamine, serotonin, acetylcholine, and, potassium ions. One mechanism involved in these cellular responses may be a relative myometrial ischemia caused by constriction and contraction of the arteries supplying the uterine muscle.

During the first stage of labor, visceral pain usually predominates, with the transmission of nociceptive stimuli from the uterus, cervix, adnexa, and pelvic ligaments. As illustrated in Figure 2, these stimuli are transmitted primarily via sympathetic fibers to the posterior nerve root ganglia at T10 through L1. As fetal descent increases during late first stage and early second stage labor, distention and traction on the pelvic structures surrounding the vaginal vault become the predominant source of noxious sensory input. Finally, second stage labor is dominated by stimuli arising from distention of the perineal structures. These stimuli are transmitted primarily by the pudendal nerves through the sacral plexus to the posterior nerve root ganglia at spinal levels S2 through S4.

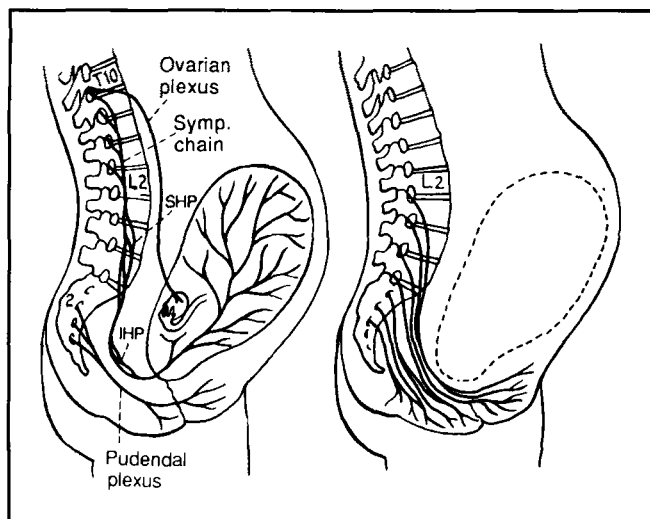


Figure 2. Nociceptive pathways involved in labor pain. The uterus, including the cervix and lower uterine segment, is supplied by afferents that pass from the uterus to the spinal cord by accompanying sympathetic nerves through the inferior hypogastric plexus (IHP), the hypogastric nerve, the superior hypogastric plexus (SHP), the lumbar and lower thoracic sympathetic chain, and the nerves at T10, T11, T12, and L1. From Bonica, J. J. (Ed.). (1990). *The management of pain* (p. 1327). Philadelphia: Lea & Febiger. Reprinted with permission.

Throughout labor, additional noxious stimuli may be transmitted because of traction and pressure on the adnexa and parietal peritoneum; pressure on and stretch of the bladder, urethra, and rectum; pressure on one or more roots of the lumbosacral plexus; and reflex skeletal muscle spasm in structures supplied by the same spinal cord segments that

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supply the uterus and cervix. Referred pain from the anterior abdominal wall, iliac crests, gluteal area, thighs, and lumbosacral regions also may be experienced because of the stimulation of neurons from these regions by afferent stimuli from the pelvic organs according to the dermatomal rule, as illustrated in Figure 3.

### ***Influences on Pain Experience During Labor***

Research evidence indicates that an explanation of the individual differences observed in pain during labor must consider the influence of physiologic and psychosocial

variables. These variables may explain not only biologic variation in the frequency or intensity of nociceptive stimulation but also some of the factors that influence a woman's perception and subjective interpretation of such stimuli.

### ***Physiologic Influences***

Greater cervical dilation has been linked with increased labor pain in a number of studies (Brown, Campbell, & Kurtz, 1989; Giuffre, 1983; Melzack, Kinch, Dobkin, Lebrun, & Taenzer, 1984; Roberts, Malasanos, & Mendez-Bauer, 1981), although increases and decreases in pain level may be seen throughout labor when the reports of individual women are studied (Melzack, 1984). Particularly in the later phases of the first stage of labor, more pain may be experienced when contractions are more frequent (Lowe, 1989, 1991a; Melzack, 1984). The combined influence of cervical dilation and contraction frequency may be partially responsible for the intense pain some women experience during transitional labor.

Data from several studies have supported a link between dysmenorrhea and increased pain during labor, regardless of parity (Fridh, Kopare, Gaston-Johansson, & Norvell, 1988; Harrison, 1991; Lowe, 1991a; Melzack, Taenzer, Feldman, & Kinch, 1981). Increased prostaglandin production, which produces greater intensity of contractions, is suggested as the common mechanism during menses and labor. This explanation is supported by research findings that showed that the actual intensity of labor contractions is more important than contraction du-

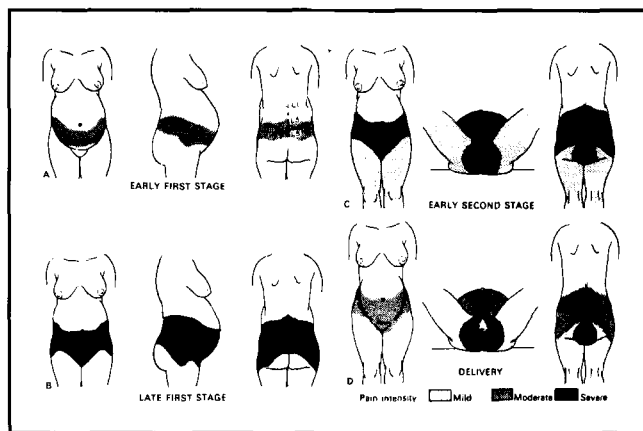


Figure 3. The intensity and distribution of labor pain during the various phases of childbirth. A. In the early first stage, the pain is referred to the T11 and T12 dermatomes. B. In the late first stage, the severe pain also is referred to the T10 to L1 dermatomes. C. In the early second stage, uterine contractions remain intense and produce severe pain in the T10 to L1 dermatomes. At the same time, the presenting part exerts pressure on pelvic structures, thus causing moderate pain in the very low back and perineum and often producing mild pain in the thighs and legs. D. Intensity and distribution of pain during the latter phase of the second stage and during delivery. The perineal component is the primary cause of pain. From Bonica, J. J. (Ed.). (1990). *The management of pain* (p. 1329). Philadelphia: Lea & Febiger. Reprinted with permission.

ration to perceived pain intensity (Corli, Grossi, Roma, & Battagliarin, 1986).

Although multiparas generally report less pain during early and active labor than do nulliparas, second stage often is more painful for parous women (Brown et al., 1989; Gaston-Johansson, Fridh, & Turner-Norvell, 1988; Lowe, 1987, 1992; Melzack et al., 1981, 1984). The increased "give" and suppleness of pelvic tissue in the parous woman may decrease nociceptive stimuli during the dilation phases of labor but increase stimuli later in labor because of the speed and intensity of fetal descent.

Data from Melzack et al. (1984) suggested an association between increased fetal weight and increased pain. Although it makes intuitive sense that a larger passenger causes more maternal pain and discomfort as it moves through the birth canal, this association may be significant only at the extreme end of the spectrum of birth weight and also is likely to be a function of the degree of "fit" between the fetus and the maternal passage. Greater fetal weight often is correlated with increased maternal weight, although a positive correlation between pre-pregnancy weight for height and labor pain has not been found consistently (Lowe, 1991a; Melzack et al., 1984).

### ***Psychologic Influences***

The influence of a variety of psychologic factors on a woman's perception of pain during labor is a well known clinical phenomenon. An anxious, tense, "out-of-control" woman thrashing about and crying with pain during early labor can be one of the greatest challenges for the intrapartum nurse. Indeed, the temptation to think or even say that "her pain is not as bad as she thinks" reflects a failure to appreciate the subjective internal reality of pain as described in Chapman's model. The woman's pain is as bad as she thinks because her pain is exactly how she perceives it. However, intervention directed at psychologic factors may lead to dramatically decreased perceived pain.

In contrast to the relationship of dysmenorrhea to increased labor pain, some data suggest that prior experience with nongynecologic pain may be associated with decreased pain (Niven & Gijsbers, 1984). Previous pain experience provides the opportunity for women to develop coping skills and more experientially grounded attitudes about pain, which may positively alter their perceptions of noxious stimuli during labor. However, it is more common that childbirth is the nullipara's first experience with significant physical pain.

Anxiety is commonly associated with increased pain during labor and may modify the experience of labor pain through psychologic and physiologic mechanisms (Astbury, 1980; Connolly et al., 1978; Giuffre, 1983; Lowe, 1987; Reading & Cox, 1985). Significant components of labor-related anxiety may be fears of pain, loss of control, abandonment, self-injury, or injury to the neonate. In addition, anxiety may be precipitated during the course of labor through the actions of individuals surrounding the laboring woman or by environmental factors, such as

noise or unfamiliarity. Fear of pain has a high correlation with pain levels during first stage labor, whereas concerns regarding the outcomes of birth for self and neonate are related to second stage pain (Harrison, 1991; Lowe, 1989, 1991a; Wuitchik, Hesson, & Bakal, 1990). These findings suggest that as the birth nears, maternal anxieties related to pain perception shift from those concerned primarily with pain to those concerned with the neonate's status and the potential for self-injury during birth.

Although some anxiety is considered normal for women during labor, excessive anxiety is an emotional factor that tends to magnify the perception of nociceptive stimuli at the cortical level. Increased catecholamine secretion produced by heightened anxiety also may magnify pain by actually increasing nociceptive stimuli from the pelvis through decreased pelvic blood flow and increased muscle tension.

One of the most difficult variables related to pain perception during labor is that of childbirth preparation. Some research data indicate that women who attend formal childbirth education classes report less pain throughout labor than do unprepared women (Giuffre, 1983; Melzack, Taenzer, Feldman, & Kinch, 1981), whereas this relationship has not been supported in other investigations (Astbury, 1980; Lowe, 1987; Niven & Gijsbers, 1984; Reading & Cox, 1985). Because of the self-selection bias and multiple intervening variables between childbirth education and labor outcomes, it has become more fruitful to study the relationship between pain during labor and one of the outcomes of childbirth education, that of a woman's confidence in her ability to handle labor. The combined results of a number of studies suggest that not only is confidence greater after childbirth education, but confidence is powerfully related to de-

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creased pain perception and decreased medication/anesthesia use during labor (Crowe & vonBaeyer, 1989; Lowe, 1987, 1989, 1991a; Manning & Wright, 1983; Walker & Erdman, 1984; Wuitchik et al., 1990).

The self-efficacy theory was used by Lowe (1991b) to discuss how women develop their confidence for labor and how confidence may be strengthened or undermined by internal and external events during labor. This theo-

retical perspective also helps in the understanding of the various mechanisms in addition to childbirth education through which women develop their confidence for labor. For example, experience generally is the most powerful way to develop self-efficacy. The importance of experience to confidence for labor is seen in the greater confidence for labor expressed by multiparous than by nulliparous women (Booth & Meltzoff, 1984; Lowe, 1992). Multiparas have been shown to have expectations of childbirth that are more similar to the event than do nulliparas and to report that their past labor experiences were the source of their expectations (Booth & Meltzoff, 1984; Stolte, 1987). Self-efficacy for labor is a motivational or conceptual factor affecting a woman's interpretation of painful labor stimuli.

Cultural expectations of the painfulness of labor sensations also are important in the perception of pain during labor. Researchers have found that when women delivering in a university hospital in the United States were compared with similar women in the Netherlands, the Americans not only expected labor to be more painful but also expected that they would receive more medication for pain than did their Scandinavian counterparts (Senden et al., 1988). Interestingly, although the American women did receive more medical intervention for pain, there were no differences between the two groups of women in whether or not labor was actually more painful, about as painful, or less painful than they expected. These data provide strong evidence for a cultural element in the United States that influences women's interpretation of labor sensations as painful.

Data from another study emphasize the importance of culture in pain expression represented by Chapman's outer circle of "observable behavior." Harrison (1991) compared the labor experiences of three groups of Arab women: Kuwaiti, Palestinian, and Bedouin. There were no differences in the level of labor pain among the three groups, but there were significant differences in pain behavior. In particular, the Bedouin women reported pain levels similar to those of the other women but had an absence of pain behavior during labor. This apparent "self-control" is in this case culturally endowed because it is shameful in the Bedouin tradition for women to exhibit pain during childbirth. Such self-control and absence of pain behavior may be seen in some Western women using psychoprophylactic techniques.

Weisenberg and Caspi (1989) also identified differences between the pain ratings and behavior of women from a Middle-Eastern background and those with a Western background. Although both groups rated the pain of childbirth as high, the Middle-Eastern women gave higher pain ratings and showed more pain behaviors than did the Western women. Lower educational level also was associated with higher pain ratings and more pain behavior in both groups. These findings and those of Harrison (1991) emphasize the importance of culturally learned values and attitudes to the perception and expression of acute pain (Bates, 1987).

## ***Interactions of Physiologic and Psychologic Influences***

It is clear that none of the factors discussed can be considered as an independent influence on pain perception during labor. Each occurs within the complexity of total physiologic and psychologic functioning of the individual woman experiencing the labor event. However, through understanding the relationship between each influence and pain perception, opportunities for multimodal interventions become apparent. In addition, the clinician who understands the internal subjectivity of the pain experience as described by Chapman is sensitive to the strength of a variety of physiologic and psychosocial factors of a woman's interpretation of potentially painful stimuli. One of the dangers of this concentration on exploring the pain of labor is the tendency to assume that pain is necessarily a terrible experience for the parturient.

It must be emphasized that the woman's internal experience of pain is affected by the environment in which she is laboring. The labor environment includes the totality of the animate and inanimate forces that influence the woman's experience. These factors include the persons who are present and their verbal and nonverbal communications; the quality of support the woman feels from those present; the degree of strangeness of the environment, including the things (such as furniture and equipment) that make up the environment; noise, lighting, and temperature; and the restrictiveness of the environment in terms of space or movement within the space. Among the few studies investigating the relationship of the environment to labor pain is a Canadian report comparing the responses of 282 couples who chose home birth to 191 couples who chose hospital birth (Morse & Park, 1988). Not only was labor perceived to be significantly more painful by the women in the hospital group than by those in the home birth group, but the same pattern was observed in the ratings of their males partners. However, the males in the hospital group rated the painfulness of labor significantly lower than did their female partners, whereas the males in the home group rated it significantly higher than did their partners. Although a multitude of personality and psychologic differences may be present between these two groups of women, the issue of environment alone is an intriguing one that merits study.

## ***Management of Pain During Labor***

The critical issue for the nurse providing intrapartum care is "How can I make a difference in the pain experience of a woman during labor?" The remainder of this article provides a framework for assessment and intervention that is intended to challenge current thinking and broaden the concept of pain management.

The initial issue is the connotation of the term "management" as it applies to care during labor. Management implies direction and control of something by the per-

son(s) doing the management. In the case of pain, the provider must realize that labor pain belongs to the woman experiencing it, and management of the pain also belongs to her. What the provider can and must do is engage in a cooperative effort with the woman to provide whatever external tools she requires to manage her experience of pain. Unfortunately, what often is offered to the woman is a limited range of helps, a small menu from which to choose, and this menu is limited by the provider who presents it.

### ***Pain Assessment and Management Decisions***

Ideally, the process of labor pain management begins during the antepartal period. This requires that the primary care provider believes in birth planning. Unlike most other experiences of acute pain, the pain and discomfort of labor can be anticipated because the eventual outcome of pregnancy is labor and birth. This feature of labor pain provides considerable opportunity for preparation and the development of pain management strategies by the woman and her significant other(s). In fact, the woman's choice of provider and location for her birth is the beginning of her pain management birth planning, although she may not appreciate that aspect of her choices. The woman who chooses a nurse-midwife and a free-standing birth center for her care has chosen a care model that emphasizes nonpharmacologic approaches to pain management, in contrast to the woman who chooses an obstetrician and an acute care hospital, which may emphasize primarily pharmacologic interventions.

Planning for pain management with the chosen provider begins with a certain amount of self-analysis by the woman, which can be facilitated by the primary provider or childbirth educator. What are her expectations about labor pain, what does she understand or believe about the potential sources of pain and discomfort during labor, what experience has she had with pain in the past, and what strategies has she used to help her cope with such experiences? These are some of the areas for prenatal assessment that will help the woman begin to plan her approach to pain management and help the care provider to initiate intervention as needed. For example, the woman who is extremely fearful of pain during labor or of childbirth may profit from an extra prenatal visit to discuss her fears or from sessions with a knowledgeable psychologic counselor who can help her to express and understand her fears and perhaps dissipate them through counseling. Readings, childbirth classes, coping strategy rehearsal, physical fitness training, or participating in another woman's labor and birth may be part of the preparations the woman makes for her pain management plan.

Regardless of the birth setting, whether home, free-standing birth center, or hospital, once the woman has engaged professional care during labor, pain assessment becomes a collaborative effort between the woman and the providers. It is critical to remember that the quality of the nurse-parturient relationship is of central importance in the assessment and management of labor pain. The

nurse's genuine caring for the woman and physical presence may be the most significant aspects of all that is said and done for the woman during the course of her labor.

Pain assessment during labor includes direct and indirect methods of evaluation. In keeping with the idea that pain has sensory and affective dimensions, assessment should include not only the intensity, the specific location(s), and pattern of the woman's pain and discomfort, but also the degree of distress it is causing her. For example, a woman may report that her back pain during a contraction is extremely severe or give it a 10 on a 1 (no pain)-to-10 (worst pain imaginable) scale but say that she is coping with it fairly well or give it a 4 on a similar 10-point scale between "no distress" and "worst distress imaginable." Verbal evaluation of pain and distress should occur between contractions, and the nurse should not be reluctant to use the word pain in her discussions with the woman. However, it is important to not call the contractions "pains," but to help the woman distinguish the sensation of muscular contraction of the uterus from the sensations of pain and discomfort the contractions may produce. This distinction will not only assist in decisions regarding specific interventions to employ, but also may assist the unprepared parturient to understand the sensations she is experiencing and reinterpret them.

Although decisions regarding pharmacologic interventions are specific and time oriented, nonpharmacologic interventions represent a wide repertoire of methods that can be used one at a time or in combination, for one contraction or for many hours, by the woman, her support person(s) or provider, and in most cases, independently by the nurse.

### ***Pharmacologic Interventions***

The pharmacologic interventions in current use include systemic sedatives and analgesics and regional analgesia. Although sedative-hypnotics of the barbiturate classification may be used occasionally for sedation in prolonged latent labor, their use in active labor is no longer common because of the rapid transport of these highly lipid-soluble drugs to the fetus and their relationship to respiratory depression and neurobehavioral abnormalities in the neonate (Rayburn & Zuspan, 1992).

Sedatives, particularly phenothiazine tranquilizers, may assist with pain management during labor by decreasing maternal anxiety, enhancing relaxation, and potentiating the effects of simultaneously administered narcotics (see Table 1). These drugs induce CNS depression primarily by inhibiting the uptake of norepinephrine and 5-hydroxytryptophan in the CNS. Through inhibition of the chemoreceptor trigger zone in the medulla, they also may enhance maternal comfort by relieving nausea and vomiting during labor. Although rapid transfer to the fetus occurs and some loss of heart rate beat-to-beat variability may be observed, phenothiazines have not been associated with any detrimental effects on the fetus or neonate in recommended doses (Rayburn & Zuspan, 1992).

The antihistamine hydroxyzine also can be used as a

**Table 1. Common Systemic Medications for Pain Management During Labor**

<i>Classification</i>	<i>Drug</i>	<i>Dose</i>	<i>Route</i>	<i>Onset of Action</i>	<i>Duration of Action</i>	<i>Indication</i>
Sedatives	Promethazine	25–75 mg	IM	20 minutes	2 or more hours	Relief of anxiety, nausea and vomiting
		25–50 mg	IV	3–5 minutes		Enhance relaxation Potentiate narcotic effect
	Hydroxyzine	25–100 mg	IM Z track	15–30 minutes	2–4 hours	Relief of anxiety, nausea and vomiting Enhance relaxation Potentiate narcotic effect
Opioids	Morphine	5–10 mg	IM	10–20 minutes	2–4 hours	Relief of moderate to severe pain
		2–5 mg	IV	3–5 minutes	1–2 hours	
	Meperidine	50–100 mg	IM	10–20 minutes	2–3 hours	Relief of moderate to severe pain
		25–50 mg	IV	3–5 minutes	1.5–2 hours	
	Butorphanol	2–4 mg	IM	10 minutes	3–4 hours	Relief of moderate to severe pain
		0.5–2 mg	IV	Rapid	1–2 hours	
	Nalbuphine	10 mg	IM	15 minutes	3–6 hours	Relief of moderate to severe pain
			IV	2–3 minutes	3–6 hours	

IM: intramuscular; IV: intravenous.

mild sedative in labor or to potentiate the effects of narcotics. Because of its tissue irritation potential, hydroxyzine is administered by deep intramuscular injection into the gluteus muscle using Z-track technique. Subcutaneous administration or the deltoid site should not be used, and intravenous administration is contraindicated.

A number of opioid drugs can be used systemically to provide maternal analgesia during labor (Table 1). Each of these drugs exhibits morphine-like action by binding with opioid receptors in the CNS. Five opioid receptors are known, each with distinctive anatomic distribution and physiologic and pharmacologic characteristics (Rayburn & Zuspan, 1992). Opioid agonist drugs have great intrinsic activity when bound to opioid receptors (morphine, fentanyl, meperidine); competitive antagonists bind competitively with receptors but have no intrinsic activity (naloxone); agonist-antagonists drugs have intrinsic activity at one receptor and no activity at another (nalbuphine, butorphanol). In general, the opioids produce maternal analgesia without loss of consciousness by raising the pain threshold and dampening pain perception. Maternal side effects include drowsiness, mental clouding, and decreased gastric motility and emptying. Although opioids may prolong latent labor by altering uterine activity, clinical evidence suggests that during active labor therapeutic doses of narcotics have no adverse effect on contractions and may actually shorten labor by decreasing the pain-related endogenous stress

response (Berg & Rayburn, 1992). Because all narcotics easily cross the placenta, fetal CNS depression may cause neonatal respiratory depression. Management includes full neonatal resuscitation and the administration of 0.1 mg/kg naloxone intravenously or intramuscularly. Although morphine generally is not used for analgesia during active labor because of its association with fetal respiratory depression, morphine is an effective agent for inducing therapeutic rest in the gravida experiencing prolonged latent labor (O'Brien & Cefalo, 1991).

The use of regional analgesia and anesthesia (blocks) has increased dramatically during the past 4 decades. These techniques include continuous lumbar epidural block, subarachnoid (saddle) block, bilateral paracervical and pudendal blocks, continuous caudal block, and double-catheter extradural block, which combines segmental epidural and low caudal blocks (Bonica & McDonald, 1990). Although each of these has particular utility, especially in relationship to the setting and the availability of obstetric anesthesia coverage, the continuous lumbar epidural block is the most popular medical approach to labor pain management. The popularity of regional analgesia and anesthesia in the management of labor pain is primarily a reflection of the potential for the complete relief of pain in most parturients. Disadvantages include the requirements for intravenous fluid administration and continuous fetal monitoring, restriction of maternal movement, the potential for vasomotor block

with maternal hypotension, and interference with the mechanisms of labor, particularly internal fetal rotation and maternal bearing-down efforts.

### ***Nonpharmacologic Interventions***

A wide variety of cognitive, behavioral, and sensory interventions may contribute to a parturient's pain management by altering the nociceptive stimuli she perceives, modifying her central processing of nociceptive input, improving her overall sense of comfort and well-being, or bolstering her coping skills. Chief among these interventions for the nurse is the therapeutic use of self in providing support to the parturient. It is critical that a laboring woman is never alone but is constantly attended by at least one individual who is focused on providing supportive care.

Cognitive pain management activities begin with the woman's preparation for childbirth through information gathering. This information may be gained through informal and formal sources, may be positive or negative, and may be accurate or inaccurate. Realistic knowledge about labor has been associated with reports of less painful childbirth (Crowe & vonBaeyer, 1989).

Once a woman enters labor her cognitive activity (what she is thinking and where her thoughts are focused) may affect not only her perceptions of pain but also the progress of her labor. Cognitive strategies may reduce pain perception by engaging the mind so that awareness of the incoming pain stimuli is reduced. Distress-related thoughts in contrast to coping-related thoughts during early labor have been linked to increased pain, increased length of labor, and increased incidences of operative delivery, abnormal fetal heart rate patterns, and the need for neonatal resuscitation at delivery (Wuitchik, Bakal, & Lipshitz, 1989). Women have described helpful thoughts during labor as those that concentrate on positive thinking; thinking about their other children, the neonate about to be born, or beloved family members; thinking about relaxing or concentrating on getting through one contraction at a time; or thinking about pleasant memories (Lowe, 1995. Unpublished data.). All methods of childbirth preparation embrace the notion that the mind is intimately linked to the physiologic processes and the source of pain messages. Thus, activities that include conversation with a woman about her family and pleasant experiences should be considered nursing intervention, rather than social exchange. Specifically asking a parturient what she is thinking and guiding her thoughts through conversation into more pleasant avenues is a specific pain and coping intervention. In addition, visualization or guided imagery is a powerful cognitive activity that nurses can learn and use to assist the prepared and unprepared woman with pain management (Jones, 1987, 1988).

Hypnotic analgesia is another learned cognitive behavior that is enjoying renewed popularity for the management of pain and stress during labor (Oster, 1994). Hypnotic analgesia requires no more time than tradi-

tional psychoprophylactic preparation; the woman and her labor partner usually are prepared for labor during six individual or group sessions. Hypnosis is associated with decreased perceived pain, shorter labors, less labor medication, higher neonatal Apgar scores, and more spontaneous births (Harmon, Hynan, & Tyre, 1990).

The most common behavioral technique discussed in the pain management literature is relaxation, a specific behavior directed toward a neutral mental and physical state that is free from tension. Common to all childbirth preparation approaches, relaxation is thought to increase pain tolerance through a number of mechanisms, including the reduction of anxiety, decreased catecholamine response, increased uterine blood flow, and decreased muscle tension. Relaxation may be enhanced through concentration on a specific breathing pattern during contractions. Clearly, relaxation also is a cognitive activity and is most successful as a pain management strategy when learned and practiced well in advance of the labor event. However, even unprepared women may benefit from the pain-reducing effects of relaxation when assisted by a caring nurse.

Movement and position are other behaviors that can be effective intervention for labor pain. In a randomized trial, Melzack, Belanger, and Lacroix (1991) found that women in a sitting or standing position experienced significantly less continuous back pain and less contraction-related front and back pain than they did when they were lying down. Ambulation and frequent changes of position should be encouraged throughout labor. Women usually are more comfortable in the upright position than supine during labor, and some find specific rhythmic movements increases their tolerance of contraction-related pain. For example, a woman experiencing back pain may find that leaning forward with support in a wide stance while she rhythmically sways or rocks her hips substantially decreases the discomfort of her contractions. Nurses must become comfortable with a variety of positions for labor, learn to support women in their preferred positions, and suggest a variety of positions to enhance comfort during labor. Movement and position changes may decrease pain and enhance uterine blood flow, uterine activity, and fetal descent.

Vocalization also can be thought of as a behavior that may be an effective pain management strategy at some points during labor. Although parturients often are admonished to not make noise during labor, a more active approach to behavior during labor embraces the idea that giving voice to the sensations she is experiencing and the effort she is expending may assist a woman in coping at particularly difficult times during labor. Vocalizations may include groaning, moaning, or chanting repeated phrases. This is not the scream of a woman terrified by her pain and sensations but rather the sounds of a woman who is engaged in the work of her body and directing some of its intense energy outward through vocal expression. This may be a rather foreign and primitive experience for the parturient and for some care providers, but the sensitive nurse can help by giving "permission" to



make noise and directing the laboring woman's efforts into low-pitched or guttural sounds.

Sensory interventions include any modality that provides sensory input to promote relaxation, enhance positive thoughts, or modulate the transmission of nociceptive stimuli. Music, touch, massage, biofeedback, acupressure, transcutaneous electrical nerve stimulation (TENS), and hydrotherapy are potential pain management tools. Music can be used alone or paired with guided imagery to enhance relaxation and coping; used as a distraction or attention-focusing modality; or used as a pacing mechanism for breathing, movement, or chanting (Di Franco, 1988). Many modalities of touch and massage, from simple hand holding or stroking to massage of specific areas, may help a woman cope with labor pain. Therapeutic touch and acupressure are other therapies that may appeal to some women and their partners. Reviews by Lothian (1988) and Jungman (1988) provide succinct introductions to both of these techniques.

TENS stimulates all of the nerves within approximately 4 cm below the surface of the skin and is one of the most effective therapies for the sensory modulation of pain (Melzack & Wall, 1984). With two pair of electrodes usually applied over the T10 to L1 vertebrae and S2 to S4 vertebrae, low-intensity, high-frequency electrical stimulation is continuously applied. During a contraction, the woman increases the stimulation until tingling sensations are felt. Some trials suggest that good or partial pain relief is reported by 40–60% of women using TENS during the first stage of labor (Bonica & McDonald, 1990).

Electromyography (EMG) biofeedback can be used during labor to reduce the tension of voluntary abdominal muscles. This technique may reduce perceived pain by decreasing peripheral afferent activity, distracting the woman's concentration away from the pain of contractions, and enhancing the descending pain modulating mechanisms. In a randomized clinical trial, Duchene (1989) found nulliparas trained in biofeedback used significantly less epidural anesthesia and had labors that averaged 2 hours shorter than did the nulliparas in the control group.

Hydrotherapy or immersion in a bathtub with or without whirlpool jets is becoming increasingly popular as a comfort and pain management strategy for labor. Water immersion may enhance maternal comfort by facilitating relaxation, decreasing muscle tension, and decreasing pressure on the abdomen. Research data suggest that bathing during labor often is associated with great maternal satisfaction and may decrease pain and increase the speed of cervical dilatation (Cammu, Clasen, Van Wettere, & Derde, 1994; Lenstrup et al., 1987). When a tub is not available, a shower may provide effective pain relief for some women, particularly if the water can be directed at specific areas of pain, such as the low back, and the woman is able to relax on a chair while in the shower. In a recent study, water immersion after rupture of membranes was not associated with any change in the incidence of infections, asphyxia, or respiratory prob-

lems in the neonate or in maternal signs of amnionitis (Waldenstrom & Nilsson, 1992).

A holistic approach to pain management during labor requires that the nurse be knowledgeable about the multidimensional characteristics of acute pain, the various factors that may affect pain perception during labor, and the range of strategies that can be used to enhance the woman's comfort and support her coping mechanisms. As expertise is gained in a variety of intervention modalities, the nurse is able to combine interventions in a complementary way to promote maternal comfort and diminish pain perception. For example, the combined effect of specific music, a guided imagery exercise, and relaxation in a bath can produce an almost trance-like state in some laboring women. Even for the unprepared woman, the effectiveness of systemic sedation or analgesia can be greatly enhanced by simultaneously providing relaxing music of the woman's choice and the comfort of touch.

## Conclusion

In our technological age, the intrapartum nurse must come to understand that the pain of labor and birth is associated with a physiologic, rather than pathologic, process; has different meanings to different women; has many different faces of expression; can be exaggerated or relieved by various interventions during labor; and does not determine a woman's satisfaction with her birth experience. Rather, coping with pain is just one facet of a woman's mastery of childbirth. When the birth environment supports pain management from only a pharmacologic perspective, women are more likely to fear their pain rather than to be freed to work actively with their pain and the labor sensations they feel. Nurses must be willing to provide comprehensive childbirth education that introduces women to a variety of pain management options; to advocate for women in the birthing environment to change practices and policies that inhibit the use of nonpharmacologic approaches; and to provide sensitive continuous care during labor that is a collaborative effort with the woman to assist her in coping with pain and also in mastering the experience of childbirth.

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