



## UNIT FOUR

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# **The Nursing Role in Caring for the Family During Labor and Birth**





# CHAPTER 18

## Caring for a Woman During Vaginal Birth

### Key Terms

amnioinfusion  
attitude  
breech presentation  
cardinal movements of labor  
cephalic presentation  
crowning  
dilatation  
effacement  
engagement  
episiotomy  
fetal descent  
Leopold's maneuvers  
lie  
molding  
pathologic retraction ring  
physiologic retraction ring  
position  
ripening  
station  
transition

### Objectives

*After mastering the contents of this chapter, you should be able to:*

1. Describe common theories explaining the onset of labor.
2. Discuss the role of the components of labor: passenger, passage, and powers.
3. Assess a woman in labor, identifying her stage and progression.
4. Formulate nursing diagnoses related to the physiologic and psychological aspects of labor.
5. Establish expected outcomes to meet the needs of a woman throughout the labor process.
6. Implement nursing care for a family during labor.
7. Evaluate expected outcomes for achievement and effectiveness of nursing care.
8. Identify National Health Goals related to safe labor and birth that nurses can help the nation achieve.
9. Identify areas related to labor and birth that could benefit from additional nursing research or application of evidence-based practice.
10. Use critical thinking to analyze the effectiveness of nursing care measures to meet the needs of women and their families so that labor is family centered.
11. Integrate knowledge of nursing care in labor with nursing process to achieve quality maternal and child health nursing care.

*Celeste Bailey is a 26-year-old you admit to a birthing room. She's been having contractions 45 seconds long and 3 minutes apart for the last 6 hours. She tells you she wants to have her baby "naturally" without any analgesia or anesthesia. Her husband is in the Army and assigned overseas, so he is not with her. Although her sister lives only two blocks from the hospital, Celeste doesn't want her called. She asks if she can talk to her mother on the telephone instead. As you finish assessing contractions, she screams with pain and shouts, "I'm doing everything I'm supposed to do! How much longer does this go on?"*

Previous chapters described the anatomic and physiologic changes that occur in pregnancy as well as effective steps women can take to prepare for labor. This chapter adds information about the labor process and how to explain what is happening during labor to a woman and give support. This is important information, because labor can be a frightening process if support people are not present.

*What teaching does Celeste need about labor and birth?*

After you've studied this chapter, access the accompanying website. Read the patient scenario and answer the questions to further sharpen your skills, grow more familiar with RN-CLEX types of questions, and reward yourself with how much you have learned.

Labor is the series of events by which uterine contractions and abdominal pressure expel a fetus and placenta from a woman's body. Regular contractions cause progressive dilatation of the cervix and sufficient muscular force to allow the baby to be pushed to the outside. It is a time of change, both an ending and a beginning, for a woman, a fetus, and her family.

Labor and birth require a woman to use all the psychological and physical coping methods she has available. Regardless of the amount of childbirth preparation or the number of times she has been through the experience before, family-focused nursing care is needed to support the family as they mark the beginning of a new family structure. This need is further emphasized by National Health Goals (Box 18.1).

## Nursing Process Overview

### For a Woman in Labor

Labor and birth are enormous emotional and physiologic accomplishments, not only for a woman but for her support person as well. For this reason, support persons should be treated with respect and included in all phases of the process whenever possible. Interventions that

#### BOX 18.1 FOCUS ON . . .



### NATIONAL HEALTH GOALS

Because labor and birth are high-risk times for both the fetus and the mother, a number of National Health Goals speak directly to them (DHHS, 2000):

- Reduce the rate of maternal deaths to no more than 3.3/100,000 live births, from a baseline of 7.1/100,000.
- Reduce the rate of fetal deaths at 20 or more weeks' gestation to no more than 4.1/1000 live births, from a baseline of 6.8/1000.
- Reduce the rate of fetal and infant deaths during the perinatal period (28 weeks' gestation to 7 days after birth) to no more than 4.5/1,000 live births, from a baseline of 7.5/1,000 live births.

Nurses can help the nation achieve these goals by closely monitoring women during labor and birth and by teaching women as much as possible about labor, so that they are able to use as little analgesia and anesthesia as possible. The less anesthesia and analgesia used, the fewer the complications that can result in fetal or maternal death.

Topics that could benefit from additional nursing research in this area are advantages and disadvantages of various birthing settings; the best way to teach unprepared women the breathing patterns for labor; how support people can best be prepared for their role; and advantages and disadvantages of various birthing or labor positions.

make the experience more positive and memorable for them help to contribute to future family interactions.

#### ● Assessment

Assessment of a woman in labor must be done quickly yet thoroughly and gently. A woman is keenly aware of words spoken around her and the manner with which procedures are carried out. Because of this sensitivity, she may perceive a venipuncture as a very painful experience. She may have difficulty relaxing for a vaginal examination if she fears that pressure on the fetal head will cause her pain. Remember that pain is a subjective symptom. Only the woman can evaluate how much she is experiencing or how much she will be able to endure.

Assess how much discomfort a woman in labor is having, not only by what she scores on a pain scale, but also by subtle signs of pain such as facial tenseness, flushing or paleness of the face, hands clenched in a fist, rapid breathing, or rapid pulse rate. Knowing the extent of a woman's discomfort helps guide the choice of comfort interventions she may need.

#### ● Nursing Diagnosis

Common nursing diagnoses used during labor include the following:

- Pain related to labor contractions
- Anxiety related to process of labor and birth
- Health-seeking behaviors related to management of discomfort of labor
- Situational low self-esteem related to inability to use prepared childbirth method

Although the discomfort of labor is commonly referred to as "contractions" rather than "pain," do not omit the word "pain" from a nursing diagnosis, because the term strengthens an understanding of the problem.

#### ● Outcome Identification and Planning

When establishing expected outcomes for a woman in labor and her partner, be certain they are realistic. Because labor usually takes place over a relatively short time frame (average, 12 hours), outcomes must be met within this period. On the other hand, it is important not to project a definite time limit for labor to be completed, because the length of labor can vary greatly from person to person and still be within normal limits. It is necessary also to appreciate the magnitude of labor. It is unlikely that all the fear or anxiety experienced during a woman's labor can be alleviated. Often, because it is such an unusual and significant experience, an average couple may need assistance with using additional coping measures.

Be certain to incorporate both the woman and her support person in planning, so that the experience is a shared one. Planning may include review and education about the normal labor process. Although a couple may have learned this information during pregnancy, the reality of labor may seem much different from what they imagined. Planning also must be flexible, changing with the progress of labor, and individualized, allowing a woman to experience the significance of the event for herself.

Comfort promotion is vital. A plan that addresses the discomforts of labor includes planning for education, validation, and response to a woman's pain to help her maintain realistic perceptions about it. Be certain to include nonpharmacologic comfort measures such as changing a wet sheet or offering a moisturizing cream for dry lips.

### ● **Implementation**

Interventions in labor must always be carried out between contractions if possible, so that the woman is free to use a prepared childbirth technique to limit the discomfort of contractions. This calls for good coordination of care among health care providers and planning with the woman and her support person. The person a woman chooses to stay with her during childbirth can be a husband, the father of the child, a sister or parent, or a close friend. Which of these persons a woman chooses is somewhat culturally determined.

It is important for women to be able to understand what is happening to them during labor. If the woman is not proficient in English, make arrangements to locate an interpreter. If she is hearing challenged, it is the hospital's responsibility to provide an interpreter for her so that she can receive adequate explanations of her progress. Remember that whether a woman enjoys being touched or not during labor is in part culturally determined. Assess early in a woman's labor whether she might benefit from such caring measures as having her hand held or her back rubbed.

### ● **Outcome Evaluation**

During labor, evaluation must be ongoing to preserve the safety of the woman and her new child. After birth, evaluation helps to determine a woman's opinion of her experience with labor and birth. Ideally, the experience should be not only one that she was able to endure but one that allowed her self-esteem to grow and the family to grow through a shared experience. It is advantageous to talk to women in the early postpartum period about their labor experience. Doing so serves as a means of evaluating nursing care during labor. It also provides a woman the chance to "work through" this experience and incorporate it into her self-image. Examples of possible outcome criteria include the following:

- Client states that pain during labor was tolerable because of her advance preparation.
- Client verbalizes that her need for additional comfort measures was met.
- Client and family members state that the labor and birth experience was a positive growth experience for them, both individually and as a family.

coordinated, productive labor contractions is unknown. In some instances, labor begins before a fetus is mature (preterm birth). In others, labor is delayed until the fetus and the placenta have both passed beyond the optimal point for birth (postterm birth).

Although a number of theories have been proposed to explain why labor begins, it is believed that labor is influenced by a combination of factors originating from the mother and the fetus (Katz, 2003). These factors include the following:

- Uterine muscle stretching, which results in release of prostaglandins
- Pressure on the cervix, which stimulates the release of oxytocin from the posterior pituitary
- Oxytocin stimulation, which works together with prostaglandins to initiate contractions
- Change in the ratio of estrogen to progesterone (increasing estrogen in relation to progesterone stimulates uterine contractions)
- Placental age, which triggers contractions at a set point
- Rising fetal cortisol levels, which reduce progesterone formation and increase prostaglandin formation
- Fetal membrane production of prostaglandin, which stimulates contractions

## **SIGNS OF LABOR**

### **Preliminary Signs of Labor**

Before labor, a woman often experiences subtle signs that signal the onset of labor. All pregnant women should be taught these signs so that they can recognize when labor is beginning.

### **Lightening**

In primiparas, lightening, or descent of the fetal presenting part into the pelvis, occurs approximately 10 to 14 days before labor begins. This changes a woman's abdominal contour, because the uterus becomes lower and more anterior. Lightening gives a woman relief from the diaphragmatic pressure and shortness of breath that she has been experiencing and in this way "lightens" her load. Lightening probably occurs early in primiparas because of tight abdominal muscles. In multiparas, it is not as dramatic and usually occurs on the day of labor or even after labor has begun. As the fetus sinks lower in the pelvis, the mother may experience shooting leg pains from the increased pressure on the sciatic nerve, increased amounts of vaginal discharge, and urinary frequency from pressure on the bladder.

### **Increase in Level of Activity**

A woman may awaken on the morning of labor full of energy, in contrast to her feelings of chronic fatigue during the previous month. This increase in activity is related to an increase in epinephrine release that is initiated by a decrease in progesterone produced by the placenta. Additional epinephrine prepares a woman's body for the work of labor ahead.

## **THEORIES OF LABOR ONSET**

Labor normally begins when a fetus is sufficiently mature to cope with extrauterine life yet not too large to cause mechanical difficulty with birth. The trigger that converts the random, painless Braxton Hicks contractions into strong,



Braxton Hicks Contractions

In the last week or days before labor begins, a woman usually notices extremely strong Braxton Hicks contractions, which she may interpret as true labor contractions. Table 18.1 summarizes the ways in which these contractions can be differentiated from true labor.

Primiparas may have great difficulty in distinguishing between the two forms of contractions. A woman may be admitted to the labor unit of a hospital or birthing center because false contractions so closely simulate true labor. It is discouraging for a woman who is having what seem like contractions (and strong Braxton Hicks contractions cause real discomfort) to be told she is not in true labor and should return home. When this happens, the woman needs sympathetic support. She can be reassured that misinterpreting labor signals is common. Remind her that if false contractions have become strong enough to be mistaken for true labor, true labor must not be far away.

Ripening of the Cervix

**Ripening** of the cervix is an internal sign seen only on pelvic examination. Throughout pregnancy, the cervix feels softer than normal, similar to the consistency of an earlobe (Goodell's sign). At term, the cervix becomes still softer (described as "butter-soft"), and it tips forward. Ripening is an internal announcement that labor is very close at hand.

Signs of True Labor

Signs of true labor involve uterine and cervical changes. The more a woman knows about true labor signs, the better, because then she will be better able to recognize them. This is helpful both to prevent preterm birth and for the woman to feel secure knowing what is happening during labor.

TABLE 18.1

Differentiation Between True and False Labor Contractions

False Contractions	True Contractions
Begin and remain irregular.	Begin irregularly but become regular and predictable.
Felt first abdominally and remain confined to the abdomen and groin.	Felt first in lower back and sweep around to the abdomen in a wave.
Often disappear with ambulation and sleep.	Continue no matter what the woman's level of activity.
Do not increase in duration, frequency, or intensity.	Increase in duration, frequency, and intensity.
Do not achieve cervical dilatation.	Achieve cervical dilatation.

Uterine Contractions

The surest sign that labor has begun is productive uterine contractions. Because contractions are involuntary and come without warning, their intensity can be frightening in early labor. Helping a woman appreciate that she can predict her pattern and therefore can control the degree of discomfort she feels by using breathing exercises offers her a sense of control.

Show

As the cervix softens and ripens, the mucus plug that filled the cervical canal during pregnancy (operculum) is expelled. The exposed cervical capillaries seep blood as a result of pressure exerted by the fetus. The blood, mixed with mucus, takes on a pink tinge and is referred to as "show" or "bloody show." Women need to be aware of this event so that they do not think they are bleeding abnormally.

Rupture of the Membranes

Labor may begin with rupture of the membranes, experienced either as a sudden gush or as scanty, slow seeping of clear fluid from the vagina. Some women may worry if their labor begins with rupture of the membranes, because they have heard that labor will then be "dry" and that this will cause it to be difficult and long. Actually, amniotic fluid continues to be produced until delivery of the membranes after the birth of a fetus, so no labor is ever "dry." Early rupture of the membranes can be advantageous if it causes the fetal head to settle snugly into the pelvis; this can actually shorten labor.

Two risks associated with ruptured membranes are intrauterine infection and prolapse of the umbilical cord, which can cut off the oxygen supply to the fetus. In most instances, if labor has not spontaneously occurred by 24 hours after membrane rupture and the pregnancy is at term, labor is induced to help reduce these risks.

Checkpoint Question 1

Celeste Bailey didn't recognize for over an hour that she was in labor. A sign of true labor is:

- a. Sudden increased energy from epinephrine release.
- b. "Nagging" but constant pain in the lower back.
- c. Urinary urgency from increased bladder pressure.
- d. "Show" or release of the cervical mucus plug.

COMPONENTS OF LABOR

A successful labor depends on four integrated concepts: (1) the woman's pelvis (the *passage*) is of adequate size and contour; (2) the *passenger* (the fetus) is of appropriate size and in an advantageous position and presentation; (3) the *powers* of labor (uterine factors) are adequate; and (4) a woman's *psyche* is preserved, so that afterward labor can be viewed as a positive experience.

## Passage

The passage refers to the route a fetus must travel from the uterus through the cervix and vagina to the external perineum. Because the cervix and vagina are contained inside the pelvis, a fetus must also pass through the bony pelvic ring. (Pelvic anatomy is discussed in Chapter 4; see Figs. 4.12 and 4.13.) For a fetus to pass through the pelvis, the pelvis must be of adequate size. Two pelvic measurements are important to determine the adequacy of the pelvic size: the diagonal conjugate (the anterior-posterior diameter of the inlet) and the transverse diameter of the outlet (see Figs. 10.10 and 10.11 in Chapter 10). At the pelvic inlet, the anteroposterior diameter is the narrowest diameter; at the outlet, the transverse diameter is the narrowest (Fig. 18.1).

In most instances, if a disproportion between fetus and pelvis occurs, the pelvis is the structure at fault. If the fetus is causing the problem, it is often because the fetal head is presented to the birth canal at less than its narrowest diameter, not because the head is actually too large. Keep this in mind when discussing with parents why an infant cannot be born vaginally. In this situation, emphasize that it is the pelvis that is too small, not that the head is too big. For parents to learn that a child cannot be born vaginally because the mother's pelvis is too small can be upsetting. It can be much more upsetting, however, to think that their infant's head is too large, because it implies that something is seriously wrong with the baby (which usually is not the case). Avoiding this type of negative thought helps promote good parent-child bonding.

## Passenger

The passenger is the fetus. The body part of the fetus that has the widest diameter is the head, so this is the part least likely to be able to pass through the pelvic ring. Whether a fetal skull can pass or not depends on both its structure (bones, fontanelles, and suture lines) and its alignment with the pelvis.

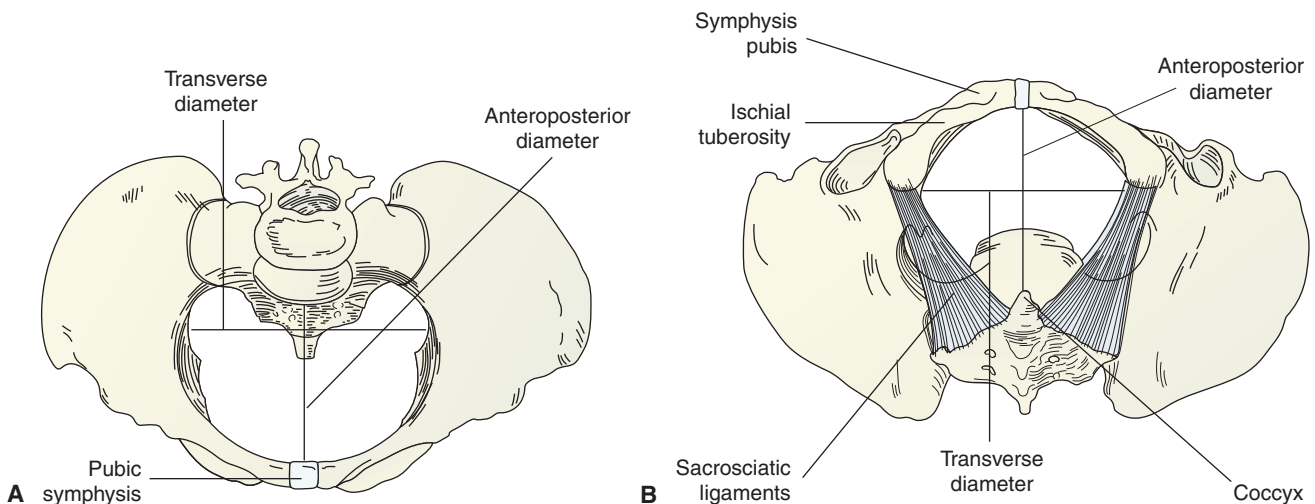
## Structure of the Fetal Skull

The cranium, the uppermost portion of the skull, comprises eight bones. The four superior bones—the frontal (actually two fused bones), the two parietal, and the occipital—are the bones that are important in childbirth. The other four bones of the skull (sphenoid, ethmoid, and two temporal bones) lie at the base of the cranium; they are of little significance in childbirth because they are never presenting parts. The chin, referred to by its Latin name *mentum*, can be a presenting part.

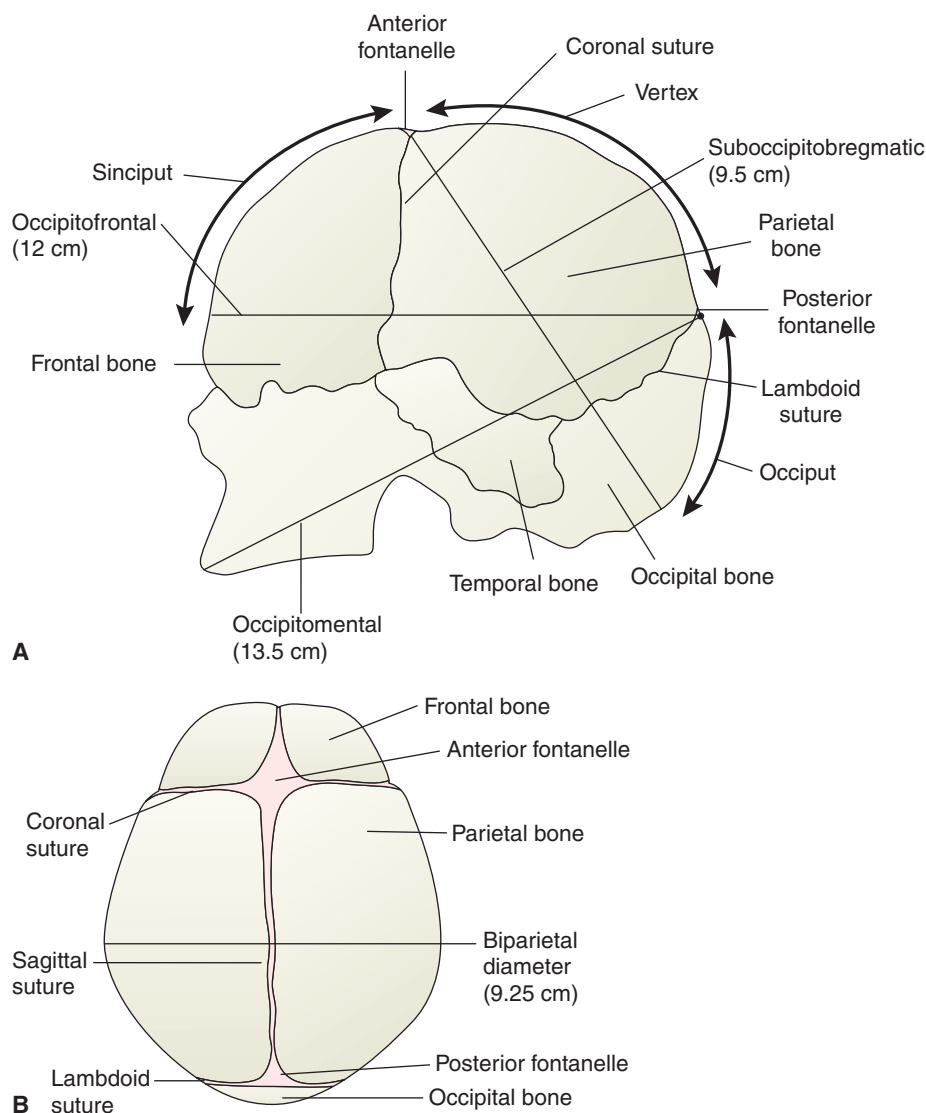
The bones of the skull meet at suture lines. The sagittal suture joins the two parietal bones of the skull. The coronal suture is the line of juncture of the frontal bones and the two parietal bones. The lambdoid suture is the line of juncture of the occipital bone and the two parietal bones. The suture lines are important in birth because, as membranous interspaces, they allow the cranial bones to move and overlap, molding or diminishing the size of the skull so that it can pass through the birth canal more readily.

Significant membrane-covered spaces called the fontanelles are found at the junction of the main suture lines. The anterior fontanelle (sometimes referred to as the bregma) lies at the junction of the coronal and sagittal sutures. Because the frontal bone consists of two fused bones, four bones (counting the two parietal bones) are actually involved at this junction, making the anterior fontanelle diamond-shaped. Its anteroposterior diameter measures approximately 3 to 4 cm; its transverse diameter, 2 to 3 cm.

The posterior fontanelle lies at the junction of the lambdoid and sagittal sutures. Because the two parietal bones and the occipital bone are involved at this junction, the posterior fontanelle is triangular. It is smaller than the anterior fontanelle, measuring approximately 2 cm across its widest part. Fontanelle spaces compress during birth to aid in molding of the fetal head. Their presence can be assessed manually through the cervix after it has dilated during labor. This helps to establish the position of the fetal head and whether it is in a favorable position for birth. The space between the two fontanelles is referred to as the vertex (Fig. 18.2). The area over the frontal bone



**FIGURE 18.1** Views of the pelvic inlet and outlet: (A) pelvic inlet; (B) pelvic outlet.



**FIGURE 18.2** The fetal skull: (A) lateral view; (B) vertex view.

is referred to as the sinciput. The area over the occipital bone is referred to as the occiput.

### Diameters of the Fetal Skull

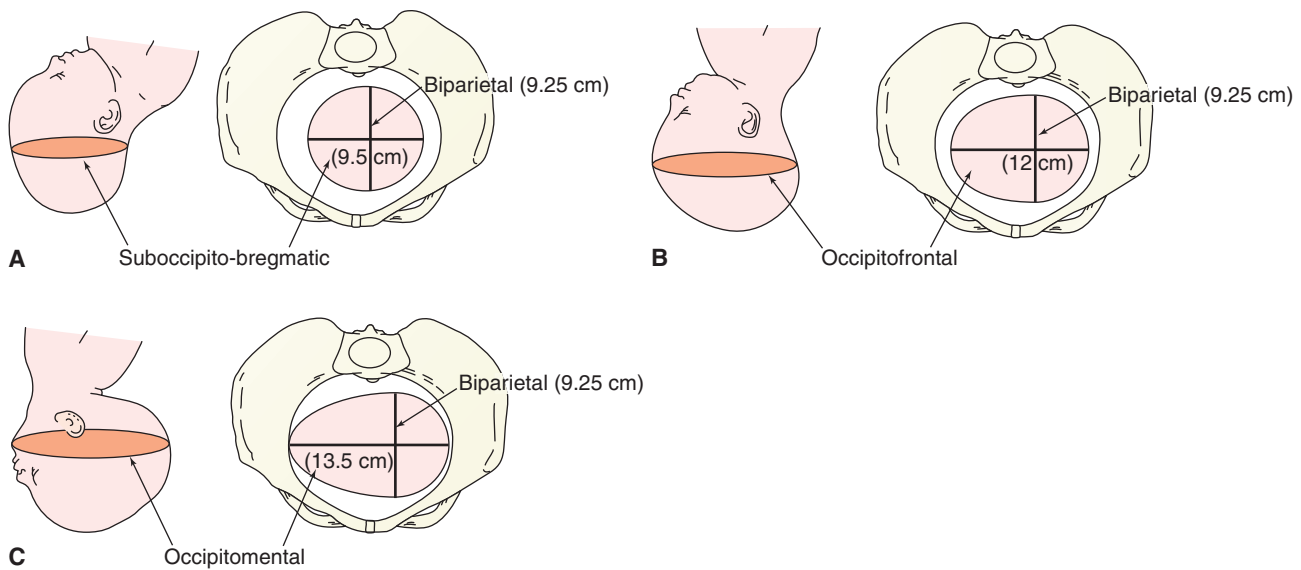
The shape of a fetal skull causes it to be wider in its anteroposterior diameter than in its transverse diameter. To fit through the birth canal best, a fetus must present the smaller diameter (the transverse diameter) to the smaller diameter of the maternal pelvis; otherwise, progress can be halted and birth may not be accomplished.

The diameter of the anteroposterior fetal skull depends on where the measurement is taken. The narrowest diameter (approximately 9.5 cm) is from the inferior aspect of the occiput to the center of the anterior fontanelle (the suboccipitobregmatic diameter). The occipitofrontal diameter, measured from the bridge of the nose to the occipital prominence, is approximately 12 cm. The occipitomental diameter, which is the widest anteroposterior diameter (approximately 13.5 cm), is measured from the chin to the posterior fontanelle.

Because the anteroposterior diameter of the pelvis, a space approximately 11 cm wide, is the narrowest pelvic inlet diameter, a fetus must present the biparietal diameter, the narrowest fetal head diameter (approximately 9.25 cm), to this inlet (see Fig. 18.2A). At the outlet, this narrowest fetal head diameter must be presented to the maternal transverse diameter, a space approximately 11 cm wide. If the anteroposterior diameter of the skull (a measurement wider than the biparietal diameter) is presented to the anteroposterior diameter of the inlet, **engagement**, or the settling of the fetal head into the pelvis, may not occur. If the anteroposterior diameter of the skull is presented to the transverse diameter of the outlet, arrest of progress may occur.

The anteroposterior diameter that will be presented to the birth canal is determined by the degree of flexion of the fetal head (Fig. 18.3). In full flexion, a fetal head flexes so sharply the chin rests on the thorax, and the smallest anteroposterior diameter, the suboccipitobregmatic, is presented to the birth canal. If the head is held in moderate flexion, the occipitofrontal diameter will be presented. In





**FIGURE 18.3** (A) Complete flexion allows the smallest diameter of the head to enter the pelvis. (B) Moderate flexion causes a larger diameter to enter the pelvis. (C) Poor flexion forces the largest diameter against the pelvic brim, but the head is too large to enter the pelvis.

poor flexion (the head hyperextended), the largest diameter (the occipitomenal) will present.

These wider fetal head diameters must fit through the transverse diameter of the pelvic inlet, a space of approximately 12.4 to 13.5 cm; and at the outlet, through the anteroposterior diameter of the pelvis, a space of 9.5 to 11.5 cm. Good head flexion is important because it follows that a fetal head presenting a diameter of 9.5 cm will fit through a pelvis much more readily than if the diameter is 12.0 or 13.5 cm.

## Molding

**Molding** is the change in shape of the fetal skull produced by the force of uterine contractions pressing the vertex of the head against the not-yet-dilated cervix. Because the bones of the fetal skull are not yet completely ossified and therefore do not form a rigid structure, pressure causes them to overlap and cause the head to become narrower and longer, a shape that facilitates passage through the rigid pelvis. Molding is commonly seen in infants just after birth. The overlapping of the sagittal suture line and, generally, the coronal suture line can be easily palpated in the newborn skull. Parents can be reassured that molding only lasts a day or two and is not a permanent condition. There is little molding when the brow is the presenting part (described later), because frontal bones are fused. No skull molding occurs when a fetus is breech, because the buttocks, not the head, are presented first.

## Fetal Presentation and Position

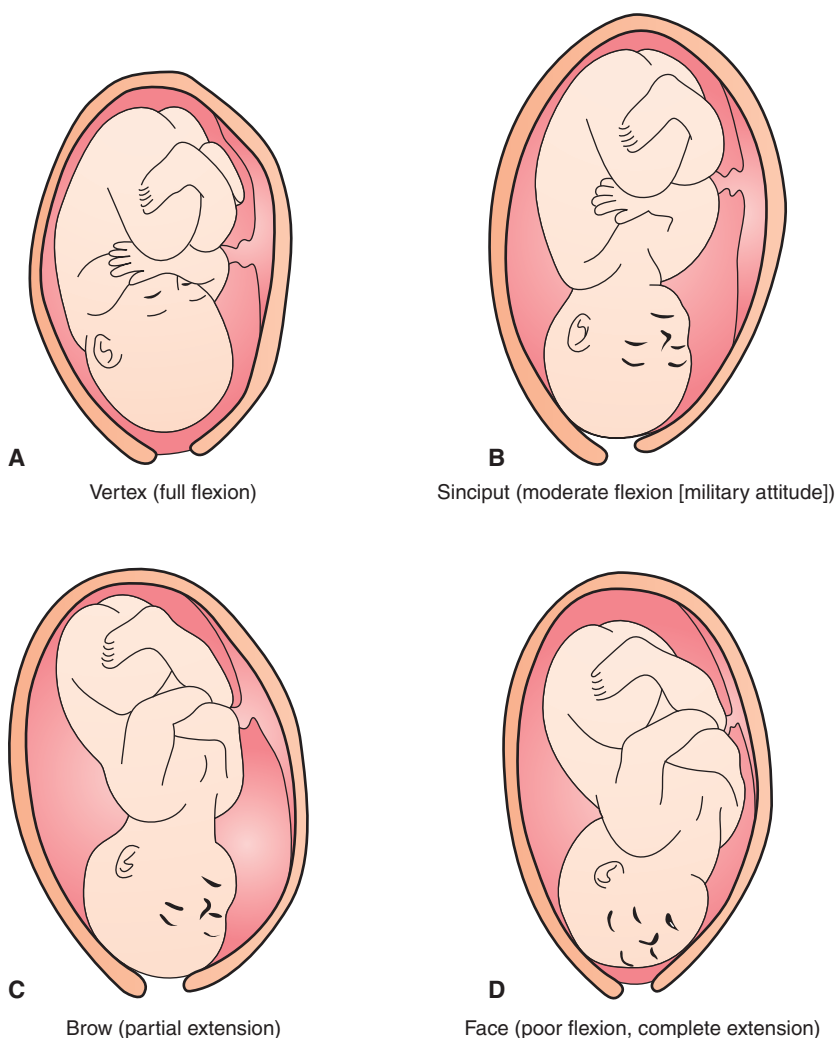
Two other factors play a part in whether a fetus is lined up in the best position to be born: fetal presentation and position.

**Attitude.** **Attitude** describes the degree of flexion a fetus assumes during labor or the relation of the fetal parts to each other (Fig. 18.4). A fetus in *good* attitude is in complete flexion: the spinal column is bowed forward, the head is flexed forward so much that the chin touches the sternum, the arms are flexed and folded on the chest, the thighs are flexed onto the abdomen, and the calves are pressed against the posterior aspect of the thighs (see Fig. 18.4A). This normal “fetal position” is advantageous for birth because it helps a fetus present the smallest anteroposterior diameter of the skull to the pelvis and also because it puts the whole body into an ovoid shape, occupying the smallest space possible.

A fetus is in *moderate* flexion if the chin is not touching the chest but is in an alert or “military position” (see Fig. 18.4B). This position causes the next-widest anteroposterior diameter, the occipital frontal diameter, to present to the birth canal. A fair number of fetuses assume a military position during the early part of labor. This does not usually interfere with labor, because during later mechanisms of labor (descent and flexion) the fetus is forced to flex the head fully.

A fetus in partial extension presents the “brow” of the head to the birth canal (see Fig. 18.4C). If a fetus is in poor flexion, the back is arched, the neck is extended, and a fetus is in complete extension, presenting the occipitomenal diameter of the head to the birth canal (face presentation; see Fig. 18.4D). This unusual position presents too wide a skull diameter to the birth canal for normal birth. Such a position may occur if there is less than the normal amount of amniotic fluid present (oligohydramnios), which does not allow a fetus adequate movement. It also may reflect a neurologic abnormality causing spasticity.

**Engagement.** Engagement refers to the settling of the presenting part of a fetus far enough into the pelvis to be at the level of the ischial spines, a midpoint of the pelvis.

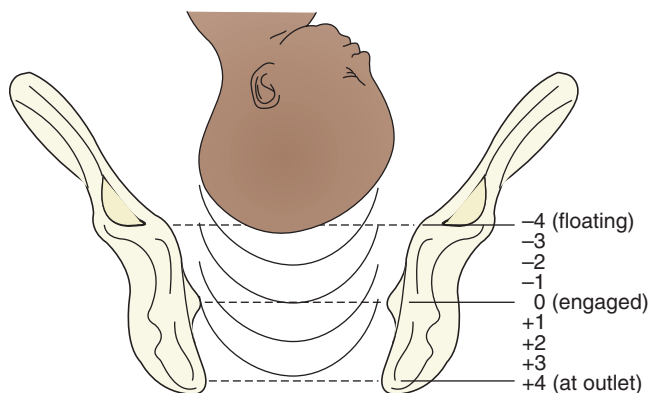


**FIGURE 18.4** Fetal attitude. (A) Fetus in full flexion presents smallest (suboccipito-bregmatic) anteroposterior diameter of skull to inlet in this good attitude (vertex presentation). (B) Fetus is not as well flexed (military attitude) as in A and presents occipitofrontal diameter to inlet (sinciput presentation). (C) Fetus in partial extension (brow presentation). (D) Fetus in complete extension presents wide (occipitomental) diameter (face presentation).

Descent to this point means that the widest part of the fetus (the biparietal diameter in a cephalic presentation; the intertrochanteric diameter in a breech presentation) has passed through the pelvis or the pelvic inlet is proven adequate for birth. In a primipara, nonengagement of the head at the beginning of labor indicates a possible complication, such as an abnormal presentation or position, abnormality of the fetal head, or cephalopelvic disproportion. In multiparas, engagement may or may not be present at the beginning of labor. The degree of engagement is assessed by vaginal and cervical examination. A presenting part that is not engaged is said to be “floating.” One that is descending but has not yet reached the ischial spines is said to be “dipping.”

**Station.** Station refers to the relationship of the presenting part of a fetus to the level of the ischial spines (Fig. 18.5). When the presenting part is at the level of the ischial spines, it is at a 0 station (synonymous with engagement). If the presenting part is above the spines, the distance is measured and described as minus stations, which range from  $-1$  to  $-4$  cm. If the presenting part is below the ischial spines, the distance is stated as plus stations ( $+1$  to  $+4$  cm). At a  $+3$  or  $+4$  station, the presenting part is at the perineum and can be seen if the vulva is separated (i.e., it is crowning).

**Fetal Lie.** Lie is the relationship between the long (cephalocaudal) axis of the fetal body and the long (cephalocaudal) axis of a woman's body; in other words, whether the fetus is lying in a horizontal (transverse) or a vertical (longitudinal) position. Approximately 99% of fetuses assume



**FIGURE 18.5** Station (anteroposterior view). Station, or degree of engagement, of the fetal head is designated by centimeters above or below the ischial spines. At  $-4$  station, head is “floating.” At 0 station, head is “engaged.” At  $+4$  station, head is “at outlet.”

a longitudinal lie (with their long axis parallel to the long axis of the woman). Longitudinal lies are further classified as cephalic, which means the head will be the first part to contact the cervix, or breech, with the breech, or buttocks, as the first portion to contact the cervix.

## Types of Fetal Presentation

Fetal presentation denotes the body part that will first contact the cervix or be born first. This is determined by a combination of fetal lie and the degree of fetal flexion (attitude).

**Cephalic Presentation.** A **cephalic presentation** is the most frequent type of presentation, occurring as often as 95% of the time. With this type of presentation, the fetal head is the body part that will first contact the cervix. The four types of cephalic presentation (vertex, brow, face, and mentum) are described in Table 18.2. The vertex is the ideal presenting part, because the skull bones are capable of molding so effectively to accommodate the cervix. It also may actually aid in cervical dilatation and prevents complications such as a prolapsed cord (i.e., a portion of the cord passing between the presenting part and the cervix and entering the vagina before the fetus does) (Cruikshank, 2003). During labor, the area of the fetal skull that contacts the cervix often becomes edematous from the continued pressure against it. This edema is called a caput succedaneum. In the newborn, the point of presentation can be analyzed from the location of the caput.

**Breech Presentation.** A **breech presentation** means that either the buttocks or the feet are the first body parts that will contact the cervix. Breech presentations occur in approximately 3% of births and are affected by fetal attitude. A good attitude brings the fetal knees up against the umbilicus; a poor attitude means that the knees are extended. Breech presentations can be difficult births, with the presenting point influencing the degree of difficulty. Three types of breech presentation (complete, frank, and footling) are possible (Table 18.3).

**Shoulder Presentation.** In a transverse lie, a fetus lies horizontally in the pelvis so that the longest fetal axis is perpendicular to that of the mother. The presenting part is usually one of the shoulders (acromion process), an iliac crest, a hand, or an elbow (Fig. 18.6).

Fewer than 1% of fetuses lie transversely. This presentation may be caused by relaxed abdominal walls from grand multiparity, which allow the unsupported uterus to fall forward. Another cause is pelvic contraction, in which the horizontal space is greater than the vertical space. Placenta previa (in which the placenta is located low in the uterus, obscuring some of the vertical space) may also limit a fetus' ability to turn, resulting in a transverse lie. With a transverse lie, the usual contour of the abdomen at term is distorted or is fuller side to side rather than top to bottom.

If an infant is preterm and smaller than usual, an attempt to turn the fetus to a horizontal lie may be made. Most infants in a transverse lie must be born by cesarean birth, however, because they cannot be turned and cannot be born normally from this "wedged" position. Discovering a shoulder presentation is an important assessment, because it almost always identifies a birth position that puts both mother and child in jeopardy unless skilled health care personnel are available to complete a cesarean birth.

## Types of Fetal Position

**Position** is the relationship of the presenting part to a specific quadrant of a woman's pelvis. For convenience, the maternal pelvis is divided into four quadrants according to the mother's right and left: (1) right anterior, (2) left anterior, (3) right posterior, and (4) left posterior.

Four parts of a fetus have been chosen as landmarks to describe the relationship of the presenting part to one of the pelvic quadrants. In a vertex presentation, the occiput is the chosen point; in a face presentation, it is the chin (mentum); in a breech presentation, it is the sacrum; in a shoulder presentation, it is the scapula or the acromion process.

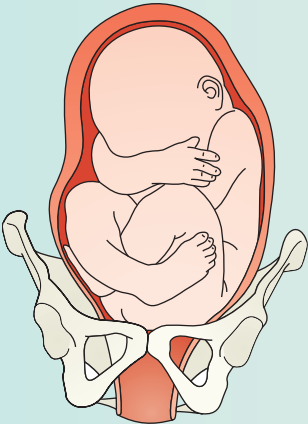
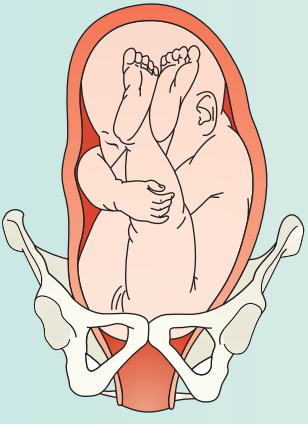
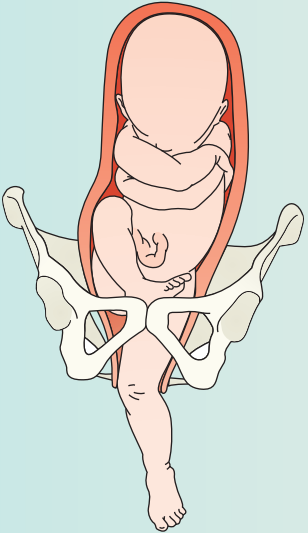
**TABLE 18.2**

### Types of Cephalic Presentation

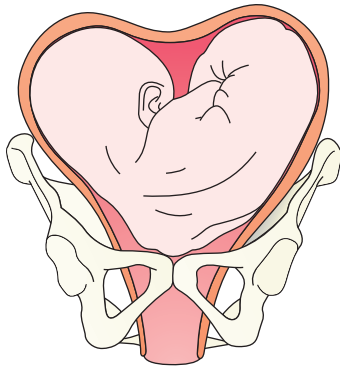
Type	Lie	Attitude	Description
Vertex	Longitudinal	Good (full flexion)	The head is sharply flexed, making the parietal bones or the space between the fontanelles (the vertex) the presenting part. This is the most common presentation and allows the suboccipitobregmatic diameter to present to the cervix.
Brow	Longitudinal	Moderate (military)	Because the head is only moderately flexed, the brow or sinciput becomes the presenting part.
Face	Longitudinal	Poor	The fetus has extended the head to make the face the presenting part. From this position, extreme edema and distortion of the face may occur. The presenting diameter (the occipitomenal) is so wide that birth may be impossible.
Mentum	Longitudinal	Very poor	The fetus has completely hyperextended the head to present the chin. The widest diameter (occipitomenal) is presenting. As a rule, the fetus cannot enter the pelvis in this presentation.

TABLE 18.3

Types of Breech Presentation

Type	Lie	Attitude	Description
Complete	Longitudinal	Good (full flexion)	The fetus has thighs tightly flexed on the abdomen; both the buttocks and the tightly flexed feet present to the cervix.
			
Frank	Longitudinal	Moderate	Attitude is moderate because the hips are flexed but the knees are extended to rest on the chest. The buttocks alone present to the cervix.
			
Footling	Longitudinal	Poor	Neither the thighs nor lower legs are flexed. If one foot presents, it is a single-footling breech; if both present, it is a double-footling breech.
			





**FIGURE 18.6** Transverse or shoulder presentation.

Position is indicated by an abbreviation of three letters. The middle letter denotes the fetal landmark (O for occiput, M for mentum or chin, Sa for sacrum, and A for acromion process). The first letter defines whether the landmark is pointing to the mother's right (R) or left (L). The last letter defines whether the landmark points anteriorly (A), posteriorly (P), or transversely (T).

If the occiput of a fetus points to the left anterior quadrant in a vertex position, for example, this is a left occipitoanterior (LOA) position. If the occiput points to the right posterior quadrant, the position is right occipitoposterior (ROP). LOA is the most common fetal position, and right occipitoanterior (ROA) the second most frequent. Box 18.2 summarizes the possible positions. Six common positions in cephalic presentations are depicted in Figure 18.7.

Position is important, because it influences the process and efficiency of labor. Typically, a fetus is born fastest from an ROA or LOA position. Labor is considerably extended if the position is posterior (ROP or LOP). Posterior positions may also be more painful for the mother, because the rotation of the fetal head puts pressure on the sacral nerves, causing sharp back pain.



### Checkpoint Question 2

Celeste asks you which fetal position and presentation are ideal. Your best answer would be:

- Right occipitoanterior with full flexion.
- Left transverse anterior in moderate flexion.
- Right occipitoposterior with no flexion.
- Left sacroanterior with full flexion.

## Mechanisms (Cardinal Movements) of Labor

Passage of a fetus through the birth canal involves a number of different position changes to keep the smallest diameter of the fetal head (in cephalic presentations) always presenting to the smallest diameter of the birth canal. These position changes are termed the **cardinal movements of labor**: descent, flexion, internal rotation, extension, external rotation, and expulsion (Fig. 18.8).

### BOX 18.2

#### Possible Fetal Positions

##### Vertex Presentation (occiput)

LOA, left occipitoanterior  
LOP, left occipitoposterior  
LOT, left occipitotransverse  
ROA, right occipitoanterior  
ROP, right occipitoposterior  
ROT, right occipitotransverse

##### Breech Presentation (sacrum)

LSaA, left sacroanterior  
LSaP, left sacroposterior  
LSaT, left sacrotransverse  
RSaA, right sacroanterior  
RSaP, right sacroposterior  
RSaT, right sacrotransverse

##### Face Presentation (mentum)

LMA, left mentoanterior  
LMP, left mentoposterior  
LMT, left mentotransverse  
RMA, right mentoanterior  
RMP, right mentoposterior  
RMT, right mentotransverse

##### Shoulder Presentation (acromion process)

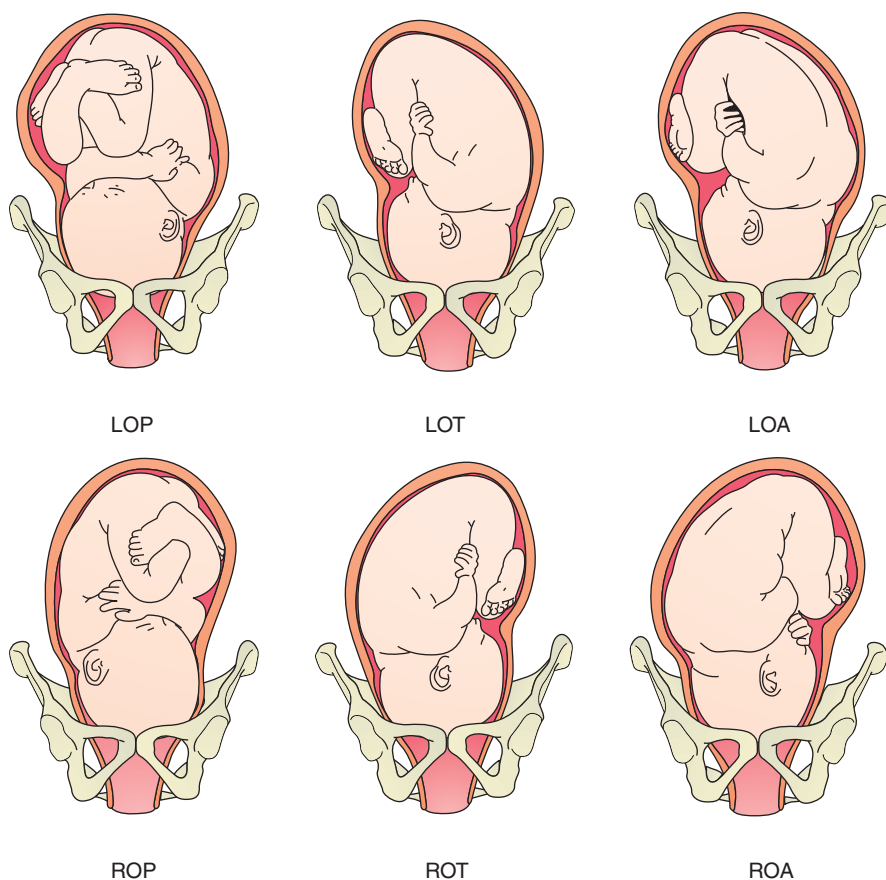
LAA, left scapuloanterior  
LAP, left scapuloposterior  
RAA, right scapuloanterior  
RAP, right scapuloposterior

**Descent.** Descent is the downward movement of the biparietal diameter of the fetal head to within the pelvic inlet. Full descent occurs when the fetal head extrudes beyond the dilated cervix and touches the posterior vaginal floor. Descent occurs because of pressure on the fetus by the uterine fundus. The pressure of the fetal head on the sacral nerves at the pelvic floor causes the mother to experience a pushing sensation. Full descent may be aided by abdominal muscle contraction as the woman pushes.

**Flexion.** As descent occurs and the fetal head reaches the pelvic floor, the head bends forward onto the chest, making the smallest anteroposterior diameter (the suboccipitobregmatic diameter) the one presented to the birth canal. Flexion is also aided by abdominal muscle contraction during pushing.

**Internal Rotation.** During descent, the head enters the pelvis with the fetal anteroposterior head diameter (suboccipitobregmatic, occipitontal, or occipitofrontal, depending on the amount of flexion) in a diagonal or transverse position. The head flexes as it touches the pelvic floor, and the occiput rotates until it is superior, or just below the symphysis pubis, bringing the head into the best relationship to the outlet of the pelvis (the anteroposterior diameter is now in the anteroposterior plane of the pelvis). This movement brings the shoulders, coming next, into the optimal position to enter the inlet, putting





**FIGURE 18.7** Fetal position. All are vertex presentations. A = anterior; L = left; O = occiput; P = posterior; R = right; T = transverse.

the widest diameter of the shoulders (a transverse one) in line with the wide transverse diameter of the inlet.

**Extension.** As the occiput is born, the back of the neck stops beneath the pubic arch and acts as a pivot for the rest of the head. The head extends, and the foremost parts of the head, the face and chin, are born.

**External Rotation.** In external rotation, almost immediately after the head of the infant is born, the head rotates (from the anteroposterior position it assumed to enter the outlet) back to the diagonal or transverse position of the early part of labor. This brings the aftercoming shoulders into an anteroposterior position, which is best for entering the outlet. The anterior shoulder is born first, assisted perhaps by downward flexion of the infant's head.

**Expulsion.** Once the shoulders are born, the rest of the baby is born easily and smoothly because of its smaller size. This movement, called expulsion, is the end of the pelvic division of labor.

For a view of the complete birth sequence, see Figure 18.9.

### Importance of Determining Fetal Presentation and Position

It is important to document presentation and position, because the presentation of a body part other than the vertex could put a fetus at risk: it implies a proportional difference between the fetus and the pelvis (perhaps the pelvis is too narrow to allow the fetus to pass through), making

a cesarean birth necessary. The membranes also are more apt to rupture early, increasing the possibility of infection. The risk for fetal anoxia and meconium staining, complications that lead to respiratory distress at birth, are also increased.

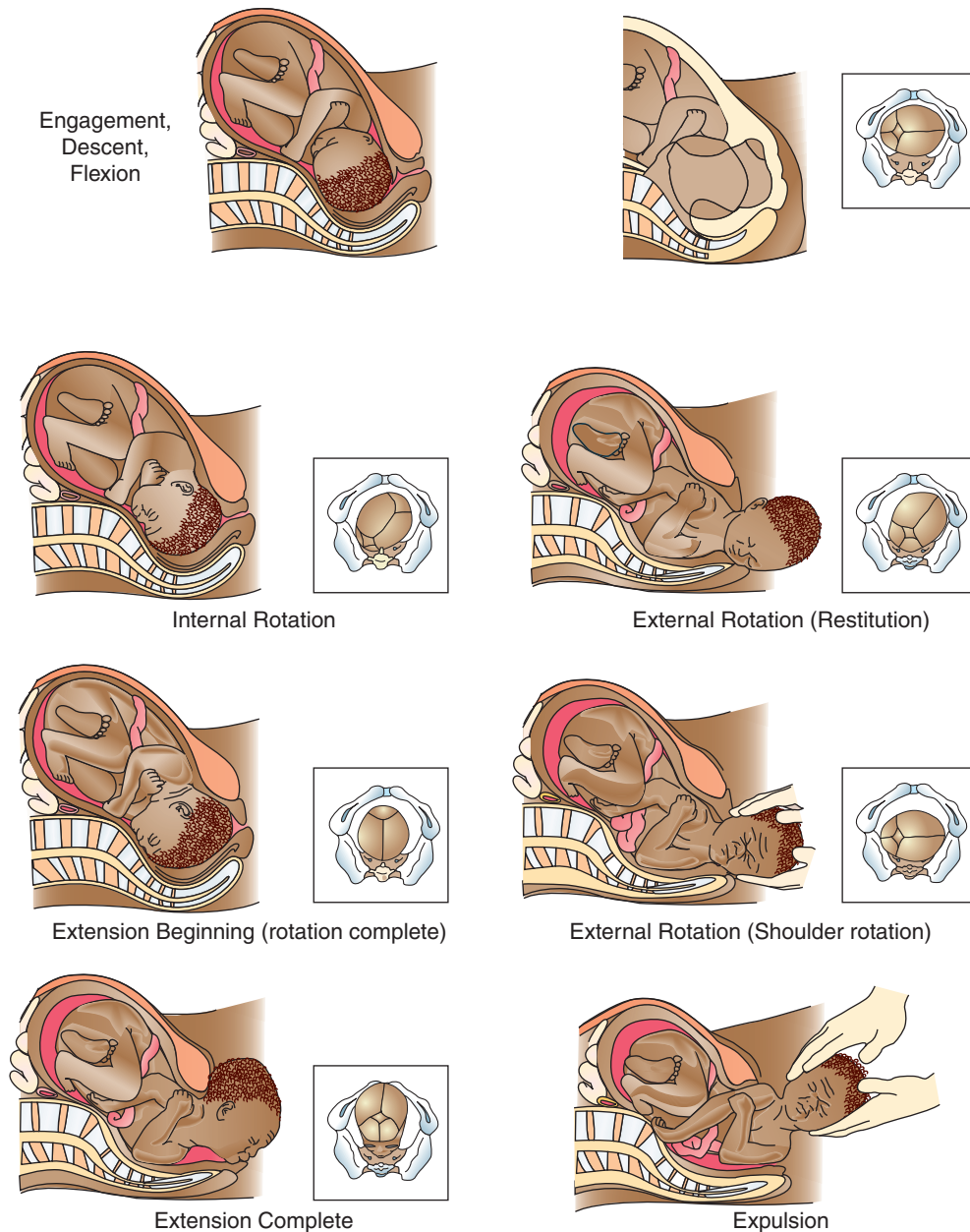
If a body part other than the vertex presents to the cervix, labor is invariably longer due to ineffective descent of the fetus, ineffective dilatation of the cervix, or irregular and weak uterine contractions.

The less effective labor is, the longer it is, tiring the mother and reducing the excitement of the experience. If an operative birth is necessary and postoperative complications occur, the mother may require a longer hospital stay and have more pain and disability after the birth. If the fetus is born vaginally after a complicated labor, there is an increased risk for perineal tears or cervical lacerations, which may also increase a woman's disability and possibly interfere with her future childbearing. If labor is threatening and unsatisfactory, it can also interfere with maternal-child bonding.

Four methods are used to determine fetal position, presentation, and lie: (1) combined abdominal inspection and palpation, called Leopold's maneuvers; (2) vaginal examination; (3) auscultation of fetal heart tones; and (4) sonography.

### Powers of Labor

The powers of labor, supplied by the fundus of the uterus, are implemented by uterine contractions, a process that



**FIGURE 18.8** Mechanism of normal labor and cardinal positions of the fetus from a left occipitoanterior position.

causes cervical dilatation and then expulsion of the fetus from the uterus. After full dilatation of the cervix, the primary power is supplemented by use of the abdominal muscles. It is important for women to understand they should not bear down with their abdominal muscles until the cervix is fully dilated. Doing so impedes the primary force and could cause fetal and cervical damage.

### Uterine Contractions

The mark of effective uterine contractions is rhythmicity and progressive lengthening and intensity.

**Origins.** Like cardiac contractions, labor contractions begin at a “pacemaker” point located in the myometrium

near one of the uterotubal junctions. Each contraction begins at that point and then sweeps down over the uterus as a wave. After a short rest period, another contraction is initiated and the downward sweep begins again.

In early labor, the uterotubal pacemaker may not be working in a synchronous manner. This makes contractions sometimes strong, sometimes weak, and irregular. This mild incoordination of early labor improves after a few hours as the pacemaker becomes more attuned to calcium concentrations in the myometrium and begins to function smoothly.

In some women, contractions appear to originate in the lower uterine segment rather than in the fundus. These are reverse, ineffective contractions, and they may actually cause tightening rather than dilatation of the cervix.

**6:00 AM:** Early in labor, a mother-to-be is supported by her husband and her sister.



**9:00 AM:** The nurse checks the fetal monitor and documents fetal and maternal status.



**10:00 AM:** The doctor makes a final check of cervical dilatation and says it's time to push.



**11:15 AM:** She pushes from an alternative position, using a support bar.



**10:30 AM:** The mother pushes in the lithotomy position, with her coach.



**FIGURE 18.9** A day in the life of a new family.





FIGURE 18.9 (continued)

That contractions are being initiated in a reverse pattern is difficult to tell from palpation. It can be suspected if the woman tells you she feels pain in her lower abdomen before the contraction is readily palpated at the fundus. It is truly revealed only when cervical dilatation does not occur.

Some women seem to have additional pacemaker sites in other portions of the uterus. If so, contractions can be uncoordinated. Uncoordinated contractions may slow labor and can lead to failure to progress and fetal distress if they do not allow for adequate placental filling. All of these possibilities make evaluating the rate, intensity, and pattern of uterine contractions an important nursing responsibility.

**Phases.** A contraction consists of three phases: the increment, when the intensity of the contraction increases; the acme, when the contraction is at its strongest; and the decrement, when the intensity decreases (Fig. 18.10). Between contractions the uterus relaxes. As labor progresses, the relaxation intervals decrease from 10 minutes early in labor to only 2 to 3 minutes. The duration of contractions also changes, increasing from 20 to 30 seconds to a range of 60 to 90 seconds.

**Contour Changes.** As labor contractions progress and become regular and strong, the uterus gradually differentiates itself into two distinct functioning areas. The upper portion becomes thicker and active, preparing it to be able to exert the strength necessary to expel the fetus when the expulsion phase of labor is reached. The lower segment becomes thin-walled, supple, and passive, so that the fetus can be pushed out of the uterus easily. As these events occur, the boundary between the two portions becomes marked by a ridge on the inner uterine surface, the **physiologic retraction ring**.

The contour of the overall uterus also changes from a round, ovoid structure to an elongated one whose vertical diameter is markedly greater than its horizontal diameter. This lengthening serves to straighten the body of the fetus, placing it in better alignment with the cervix and

pelvis. As the uterus contracts, the round ligaments move, keeping the fundus forward, again to assist in placing the fetus in good alignment with the cervix. The elongation of the uterus exerts pressure against the diaphragm and causes the often-expressed sensation that a uterus is “taking control” of a woman’s body.

In a difficult labor, particularly if the fetus is larger than the birth canal, the round ligaments of the uterus become tense and may be palpable on the abdomen. The normal physiologic retraction ring may become prominent and observable as an abdominal indentation. Termed a **pathologic retraction ring** or Bandl’s ring, it is a danger sign that signifies impending rupture of the lower uterine segment if the obstruction to labor is not relieved (Malee, 2003).

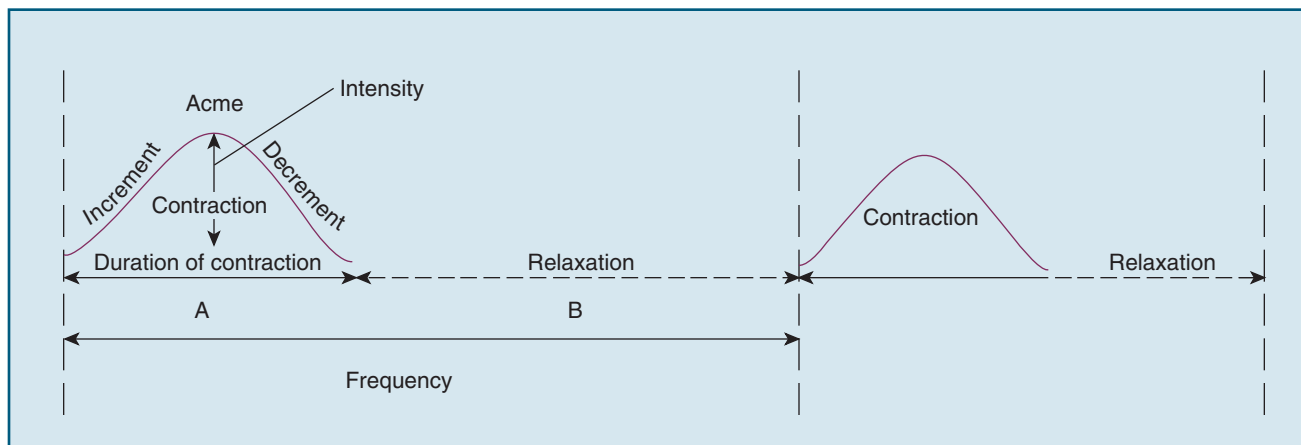
## Cervical Changes

Even more marked than the changes in the body of the uterus are two changes that occur in the cervix: effacement and dilatation.

**Effacement.** Effacement is shortening and thinning of the cervical canal. Normally, the canal is approximately 1 to 2 cm long. With effacement, the canal virtually disappears (Fig. 18.11). This occurs because of longitudinal traction from the contracting uterine fundus.

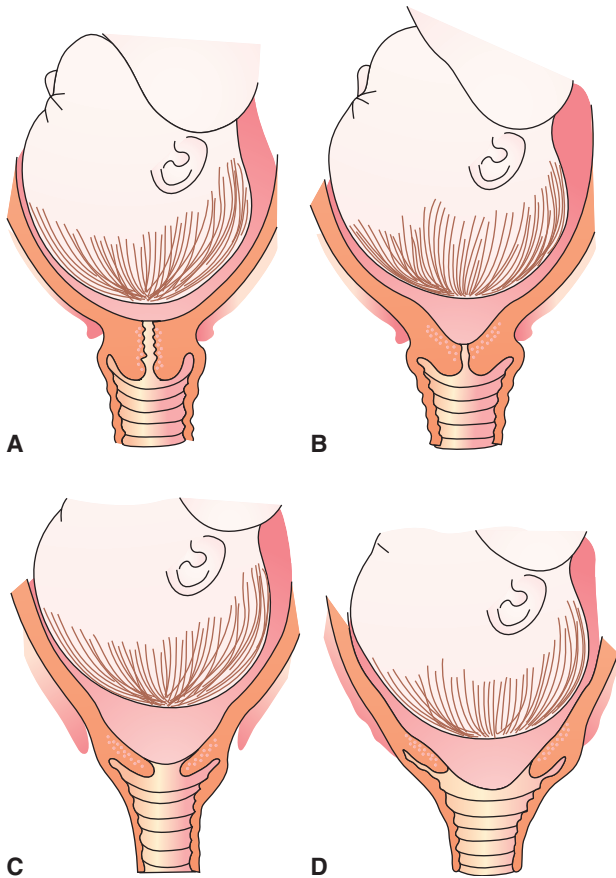
In primiparas, effacement is accomplished before dilatation begins. Be sure to inform the woman of this fact. Otherwise, she may become discouraged if, for example, at noon after a cervical examination she is told she is 2 cm dilated and then at 4 PM is told she is still 2 cm dilated. This type of report makes it seem to her that absolutely nothing has happened in 4 hours. However, effacement will have been occurring, and when it is complete, dilatation will then progress rapidly.

In multiparas, dilatation may proceed before effacement is complete. Effacement must occur at the end of dilatation, however, before the fetus can be safely pushed



**FIGURE 18.10** The interval and duration of uterine contractions. The frequency of contractions is the time from the beginning of one contraction to the beginning of the next contraction. It consists of two parts: (A) the duration of the contraction and (B) the period of relaxation. The broken line indicates an indeterminate period because the relaxation time (B) is usually of longer duration than the actual contraction (A).





**FIGURE 18.11** Effacement and dilation of cervix. (A) Beginning labor. (B) Effacement is beginning; dilation is not apparent yet. (C) Effacement is almost complete. (D) After complete effacement, dilation proceeds rapidly.

through the cervical canal; otherwise, cervical tearing could result.

**Dilatation.** **Dilatation** refers to the enlargement or widening of the cervical canal from an opening a few millimeters wide to one large enough (approximately 10 cm) to permit passage of a fetus (see Fig. 18.11).

Dilatation occurs for two reasons. First, uterine contractions gradually increase the diameter of the cervical canal lumen by pulling the cervix up over the presenting part of the fetus. Second, the fluid-filled membranes press against the cervix. If the membranes are intact, they push ahead of the fetus and serve as an opening wedge. If they are ruptured, the presenting part serves this same function.

As dilatation begins, there is an increase in the amount of vaginal secretions (show), because the last of the operculum or mucus plug in the cervix is dislodged and minute capillaries in the cervix rupture.

## Psyche

The fourth “P,” or “psyche,” refers to the psychological state or feelings that a woman brings into labor. For many women, this is a feeling of apprehension or fright. For almost everyone, it includes a sense of excitement or awe.

Women who manage best in labor typically are those who have a strong sense of self-esteem and a meaningful support person with them. These factors allow women to feel in control of sensations and circumstances that they have not experienced previously and that may not be at all what they pictured as happening. Women without adequate support can have an experience so frightening and stressful they can develop a posttraumatic stress syndrome (Beck, 2004).

Encouraging women to ask questions at prenatal visits and to attend preparation for childbirth classes helps prepare them for labor. Encouraging them to share their experience after labor serves as “debriefing time” and helps them integrate the experience into their total life.

## STAGES OF LABOR

In nursing literature, labor is traditionally divided into three stages: a first stage of dilatation, which begins with the initiation of true labor contractions and ends when the cervix is fully dilated; a second stage, extending from the time of full dilatation until the infant is born; and a third or placental stage, lasting from the time the infant is born until after the delivery of the placenta. The first 1 to 4 hours after birth of the placenta is sometimes termed the “fourth stage” to emphasize the importance of the close observation needed at this time. These designations are helpful in planning nursing interventions to ensure the safety of both the mother and the fetus. Box 18.3 highlights appropriate outcomes and interventions related to labor using the terminology identified by the Nursing Outcomes Classification (NOC) and Nursing Interventions Classification (NIC).

Friedman (1978), a physician who studied the process of labor extensively, used data to identify two phases of labor: latent and active phases. He further divided the active phase into three parts. His data, when plotted in graph form, are useful in monitoring an individual woman’s labor progress (Fig. 18.12). Table 18.4 lists clinical features of the divisions of labor, as described by Friedman. Friedman’s terms—preparatory division, dilatational division, and pelvic division—correspond to the first and second stages of labor. Because his “norms” refer to averages, an individual woman’s labor can vary greatly from the ideal projected course of labor and still be normal for that woman. With the use of less analgesia in labor today, Friedman’s norms may need to be reevaluated (Cesario, 2005).

Typically, a labor progress graph is labeled as follows:

- Left side numbered from 1 to 10 (representing the centimeters of cervical dilatation)
- Bottom line numbered to represent the number of hours of labor
- Right side numbered from  $-4$  to  $+4$  (representing the station of the presenting part)

After each cervical examination, cervical dilatation and **fetal descent** are plotted on the graph. The pattern of cervical dilatation usually plots as an S-shaped curve. The fetal descent pattern forms a downward curve. Both lines cross at the point of maximum cervical dilatation. A typical labor graph is shown in Figure 18.13.

## BOX 18.3

## Nursing Outcomes Classification (NOC) and Nursing Interventions Classification (NIC)

## Intrapartal Period

**NOC: Maternal Status, Intrapartum**

Maternal status, intrapartum, is defined as the conditions and behaviors indicating maternal well-being from the onset of labor to delivery (Johnson, Maas, & Moorhead, 2000). Some specific indicators that suggest that this outcome has been achieved include demonstration of the following:

- Coping mechanisms
- Techniques to facilitate labor
- Uterine contraction frequency, duration, and intensity within expected range
- Physiologic parameters such as vital signs, neurologic reflexes, urine output, and blood glucose levels within expected range
- Progressive cervical dilation

**NOC: Fetal Status, Intrapartum**

Fetal status, intrapartum, is defined as the conditions and behaviors indicating fetal well-being from the onset of labor to delivery (Johnson, Maas, & Moorhead, 2000). Some specific indicators that suggest that this outcome has been achieved include demonstration of the following:

- Fetal heart rate between 120 and 160 beats per minute
- Fetal position, presenting part, heart rate, and scalp blood pH within expected range
- Amniotic fluid color and amount within expected range
- Deceleration patterns and variability findings without deviation from expected

**NIC: Intrapartal Care**

Intrapartal care is defined as the monitoring and management of stages one and two of the birth process (McCloskey & Bulechek, 2000). Some important activities involved when implementing this intervention include:

- Admitting client to birthing area after determining that client is in labor
- Determining if client's membranes have ruptured
- Encouraging family participation as appropriate with the labor process
- Performing Leopold maneuver and vaginal exams as appropriate
- Monitoring maternal vital signs and fetal heart rate and patterns, reporting any deviations or abnormalities
- Applying electronic fetal monitor as appropriate (see next NIC)
- Assessing pain level, instituting positioning, breathing, relaxation, and other methods for pain control; administering analgesics as ordered

- Providing ice chips, wet washcloth, or hard candy
- Encouraging voiding at least every 2 hours
- Assisting with anesthetic administration
- Assisting with amniotomy with assessment of fetal heart rate, fetal positioning, and fetal cord after amniotomy
- Cleansing perineum and assisting with pad changes regularly
- Monitoring progress including vaginal discharge, cervical dilation and effacement, position, and fetal descent
- Performing vaginal examinations as necessary
- Encouraging spontaneous bearing-down efforts for second stage
- Evaluating pushing efforts and length of time in second stage
- Assisting coach and supporting client and partner
- Preparing supplies and equipment for delivery
- Notifying primary health care provider at appropriate time to scrub for attending delivery

**NIC: Electronic Fetal Monitoring, Intrapartum**

Electronic fetal monitoring, intrapartum, is defined as electronic evaluation of the fetal heart rate response to uterine contractions during intrapartal care (McCloskey & Bulechek, 2000). Some important activities involved when implementing this intervention include:

- Verifying maternal and fetal heart rate response to uterine contractions during intrapartal care
- Instructing client and partner about reasons for electronic monitoring
- Applying tocotransducer snugly after determining fetal position via Leopold maneuver
- Palpating to determine contraction intensity with tocotransducer use
- Differentiating among multiple fetuses by documenting on tracing and comparing data when simultaneous tracings are being used
- Discussing appearance of rhythm strip with client and support person
- Reassuring client about normal fetal heart rates
- Adjusting monitor to achieve and maintain clear tracing
- Interpreting rhythm strips when at least a 10-minute tracing has been obtained
- Documenting elements of external tracing and relevant intrapartal care
- Initiating fetal resuscitation interventions (see below) to treat abnormalities
- Documenting changes in fetal heart patterns after resuscitation

## BOX 18.3

## Nursing Outcomes Classification (NOC) and Nursing Interventions Classification (NIC)

## Intrapartal Period

- Applying internal fetal electrode and internal uterine pressure catheter after rupture of membranes, when necessary
- Documenting maternal and fetal response to internal monitoring placement
- Keeping primary health care provider informed of changes
- Continuing electronic monitoring through second-stage labor or up to time of cesarean delivery, with removal if cesarean delivery is necessary
- Documenting monitor interpretation, including providing safekeeping of intrapartal strip as part of the permanent record

**NIC: Resuscitation, Fetus**

Resuscitation, fetus, is defined as administering emergency measures to improve placental perfusion or correct fetal acid-base status (McCloskey & Bulechek, 2000). Some important activities involved when implementing this intervention include:

- Assessing fetal vital signs, including observation of abnormalities
- Repositioning client to lateral or hands-knees position
- Applying oxygen at 6 to 8 L/minute if positioning is ineffective
- Initiating intravenous therapy, including administration of fluid bolus, as ordered
- Performing vaginal examination with fetal scalp stimulation
- Documenting strip interpretation, including activities performed, and fetal and maternal response
- Reassuring client and support person
- Decreasing uterine activity by stopping oxytocin infusion or administering tocolytic medication as appropriate
- Performing amniotransfusion for abnormal variable decelerations or meconium-stained amniotic fluid
- Turning client to left lateral position for pushing during second stage
- Anticipating requirements for mode of delivery and neonatal support based on fetal responses to resuscitation techniques

## First Stage

The first stage of labor is divided into three phases: the latent, the active, and the transition phase.

## Latent Phase

The latent or preparatory phase begins at the onset of regularly perceived uterine contractions and ends when rapid cervical dilatation begins. Contractions during this phase are mild and short, lasting 20 to 40 seconds. Cervical effacement occurs, and the cervix dilates from 0 to 3 cm. The phase lasts approximately 6 hours in a nullipara and 4.5 hours in a multipara. A woman who enters labor with a “nonripe” cervix will have a longer than usual latent phase. Although women should not be denied analgesia at this point, analgesia given too early may prolong this phase. Yet another reason for a prolonged latent phase is cephalopelvic disproportion (a disproportion between the fetal head and pelvis).

In a woman who is psychologically prepared for labor and who does not tense at each tightening sensation in her abdomen, latent phase contractions cause only minimal discomfort. A woman can (and should) continue to walk about and make preparations for birth, such as doing last-minute packing for her stay at the hospital or birthing center, preparing older children for her departure and the upcoming birth, or giving instructions to the person who will take care of them while she is away.

## Active Phase

During the active phase of labor, cervical dilatation occurs more rapidly, increasing from 4 to 7 cm. Contractions grow stronger, lasting 40 to 60 seconds, and occur approximately every 3 to 5 minutes. This phase lasts approximately 3 hours in a nullipara and 2 hours in a multipara. Show (increased vaginal secretions) and perhaps spontaneous rupture of the membranes may occur during this time. This phase can be a difficult time for a woman because contractions grow so strong, last longer, and begin to cause true discomfort. It is also an exciting time, because a woman realizes something dramatic is happening. It can be a frightening time as she realizes labor is truly progressing and her life is about to change forever.

The active stage of labor in a Friedman graph can be subdivided into the following periods: acceleration (4 to 5 cm) and maximum slope (5 to 9 cm). During the period of maximum slope, cervical dilatation proceeds at its most rapid pace, averaging 3.5 cm per hour in nulliparas and 5 to 9 cm per hour in multiparas. Administration of an analgesic at this point has little effect on the progress of labor (Rouse & St. John, 2003).

## Transition Phase

During the **transition** phase, contractions reach their peak of intensity, occurring every 2 to 3 minutes with a duration of 60 to 90 seconds and causing maximum dilatation of

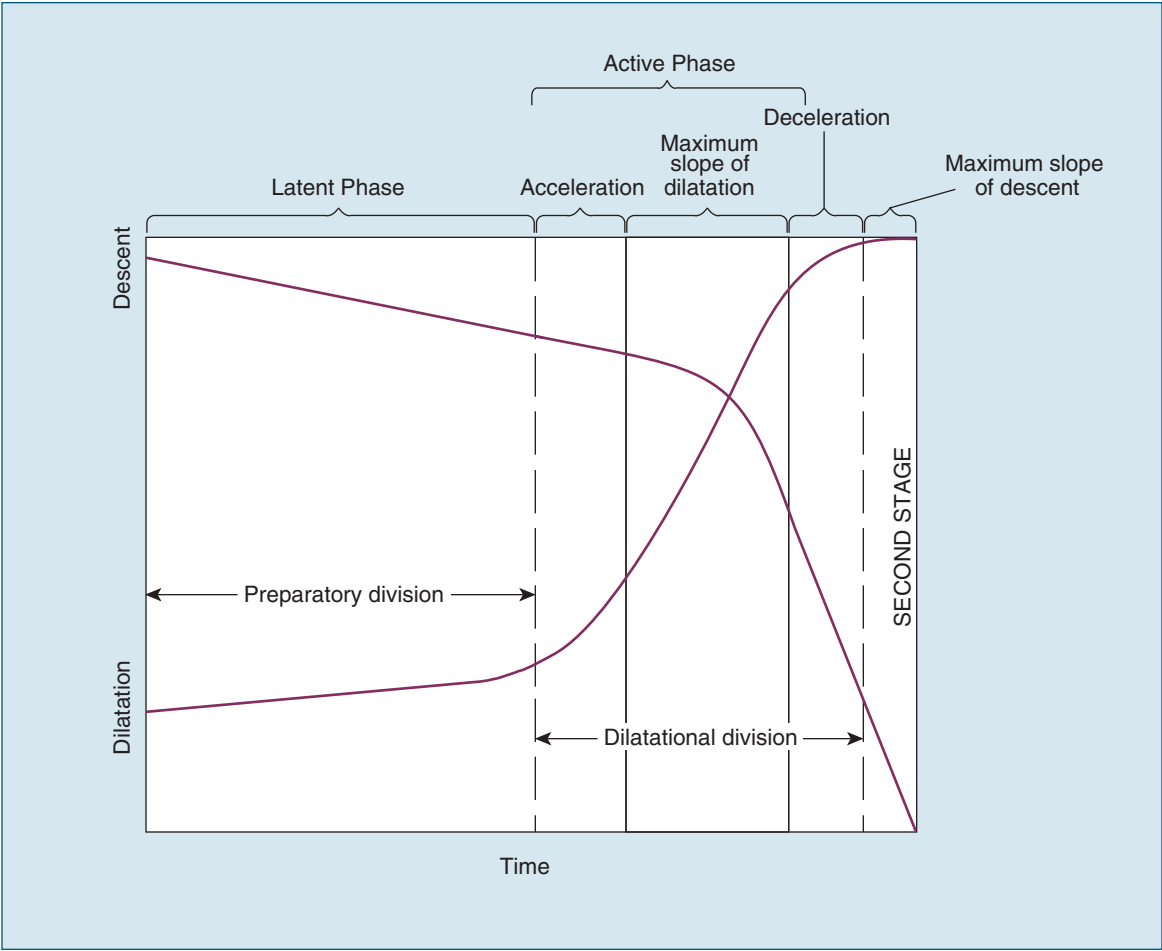


FIGURE 18.12 Divisions of labor.

8 to 10 cm. If the membranes have not previously ruptured or been ruptured by amniotomy, they will rupture as a rule at full dilatation (10 cm). If it has not previously occurred, show occurs as the last of the mucus plug from the cervix is released. By the end of this phase, both full dilatation

(10 cm) and complete cervical effacement (obliteration of the cervix) have occurred.

During this phase, a woman may experience intense discomfort, so strong that it is accompanied by nausea and vomiting. Because of the intensity and duration of the con-

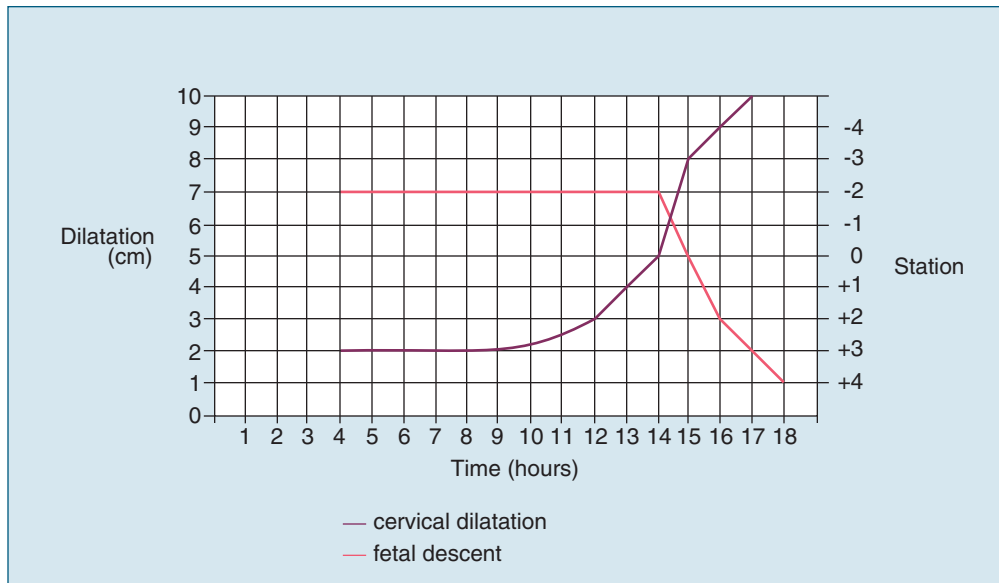
TABLE 18.4

Principal Clinical Features of the Divisions of Labor

Feature	First Stage		Second Stage
	Preparatory Division	Dilatational Division	Pelvic Division
Functions	Contractions coordinated, cervix prepared	Cervix actively dilating	Pelvis negotiated; mechanisms of labor; fetal descent; birth
Interval	Latent phase	Acceleration and phase of maximum slope	Deceleration phase and maximum descent
Measurement	Elapsed duration	Linear rate of dilatation	Linear rate of descent
Diagnosable disorders	Prolonged latent phase	Protracted dilatation; protracted descent	Prolonged deceleration; secondary arrest of dilatation; arrest of descent; failure of descent

Friedman, E. (1978). *Labor, clinical evaluation and management* (2nd ed.). New York: Appleton-Century-Crofts.





**FIGURE 18.13** Normal labor graph. Fetal descent and cervical dilatation are occurring at the same time.

tractions, a woman may also experience a feeling of loss of control, anxiety, panic, or irritability. The sensation in her abdomen may be so intense it may seem as though labor has taken charge of her. A few minutes before, she enjoyed having her forehead wiped with a cool cloth. Now she may knock the wiper's hand away. A moment before, she enjoyed having her partner rub her back. Now she may resist being touched and push that person away. Her focus is entirely inward on the task of birthing her baby.

The peak of the transition phase can be identified by a slight slowing in the rate of cervical dilatation when 9 cm is reached (termed deceleration on a labor graph). As a woman reaches the end of this stage at 10 cm of dilatation, a new sensation (i.e., an irresistible urge to push) occurs.

## Second Stage

The second stage of labor is the period from full dilatation and cervical effacement to birth of the infant; with uncomplicated birth, this stage takes about 1 hour (Cheng et al., 2004). Contractions change from the characteristic crescendo-decrescendo pattern to an overwhelming, uncontrollable urge to push or bear down with each contraction as if to move her bowels. A woman may experience momentary nausea or vomiting because pressure is no longer exerted on her stomach as the fetus descends in the pelvis. She pushes with such force that she perspires and the blood vessels in her neck may become distended.

As the fetal head touches the internal side of the perineum, the perineum begins to bulge and appears tense. The anus may become everted, and stool may be expelled. As the fetal head pushes against the perineum, the vaginal introitus opens and the fetal scalp appears at the opening to the vagina. At first, the opening is slitlike, then becomes oval, and then circular. The circle enlarges from the size

of a dime, then a quarter, then a half-dollar. This is called **crowning**.

It takes a few contractions of this new type for the woman to realize everything is still all right, just different, and to appreciate that it feels good, not frightening, to push with contractions. In fact, the need to push becomes so intense that she cannot stop herself. She barely hears the conversation in the room around her. All of her energy, her thoughts, her being are directed toward giving birth. As she pushes, using her abdominal muscles to aid the involuntary uterine contractions, the fetus is pushed out of the birth canal.

## Third Stage

The third stage of labor, the placental stage, begins with the birth of the infant and ends with the delivery of the placenta. Two separate phases are involved: placental separation and placental expulsion.

After the birth of an infant, a uterus can be palpated as a firm, round mass just inferior to the level of the umbilicus. After a few minutes of rest, uterine contractions begin again, and the organ assumes a discoid shape. It retains this new shape until the placenta has separated, approximately 5 minutes after the birth of the infant.

## Placental Separation

As the uterus contracts down on an almost empty interior, there is such a disproportion between the placenta and the contracting wall of the uterus that folding and separation of the placenta occur. Active bleeding on the maternal surface of the placenta begins with separation; this bleeding helps to separate the placenta still further by pushing it away from its attachment site. As separation is completed, the placenta sinks to the lower uterine segment or the upper vagina.



The following signs indicate that the placenta has loosened and is ready to deliver:

- Lengthening of the umbilical cord
- Sudden gush of vaginal blood
- Change in the shape of the uterus
- Firm contraction of the uterus
- Appearance of the placenta at the vaginal opening

If the placenta separates first at its center and lastly at its edges, it tends to fold on itself like an umbrella and presents at the vaginal opening with the fetal surface evident. Appearing shiny and glistening from the fetal membranes, this is called a Schultze placenta. Approximately 80% of placentas separate and present in this way. If, however, the placenta separates first at its edges, it slides along the uterine surface and presents at the vagina with the maternal surface evident. It looks raw, red, and irregular, with the ridges or cotyledons that separate blood collection spaces showing; this is called a Duncan placenta. A simple trick of remembering the presentations is associating “shiny” with Schultze (the fetal membrane surface) and “dirty” with Duncan (the irregular maternal surface) (Fig. 18.14).

Bleeding occurs as part of the normal consequence of placental separation, before the uterus contracts sufficiently

to seal maternal sinuses. The normal blood loss is 300 to 500 mL.

### Placental Expulsion

After separation, the placenta is delivered either by the natural bearing-down effort of the mother or by gentle pressure on the contracted uterine fundus by the physician or nurse-midwife (Credé’s maneuver). Pressure must never be applied to a postpartal uterus in a noncontracted state, because doing so may cause the uterus to evert and hemorrhage. This is a grave complication of birth, because the maternal blood sinuses are open and gross hemorrhage could occur (Rouse & St. John, 2003).

If the placenta does not deliver spontaneously, it can be removed manually. With delivery of the placenta, the third stage of labor is over. In some institutions, placentas are saved so that the blood can be removed for stem cell research, or the membranes may be used as temporary coverings for burns. In some cultures, parents want the placenta saved (Box 18.4). Ask the parents whether saving the placenta is important to them before it is destroyed.

## MATERNAL AND FETAL RESPONSES TO LABOR

Because labor is such an intense process, it has physiologic effects on both the mother and the fetus.

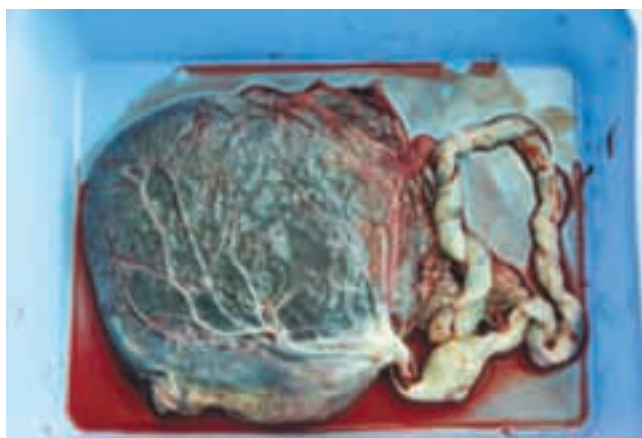
### Physiologic Effects of Labor on a Woman

Labor is a local process that involves the abdomen and reproductive organs, but its intensity is so great that almost all body systems are affected during it.

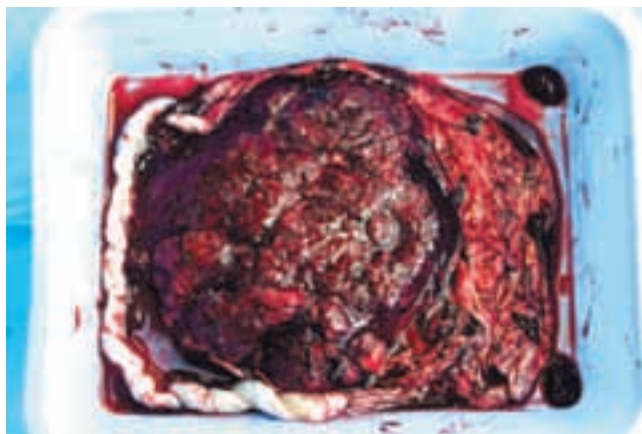
#### Cardiovascular System

Labor involves strenuous work and effort, which mandates a response from the cardiovascular system.

**Cardiac Output.** A contraction greatly decreases blood flow to the uterus, because it puts pressure on the uterine



A



B

**FIGURE 18.14** Fetal (A) and maternal (B) surface of the placenta. (Photos by Joe Mitchell.)

#### BOX 18.4 FOCUS ON . . .



### DIVERSITY OF CARE

For most health care providers in the United States, a placenta has little importance or meaning after its work of oxygenation is done and it is delivered. For many women, however, the placenta has continuing importance. For this reason, women may ask if they can take it home with them. In a number of Asian and Native American cultures, women bury the placenta to ensure that the child will continue to be healthy. In some parts of China, the placenta is cooked and eaten to ensure the continued health of the mother. Be certain when supplying placentas to women that you respect standard precautions and hospital policy.

arteries. This increases the amount of blood that remains in the general circulation, leading to an increase in peripheral resistance, which in turn results in an increase in systolic and diastolic blood pressure. In addition, the work of pushing may increase cardiac output by as much as 40% to 50% above the prelabor level.

The average blood loss with birth (300 to 500 mL) is not detrimental to most women, because of the blood volume increase that occurred during pregnancy. It may actually play an advantageous role by reducing blood volume to prepregnancy levels. Immediately after birth, with the weight and pressure removed from the pelvis, blood from the peripheral circulation may flood into the pelvic vasculature, momentarily dropping the pressure in the vena cava. The body quickly compensates for this, and a heavy load of blood is delivered to the heart, causing cardiac output to peak at 80% above prelabor levels. Because the pressure of the uterus against the vena cava is no longer present, cardiac output decreases from this high level, within the first hour after birth, by about 50%. An average woman's heart adjusts well to these sudden changes. If she has a cardiac problem, however, these sudden hemodynamic changes can have implications for her (see Chapter 14).

**Blood Pressure.** With the increased cardiac output caused by contractions, systolic blood pressure rises an average of 15 mm Hg with each contraction. Higher increases could be a sign of pathology. When a woman lies in a supine position and pushes, her blood pressure can drop precipitously, leading to hypotension. An upright or side-lying position during the second stage of labor can help avoid such a problem.

### Hemopoietic System

The major change in the blood-forming system that occurs during birth is the development of leukocytosis, or a sharp increase in the number of circulating white blood cells, possibly as a result of stress and heavy exertion. At the end of labor, the average woman has a white blood cell count of 25,000 to 30,000 cells/mm<sup>3</sup>, compared with a normal count of 5,000 to 10,000 cells/mm<sup>3</sup>.

### Respiratory System

Whenever there is an increase in cardiovascular parameters, the body responds by increasing the respiratory rate to supply additional oxygen. This can result in hyperventilation. Using appropriate breathing patterns during labor can help avoid severe hyperventilation. Total oxygen consumption increases by about 100% during the second stage of labor. Women adjust well to this change, which is comparable to that of a person performing a strenuous exercise such as running.

### Temperature Regulation

The increased muscular activity associated with labor may result in a slight elevation (1°F) in temperature. Diaphoresis occurs with accompanying evaporation to cool and limit excessive warming.

### Fluid Balance

Because of the increase in rate and depth of respirations (which causes moisture to be lost with each breath) and diaphoresis, insensible water loss increases during labor. Fluid balance is further affected if a woman eats nothing but sips of fluid or ice cubes or hard candy. The combination of increased fluid losses and decreased oral intake may make intravenous fluid replacement necessary if labor is prolonged.

### Urinary System

With the decrease in fluid intake during labor and the increased insensible water loss, the kidneys begin to concentrate urine to preserve both fluid and electrolytes. Specific gravity may rise to a high normal level of 1.020 to 1.030. It is not unusual for protein (trace to 1+) to be evident in urine because of the breakdown of protein caused by the increased muscle activity. Pressure of the fetal head as it descends in the birth canal against the anterior bladder reduces bladder tone or the ability of the bladder to sense filling. Therefore, unless the woman is asked to void approximately every 2 hours during labor, overfilling may occur, possibly decreasing bladder tone in the postpartal period.

### Musculoskeletal System

All during pregnancy, relaxin, an ovarian-released hormone, has acted to soften the cartilage between bones. In the week before labor, considerable additional softening causes the symphysis pubis and the sacral/coccyx joints to become even more relaxed and movable, allowing them to stretch apart to increase the size of the pelvic ring by as much as 2 cm. A woman may report this increased pubic flexibility as increased back pain or irritating, nagging pain at the pubis as she walks or turns in labor.

### Gastrointestinal System

The gastrointestinal system becomes fairly inactive during labor, probably because of the shunting of blood to more life-sustaining organs and also because of pressure on the stomach and intestines from the contracting uterus. Digestive and emptying time of the stomach becomes prolonged, which is why eating during labor is usually restricted. Some women experience a loose bowel movement as contractions grow strong, similar to what they may experience with menstrual cramps.

### Neurologic and Sensory Responses

The neurologic responses that occur during labor are responses related to pain (increased pulse and respiratory rate). Early in labor, the contraction of the uterus and dilatation of the cervix cause the discomfort. This pain is registered at uterine and cervical nerve plexuses (at the level of the 11th and 12th thoracic nerves). At the moment of birth, the pain is centered on the perineum as it stretches to allow the fetus to move past it. Perineal pain is registered at S2 to S4 nerves.

## Psychological Responses of a Woman to Labor

Labor can lead to emotional distress because it represents the beginning of a major life change for the woman and her partner. Even for the most organized woman, pain reduces the ability to cope and may make her short-tempered or quick to criticize things around her. Admitting her quickly to a birthing room, an environment free from outside interference, can help her begin to control her breathing patterns and reduce the pain of early contractions, as well as begin to organize coping strategies (Box 18.5).

### Fatigue

By the time the date of birth approaches, a woman is generally tired from the burden of carrying so much extra weight with her. In addition, most women do not sleep well during the last month of pregnancy. They have backache in a side-lying position; they turn on their back and a fetus kicks and wakens them; they turn to their side and their back aches again; and so on. Sleep hunger from this discomfort can make it difficult for them to perceive situations clearly or to adjust rapidly to new situations. It can make a little deficiency such as a wrinkled sheet appear as a threatening discrepancy in their care. It can make the process of labor loom as an overwhelming, unendurable experience.

#### BOX 18.5 FOCUS ON . . .

### EVIDENCE-BASED PRACTICE

#### What are the best nursing actions to promote dignity for women during labor?

To answer this question, two nurse researchers interviewed 20 low-risk primiparas who had recently given birth to healthy term newborns about their perceptions of how nurses maintained or strengthened their dignity during labor and childbirth.

The following themes from the women's narratives were identified: (1) women saw nurses as playing a pivotal role in preserving dignity during labor, by both their constant presence and their knowledge of labor and childbirth; (2) women appreciated feeling valued and respected by such measures as protection of their privacy and taking their physical discomfort seriously; and (3) dignity was enhanced when nurses were careful to give care that allowed the woman to maintain the level of control she individually desired.

This is an important study for nurses, because nurses are the health care providers a woman sees the most during labor. That means that nurses have the prime responsibility to carry out measures to enhance dignity and help make childbearing a positive experience.

Matthews, R., & Callister, L. C. (2004). Childbearing women's perceptions of nursing care that promotes dignity. *JOGNN: Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 33(4), 498–507.

### Fear

Women appreciate a review of the labor process early in labor as a reminder that childbirth is not a strange, bewildering event but a predictable and well-documented one. Be sure to explain that contractions last a certain length and reach a certain firmness but always have a rest period in between.

Being taken by surprise—labor moving faster or slower than the woman thought it would be or contractions harder and longer than she remembers from last time—brings to mind horror stories of labor the woman has heard. It may make her begin to worry that her infant may die or be born with an abnormality; it may make her afraid that she will not meet her own behavioral expectations. Explain that labor is predictable, but also variable, to limit this kind of fear.

### Cultural Influences

Cultural factors can strongly influence a woman's experience of labor. In the past, American women were accustomed to following hospital procedures and the medical model of care; therefore, they followed instructions during labor with few questions. Today, women are educated to question modes of care. In addition, every woman in labor responds to cultural cues in some way. This makes her response to pain, her choice of nourishment, her preferred birthing position, the proximity and involvement of a support person, and customs related to the immediate postpartal period individualized.

To make labor a positive experience, be prepared to adapt your care to the woman's specific circumstances. A woman may have traditions that run counter to American hospital protocols. Address these differences, and make arrangements to accommodate her beliefs or customs if possible (e.g., providing warm food or fluids during labor, saving the placenta for the mother to take home). If the woman is not proficient in English, arranging for an interpreter or working closely with a family member who can interpret may be necessary.

### Fetal Responses to Labor

Although a fetus is basically a passive participant in labor, the pressure and circulatory changes that occur with contractions cause detectable physiologic adjustments.

### Neurologic System

Uterine contractions exert pressure on the fetal head, so the same response that is involved with any instance of increased intracranial pressure occurs. The fetal heart rate (FHR) decreases by as much as 5 bpm during a contraction, as soon as contraction strength reaches 40 mm Hg. This decrease appears on a fetal heart monitor as an early deceleration pattern.

### Cardiovascular System

The ability to respond to cardiovascular changes is usually mature enough that the fetus is unaffected by the con-



tinual variations of heart rate that occur with labor—a slight slowing and then a return to normal (baseline) levels. During a contraction, the arteries of the uterus are sharply constricted and the filling of cotyledons almost completely halts. The amount of nutrients, including oxygen, exchanged during this time is reduced, causing a slight but inconsequential fetal hypoxia. Increased intracranial pressure caused by uterine pressure on the fetal head serves to keep circulation from falling below normal during the duration of a contraction.

### Integumentary System

The pressure involved in the birth process is often reflected in minimal petechiae or ecchymotic areas on a fetus (particularly the presenting part). There may also be edema of the presenting part (caput succedaneum).

### Musculoskeletal System

The force of uterine contractions tends to push a fetus into a position of full flexion, the most advantageous position for birth.

### Respiratory System

The process of labor appears to aid in the maturation of surfactant production by alveoli in the fetal lung. The pressure applied to the chest from contractions and passage through the birth canal helps to clear it of lung fluid. For this reason, an infant born vaginally is usually able to establish respirations more easily than a fetus born by cesarean birth.

## Danger Signs of Labor

Wide variation exists among individuals in their patterns of labor contractions and in maternal responses to labor and birth. Certain signs, however, indicate that the course of events is deviating too far from normal. These signs, both fetal and maternal, are described in Box 18.6. Nursing care of a woman who is experiencing a complication during labor or birth is addressed in Chapter 21.

### Fetal Danger Signs

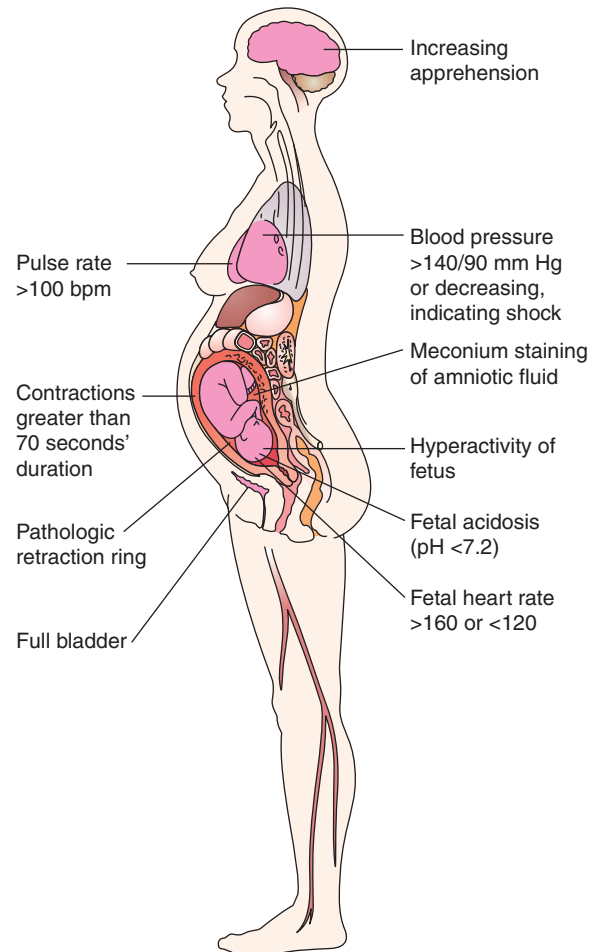
**High or Low Fetal Heart Rate.** As a rule, an FHR of more than 160 bpm (fetal tachycardia) or less than 110 bpm (fetal bradycardia) is a sign of possible fetal distress. An equally important sign is a late or variable deceleration pattern (described later) on the fetal monitor. The FHR may return to a normal range in between these irregular patterns, giving a false sense of security if FHR is assessed only between contractions.

**Meconium Staining.** Meconium staining, a green color in the amniotic fluid, is not always a sign of fetal distress but is highly correlated with its occurrence. It reveals that the fetus has had an episode of loss of sphincter control, allowing meconium to pass into the amniotic fluid. It may indicate that the fetus has or is experiencing hypoxia, which stimulates the vagal reflex and leads to increased



### BOX 18.6 ASSESSMENT

#### Assessing for Danger Signs of Labor



bowel motility. Although meconium staining may be normal in a breech presentation, because pressure on the buttocks causes meconium loss, it should always be reported immediately so that its cause can be investigated.

**Hyperactivity.** Ordinarily, a fetus is quiet and barely moves during labor. Fetal hyperactivity may be a sign that hypoxia is occurring, because frantic motion is a common reaction to the need for oxygen.

**Fetal Acidosis.** If blood analyses are made on a fetus during labor by use of a scalp capillary technique, the finding of acidosis (blood pH lower than 7.2) is a certain sign that fetal well-being is becoming compromised.

### Maternal Danger Signs

**Rising or Falling Blood Pressure.** Normally, a woman's blood pressure rises slightly in the second (pelvic) stage

of labor because of her pushing effort. A systolic pressure greater than 140 mm Hg and a diastolic pressure greater than 90 mm Hg, or an increase in the systolic pressure of more than 30 mm Hg or in diastolic pressure of more than 15 mm Hg (the basic criteria for pregnancy-induced hypertension), should be reported. Just as important to report is a falling blood pressure, because it may be the first sign of intrauterine hemorrhage. A falling blood pressure is often associated with other clinical signs of shock, such as apprehension, increased pulse rate, and pallor.

**Abnormal Pulse.** Most pregnant women have a pulse rate of 70 to 80 bpm. This rate normally increases slightly during the second stage of labor because of the exertion involved. A maternal pulse rate greater than 100 bpm during the normal course of labor is unusual and should be reported. It may be another indication of hemorrhage.

**Inadequate or Prolonged Contractions.** Uterine contractions normally become more frequent, intense, and longer as labor progresses. If they become less frequent, less intense, or shorter in duration, this may indicate uterine exhaustion (inertia). If this problem cannot be corrected, a cesarean birth may be necessary.

A period of relaxation must be present between contractions so that the intervillous spaces of the uterus can fill and maintain an adequate supply of oxygen and nutrients for the fetus. As a rule, uterine contractions lasting longer than 70 seconds should be reported, because contractions of this length may begin to compromise fetal well-being by interfering with adequate uterine artery filling.

**Pathologic Retraction Ring.** An indentation across a woman's abdomen, where the upper and lower segments of the uterus join, may be a sign of extreme uterine stress and possible impending uterine rupture. For this reason, it is important to observe the contours of the abdomen periodically during labor. Fetal heartbeat auscultation automatically provides a regular opportunity to assess a woman's abdomen. If an electronic monitor is in place, it is necessary to make this observation deliberately.

**Abnormal Lower Abdominal Contour.** If a woman has a full bladder during labor, a round bulge on her lower anterior abdomen may appear. This is a danger signal for two reasons: first, the bladder may be injured by the pressure of a fetal head; second, the pressure of the full bladder may not allow the fetal head to descend.

**Increasing Apprehension.** Warnings of psychological danger during labor are as important to consider in assessing maternal well-being as are physical signs. A woman who is becoming increasingly apprehensive despite clear explanations of unfolding events may only be approaching the second stage of labor. She may, however, not be "hearing" because she has a concern that has not been met. Using an approach such as, "You seem more and more concerned. Could you tell me what is worrying you?" may be helpful. Increasing apprehension also needs to be investigated for physical reasons, because it can be a sign of oxygen deprivation or internal hemorrhage.



### Checkpoint Question 3

Celeste is having long and hard uterine contractions. What length of contraction would you report as abnormal?

- Any length over 30 seconds.
- A contraction over 70 seconds in length.
- A contraction that peaks at 20 seconds.
- A contraction shorter than 60 seconds.

## MATERNAL AND FETAL ASSESSMENT DURING LABOR

Nursing assessment is instrumental to keep women safe during labor.

### Immediate Assessment of a Woman in Stage One

A number of immediate assessment measures are necessary to safeguard maternal and fetal health when a woman first arrives at a birthing facility. Encourage every woman to bring a support person with her into labor (Hodnett et al., 2005). After she and her support person are oriented to the area, focus on obtaining vital assessment data (Box 18.7).

#### Initial Interview and Physical Examination

Important data that need to be obtained include a description of labor thus far, the woman's general physical condition, and her preparedness for labor and birth.

Obtain information about the following areas:

- Expected date of birth
- Frequency, duration, and intensity of contractions

#### BOX 18.7 FOCUS ON . . .



### FAMILY TEACHING

#### Admission Procedures for the Laboring Client

**Q.** Celeste Bailey asks you, "What will happen when I arrive at a birthing center?"

**A.** Every setting differs, but actions you can expect include the following:

- Orientation to a birthing room
- Baseline assessment of your temperature, pulse, respirations, and blood pressure
- Recording of your pregnancy history and physical examination
- Assessment of fetal heart rate
- A vaginal examination
- Urine and necessary blood samples obtained
- Explanation of fetal or uterine monitoring equipment to be used and connection of this equipment



- Amount and character of show
- Whether rupture of membranes has occurred
- Vital signs—temperature, pulse, respirations, and blood pressure (assessed between contractions)
- Time the woman last ate
- Any known drug allergies
- Past pregnancy and previous pregnancy history
- Her birth plan or what individualized measures she has planned, such as no analgesia or who will cut the umbilical cord

This amount of information is scant but helps to establish whether the woman is in active labor and needs intense care or whether she has arrived at the hospital or birthing center at an early stage of labor and therefore can benefit most from paced interventions.

After these initial assessment procedures, the woman is categorized as to her risk for having difficulty in labor or fetal risk for needing special care at birth.

## Detailed Assessment During the First Stage of Labor

If the woman is in active labor, the history taken on arrival may be the only history obtained until after the baby is born. If birth is not imminent, a more extensive history and physical examination can be completed.

### History

The full history should include a review of a woman's pregnancy, including both physical and psychological events, and a review of past pregnancies, her general health, and family medical information—all data necessary to plan nursing care.

Performing a detailed interview of a woman in labor can be difficult because of the constant interruptions caused by labor contractions. Be patient. Remember that the longest contraction is rarely more than 60 seconds. If a woman concentrates so intently on a breathing exercise she completely forgets a question asked just before the contraction, repeat the question as the contraction subsides, as if it had not been asked before, or act as if it is no trouble to ask it again.

**Current Pregnancy History.** Important information needed for a complete history includes documentation of gravida and para status; a description of this pregnancy (planned or not, pattern and place of prenatal care, adequacy of nutrition, whether any complication such as spotting, falls, hypertension of pregnancy, infection, or alcohol or drug ingestion has occurred); plans for labor (does she want medication for pain, will she use breathing exercises, will she have a support person with her); and future childcare (will she breast-feed or bottle-feed, has she chosen a pediatrician).

**Past Pregnancy History.** Document prior pregnancies, including number, dates, types of birth, any complications, and outcomes, including sex and birthweights of children. What is the current health status of the children?

**Past Health History.** Document any previous surgeries (surgical adhesions might interfere with free fetal pas-

sage); heart disease or diabetes (special precautions are required during labor and birth); anemia (blood loss at birth may be more important than it is normally); tuberculosis (lung lesions may be reactivated at birth by changes in lung contour); kidney disease or hypertension (blood pressure must be monitored even more carefully than it is normally); or a sexually transmitted infection such as herpes (the infant may be exposed to the disease by vaginal contact if the disease is still active). Determine also whether the woman's lifestyle places her at high risk for human immunodeficiency virus (HIV) exposure.

**Family Medical History.** Ask if any family member is cognitively challenged or has a condition such as heart disease, a blood dyscrasia, diabetes, kidney disease, cancer, allergies, seizures, or a congenital disorder. Adequate preparation can then be made for a child who might have special needs.

### Physical Examination

After history taking, perform a thorough physical examination, including a pelvic examination, to confirm the presentation and position of the fetus and the stage of cervical dilatation.

Physical assessment during labor begins, as does all physical assessment, with the woman's overall appearance and is similar to that for any woman. However, be prepared to adapt examination techniques to the client's stage of labor and its progression. Does she appear tired? Pale? Ill? Frightened? Is there obvious edema or dehydration? Does she have open lesions anywhere?

Palpate for enlargement of lymph nodes to detect the possibility of infection. Inspect the mucous membrane of the mouth and the conjunctiva of the eyes for color. Does the color (paleness) suggest anemia? What is the condition of the woman's teeth? Are there any caries? Do any teeth appear abscessed (such a condition needs to be documented because it might account for a postpartal fever)? Examine the outer and inner surfaces of her lips carefully. Does she have herpes lesions (pinpoint vesicles on an erythematous base)? Type II (genital) virus can be lethal to newborns. If herpetic lesions are present anywhere, a woman will probably be isolated from her child until the lesions crust.

Assess the lungs to be certain they are clear to auscultation. Listen for normal heart sounds and rhythms. Many pregnant women at term have a grade II to III systolic ejection murmur because of the extra volume of blood that must cross the heart valves. Inspect and palpate her breasts. Are they free of cysts and lumps? Mark the chart of a woman who has a palpable mass in her breasts for reexamination after labor and birth. This is probably an enlarged milk gland but needs further evaluation.

**Abdominal Assessment.** Assessing a woman's abdomen is important to estimate fetal size by fundal height (should be at the level of the xiphoid process at term). Assess presentation and position by Leopold's maneuvers (see later discussion). Palpate and percuss the bladder area (over the symphysis pubis) to detect a full bladder. Assess for abdominal scars, because abdominal or pelvic surgery can leave adhesions.

Finally, inspect lower extremities for skin turgor to assess hydration, and also for edema and varicose veins. Women with large varicosities are more prone to thrombophlebitis after birth than other women are. Some physicians prefer not to use birth room stirrups if varicosities are prominent during labor, because the stirrups may press against them. Severe edema suggests hypertension of pregnancy, so the extent and intensity of edema must be assessed and correlated with the woman's blood pressure.

### Leopold's Maneuvers

**Leopold's maneuvers** are a systematic method of observation and palpation to determine fetal presentation and position. They are described in Box 18.8.

### Assessing Rupture of Membranes

One of every four labors begins with spontaneous rupture of the fetal membranes. When this occurs, the woman may feel a sudden gush of amniotic fluid from her vagina. This is a startling sensation because it feels as if she has lost bladder control. She may feel embarrassed before she realizes the warm fluid on her perineum and legs is not urine but a sudden announcement that labor is beginning. In other women, rupture of membranes is more subtle, occurring as a slow loss of fluid. In such cases, there may be a question whether the membranes have ruptured.

A sterile vaginal examination using a sterile speculum usually reveals whether amniotic fluid is present in the vagina. After vaginal secretions are obtained (usually with the use of a sterile, cotton-tipped applicator), test them with a strip of Nitrazine paper. Vaginal secretions are usually acid; amniotic fluid, in contrast, is alkaline. If amniotic fluid has passed through the vagina recently, the pH of the vaginal fluid will probably be alkaline (greater than 6.5) when tested by Nitrazine paper (appears blue-green or gray to deep blue). A false reading may occur in a woman with intact membranes who has a heavy, bloody show, because blood is also alkaline. An additional test is the fern test (examination of vaginal secretions under a microscope). Because of its high estrogen content, amniotic fluid will show a fern pattern (see Fig. 4.16 in Chapter 4) when dried and examined in this way; urine will not.

If the woman's membranes ruptured at home, ask her to describe the color of the amniotic fluid. It should be as clear as water. Yellow-stained fluid may indicate a blood incompatibility between mother and fetus (the amniotic fluid is bilirubin-stained from the breakdown of red blood cells). Green fluid indicates meconium staining. Although meconium staining is normal in breech births because of buttocks compression, in a vertex presentation it may indicate fetal anoxia. A fetus with meconium staining needs immediate assessment to safeguard well-being. The infant will need continuing close assessment after birth because of possible meconium aspiration.

### Vaginal Examination

A vaginal examination is necessary to determine the extent of cervical effacement and dilatation and to confirm

the fetal presentation, position, and degree of descent. The technique for a vaginal examination during labor is shown in Box 18.9.

Vaginal examinations may be done either between contractions or during contractions. More of the fetal skull may be palpated during a contraction, because the cervix retracts more at that time. However, examination during a contraction is more painful and rarely is justified by the additional amount of information gained. Palpation of membranes during a contraction, when they are under pressure, may cause them to rupture.

Women are anxious to have frequent progress reports during labor, to reassure them everything is progressing well. Tell the woman immediately after an examination about her progress. Most women are aware of dilatation but not the word effacement. Just saying, "no further dilatation" is a depressing report. "You're not dilated a lot more, but a lot of thinning is happening and that's just as important" is the same report given in a positive manner. After finishing a vaginal examination, plot the new degree of dilatation and descent of the presenting part on a labor progress graph, as described earlier.

Do not do vaginal examinations in the presence of fresh bleeding, because this may indicate a placenta previa (implantation of the placenta so low in the uterus that it encroaches on the cervical os). Performing a vaginal examination in this instance might tear the placenta and cause hemorrhage, resulting in danger to both mother and fetus. If in doubt, err on the side of postponing a vaginal examination.

### Assessment of Pelvic Adequacy

Evaluating pelvic adequacy using internal conjugate and ischial tuberosity diameters is generally done during pregnancy, so that, by weeks 32 to 36 of pregnancy, the nurse-midwife or physician is alerted that a cephalopelvic disproportion could occur. Women with this potential problem are cautioned not to attempt a home birth or use a birthing center without nearby hospital facilities available.

Whether the pelvis is wide enough to allow the fetus to pass through the internal diameters can be reassessed during early labor. Because these procedures involve vaginal manipulation and discomfort (and the diameters obtained during pregnancy have not changed), they are not retaken routinely. However, if the woman did not receive prenatal care, they need to be estimated at this time. (These procedures are described in Chapter 10.)

The suprapubic angle may be estimated early in labor to determine how readily the fetal head will be born (if the angle is too steep, the fetal head can lock behind it and perineal tissue may tear during birth as the fetal head is pushed posteriorly). To estimate this angle, place the fingers vaginally and press up against the pubic arch. If the fingers cannot be separated in this position, the angle is unusually steep (less than 90 degrees).

### Sonography

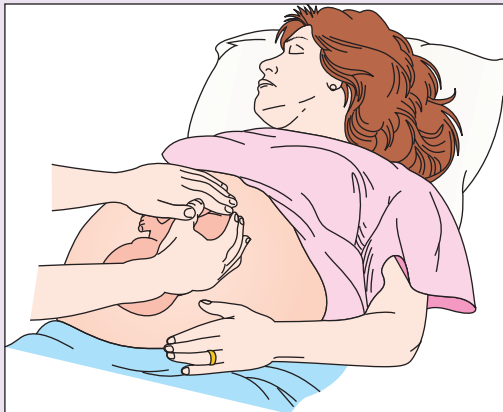
Sonography may be used at term to determine the diameters of the fetal skull and to determine presentation, pre-

**BOX 18.8 NURSING PROCEDURE****Leopold's maneuvers****Purpose**

Systematically observing and palpating the abdomen to determine fetal presentation and position.

**PROCEDURE**

1. Prepare the client.
  - a. Explain the procedure.
  - b. Instruct the client to empty her bladder.
  - c. Position the woman supine with knees slightly flexed. Place a small pillow or rolled towel under one side.
  - d. Wash your hands using warm water.
  - e. Observe the woman's abdomen for longest diameter and where fetal movement is apparent.
2. Perform the first maneuver.
  - a. Stand at the foot of the client, facing her, and place both hands flat on her abdomen.
  - b. Palpate the superior surface of the fundus. Determine consistency, shape, and mobility.



3. Perform the second maneuver.
  - a. Face the client and place the palms of each hand on either side of the abdomen.
  - b. Palpate the sides of the uterus. Hold the left hand stationary on the left side of the uterus while the right hand palpates the opposite side of the uterus from top to bottom. Then hold the right hand steady, and repeat palpation using the left hand on the left side.

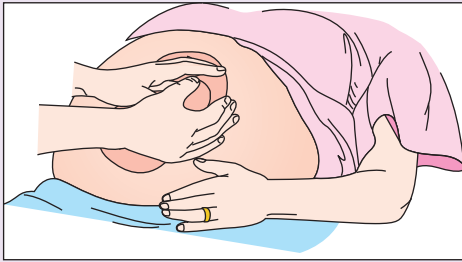
**PRINCIPLE**

- a. Explanation reduces anxiety and enhances cooperation.
  - b. Doing so promotes comfort and allows for more productive palpation because fetal contour will not be obscured by a distended bladder.
  - c. Flexing the knees relaxes the abdominal muscles. Using a pillow or towel tilts the uterus off the vena cava, thus preventing supine hypotension syndrome.
  - d. Handwashing prevents the spread of possible infection. Using warm water aids in client comfort and prevents tightening of abdominal muscles.
  - e. The longest diameter (axis) is the length of the fetus. The location of activity most likely reflects the position of the feet.
2. This maneuver determines whether fetal head or breech is in the fundus.
    - a. Proper positioning of hands ensures accurate findings.
    - b. When palpating, a head feels more firm than a breech. A head is round and hard; the breech is less well defined. A head moves independently of the body; the breech moves only in conjunction with the body.
3. This maneuver locates the back of the fetus.
    - a. Proper positioning of hands ensures accurate findings.
    - b. This method is most successful to determine the direction the fetal back is facing. One hand will feel a smooth, hard, resistant surface (the back), while on the opposite side, a number of angular nodulations (the knees and elbows of the fetus) will be felt.

(continued)

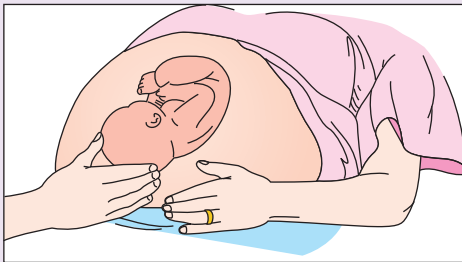
## PROCEDURE

## PRINCIPLE



## 4. Perform the third maneuver.

- a. Gently grasp the lower portion of the abdomen just above the symphysis pubis between the thumb and index finger and try to press the thumb and finger together. Determine any movement and whether the part is firm or soft.



## 5. Perform the fourth maneuver.

- a. Place fingers on both sides of the uterus approximately 2 inches above the inguinal ligaments, pressing downward and inward in the direction of the birth canal. Allow fingers to be carried downward.



## 4. This maneuver determines the part of the fetus at the inlet and its mobility.

- a. If the presenting part moves upward so an examiner's hands can be pressed together, the presenting part is not engaged (not firmly settled into the pelvis). If the part is firm, it is the head; if soft, then it is the breech.

## 5. This maneuver determines fetal attitude and degree of fetal extension into the pelvis; it should be done only if the fetus is in cephalic presentation. Information about the infant's anteroposterior position may also be gained from this final maneuver.

- a. The fingers of one hand will slide along the uterine contour and meet no obstruction, indicating the back of the fetal neck. The other hand will meet an obstruction an inch or so above the ligament—this is the fetal brow. The position of the fetal brow should correspond to the side of the uterus that contained the elbows and knees of the fetus. If the fetus is in a poor attitude, the examining fingers will meet an obstruction on the same side as the fetal back. That is, the fingers will touch the hyperextended head. If the brow is very easily palpated (as if it lies just under the skin), the fetus is probably in a posterior position (the occiput is pointing toward the woman's back).



## BOX 18.9 NURSING PROCEDURE

## Vaginal Examination

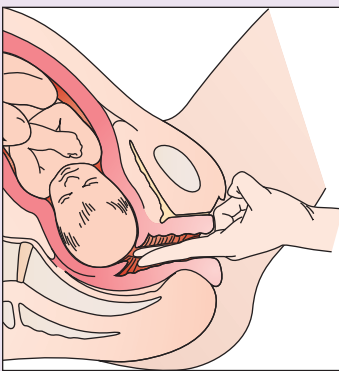
## Purpose

Determine cervical readiness and fetal position and presentation.



## PROCEDURE

1. Wash your hands; explain procedure to client. Provide privacy.
2. Assess client status and adjust plan to individual client need.
3. Assemble equipment: sterile examining gloves, sterile lubricant, antiseptic solution. Ask the woman to turn onto her back with knees flexed (a dorsal recumbent position). Put on sterile examining gloves.
4. Discard one drop of clean lubricating solution and drop an ample supply on tips of gloved fingers.
5. Pour antiseptic solution over vulva using nondominant hand.
6. Place nondominant hand on the outer edges of the woman's vulva and spread her labia while inspecting the external genitalia for lesions. Look for red, irritated mucous membranes; open, ulcerated sores; clustered, pinpoint vesicles.
7. Look for escaping amniotic fluid or the presence of umbilical cord or bleeding.
8. If there is no bleeding or cord visible, introduce your index and middle fingers of dominant hand gently into the vagina, directing them toward the posterior vaginal wall.
9. Touch the cervix with your gloved examining fingers.
  - a. Palpate for cervical consistency and rate if *firm* or *soft*.
  - b. Measure the extent of dilatation; palpate for an anterior rim or lip of cervix.



## PRINCIPLE

1. Handwashing helps prevent spread of microorganisms; explanations ensure client cooperation and compliance. Privacy enhances self-esteem.
2. Care is always individualized according to a client's needs.
3. Organization and planning improve efficiency. Positioning in this manner allows for good visualization of perineum. Use of a sterile glove prevents contamination of birth canal.
4. Discarding the first drop ensures that quantity used will not be contaminated.
5. This prevents the spread of organisms from perineum to birth canal.
6. Positioning hands in this way allows for good perineal visualization. Presence of any lesions may indicate an infection and possibly preclude vaginal birth.
7. Amniotic fluid implies membranes have ruptured and umbilical cord may have prolapsed. Bleeding may be a sign of placenta previa. *Do not do a vaginal examination if a possible placenta previa is present.*
8. The posterior vaginal wall is less sensitive than the anterior wall. Stabilize the uterus by placing your nondominant hand on the woman's abdomen.
9.
  - a. The cervix feels like a circular rim of tissue around a center depression. Firm is similar to the tip of a nose; soft is as pliable as an earlobe. The anterior rim is usually the last portion to thin.
  - b. The width of the fingertip helps to estimate the degree of dilatation. An index finger averages about 1 cm; a middle finger about 1½ cm. If they can both enter the cervix, the cervix is dilated 2½ to 3 cm. If there would be room for double the width of your examining fingers in the cervix, the dilatation is about 5 to 6 cm. When the space is four times the width of your fingertips, dilatation is complete—10 cm. Measure the width of your fingertips on a centimeter scale if you are going to do a vaginal examination, so you know how wide your index and middle fingers are at the tip.

(continued)

PROCEDURE	PRINCIPLE
10. Estimate the degree of effacement.	10. Effacement is estimated in percentage depending on thickness. A cervix before labor is 2 to 2½ cm thick. If it is only 1 cm thick now, it is 50% effaced. If it is tissue paper thin, it is 100% effaced. With a 100% effaced cervix, dilatation is difficult to feel for because the edges of the cervix are so thin.
11. Estimate whether membranes are intact.	11. The membranes (with a slight amount of amniotic fluid in front of the presenting part) are the shape of a watch crystal. With a contraction, they bulge forward and become prominent and can be felt much more readily.
12. Locate the ischial spines. Rate the station of the presenting part. Identify the presenting part.	12. Ischial spines are palpated as notches at the 4 and 8 o'clock positions at the pelvic outlet. Station is the number of centimeters above or below the spines where the presenting part is. Identifying the presenting part confirms findings obtained with Leopold's maneuvers. Differentiating a vertex from a breech may be more difficult than would first appear. A vertex has a hard, smooth surface. Fetal hair may be palpable but massed together and wet; it may be difficult to appreciate through gloves. Palpating the two fontanelles, one diamond-shaped and one triangular, helps the identification. Buttocks feel softer and give under fingertip pressure. Identifying the anus may be possible because the sphincter action will "trap" the index finger.
13. Establish the fetal position.	13. The fontanelle palpated is invariably the posterior one because the fetus maintains a flexed position, presenting the posterior not the anterior fontanelle. In an ROA position, the triangular fontanelle will point toward the right anterior pelvic quadrant. In an LOA position, the posterior fontanelle will point toward the left anterior pelvis. In a breech presentation, the anus can serve as a marker for position. When the anus is pointing toward the left anterior quadrant of the woman's pelvis, the position is LSA.
14. Withdraw your hand. Wipe the perineum front to back to remove secretions or examining solution. Leave client comfortable and turned to side.	14. Use as gentle a technique with withdrawal as with insertion. Wiping front to back prevents moving rectal contamination forward to the vagina. Side-lying is the best position to prevent supine hypotension syndrome in labor.
15. Document procedure and assessment findings and how client tolerated procedure.	15. Documentation provides a means for communication and evaluation of care and client outcomes.

senting part, position, flexion, and degree of descent of a fetus. If the woman is going to be transported to another department to have this done, be sure someone accompanies her, so that, if labor should become more active, she can be returned quickly to the labor and birth service.

### Vital Signs

Vital signs are taken at the beginning and then periodically during labor, as summarized in Table 18.5.

**Temperature.** Temperature is usually obtained every 4 hours during labor. Report a temperature greater than

37.2°C (99°F) to the attending physician or nurse-midwife, because it may indicate the development of infection. Unless there are accompanying symptoms, however, temperature elevation in a woman who is taking no fluids by mouth usually reflects dehydration. After rupture of the membranes, temperature should be taken every 2 hours, because the possibility for infection increases markedly after this time.

**Pulse and Respiration.** Pulse and respiration rate should be measured and recorded every 4 hours during labor. A woman's pulse may be rapid on admission because she is nervous and anxious. After she has become better

TABLE 18.5

## Time Intervals for Nursing Interventions During First Stage of Labor

Intervention	Assessment on Admission	Continued Assessments
<b>Assess and Record</b>		
Temperature	X	q4h (unless membranes are ruptured, then q2h)
Pulse	X	q4h
Respirations	X	q4h
Blood pressure	X	q4h
Voiding	X	q2–4h
Fetal heart rate	X	Continuously by monitor or q30min
Contractions	X	Continuously by monitor or q30min
<b>Provide</b>		
Ambulation	X	Until membranes rupture
Support	X	Continuously

acquainted with her surroundings and has been assured that everything is going well, her pulse usually ranges between 70 and 80 bpm. A persistent pulse rate of more than 100 bpm suggests tachycardia from dehydration or hemorrhage. Respiratory rate during labor is usually 18 to 20 breaths per minute. Do not count respirations during contractions, because women tend to breathe rapidly from pain. Conversely, if a woman is using controlled breathing to decrease pain in labor, her respirations could be abnormally slow.

Observe for hyperventilation (rapid, deep respirations). Prolonged hyperventilation leads to the “blowing off” of carbon dioxide and accompanying symptoms of dizziness and tingling of hands and feet. Rebreathing into a paper bag and reassurance help to reverse this process.

**Blood Pressure.** Blood pressure is usually measured and recorded every 4 hours during labor. Measure blood pressure between contractions, both for the woman’s comfort and for accuracy, because blood pressure tends to rise 5 to 15 mm Hg during a contraction. An increase in blood pressure may indicate the development of pregnancy-induced hypertension. A decrease in blood pressure or a decrease in the pulse pressure (the difference between the systolic and diastolic pressures) may indicate hemorrhage. If the woman receives an analgesic agent (such as meperidine) that tends to be hypotensive, check her blood pressure approximately 15 minutes after administration to be certain that extreme hypotension is not occurring.

### Laboratory Analysis

Most women have some preliminary laboratory studies done in early labor.

**Blood.** Blood is drawn for hemoglobin and hematocrit, a serologic test for syphilis (VDRL), hepatitis B antibodies, and blood typing to determine the woman’s baseline level of health. These findings can be used to alert the laboratory that a woman with a certain blood type is in labor and to help predict whether a blood incompatibility is likely to exist in the newborn.

**Urine.** Obtain a clean-catch urine specimen and test it immediately for protein and glucose; then send it to the laboratory for a complete or dipstick urinalysis. If the woman reports any symptoms that suggest a urinary tract infection (e.g., burning on urination, blood in urine, extreme frequency, flank pain), obtain a clean-catch specimen for culture. A woman in labor is able to void most easily if she is allowed to use a bathroom. However, if the woman has ruptured membranes, do not allow her to ambulate to a bathroom until it is confirmed that the fetal head is engaged, so that gravity does not cause a prolapsed cord. A bedpan or receptacle placed on a commode allows for collection of any material passed from the vagina.

### Assessment of Uterine Contractions

Uterine contractions may be monitored intermittently by hand or continuously by an internal or external system. Most women are monitored for a short period in early labor to screen for fetal well-being. Continuing to monitor the duration, strength, and interval between contractions can aid in tracking the progress of labor (Thacker et al., 2005).

**Length of Contractions.** To determine the length of a contraction with a monitor in place, simply observe the rhythm strip and count the time interval of the contraction. To determine the beginning of a contraction without a monitor, rest a hand on a woman’s abdomen at the fundus of the uterus very gently to sense the gradual tensing and upward rising of the fundus that accompanies a contraction (Fig. 18.15). It is possible to palpate this tensing approximately 5 seconds before the woman is able to feel the contraction. (Contractions are palpable when the intrauterine pressure reaches approximately 20 mm Hg. The pain of a contraction is not usually felt until pressure reaches approximately 25 mm Hg.) Time the duration of a contraction from the moment the uterus first tenses until it has relaxed again.

**Intensity of Contractions.** In addition to observing the duration of contractions, estimate the intensity or strength of the contraction. On a monitor, this is the height of the contraction. If you are assessing manually, rate a



**FIGURE 18.15** Contractions can be assessed by very gently placing the hand over the fundus of the uterus.

contraction as mild if the uterus does not feel more than minimally tense; as moderate if the uterus feels firm; and as strong if the uterus feels as hard as a wooden board at the peak of the contraction. With a strong contraction, you will also not be able to indent the uterus with your fingertips.

After estimating the intensity and duration of a contraction, recheck the fundus at the conclusion of the contraction, to be certain that it is relaxing and becoming soft to the touch again. This demonstrates that the uterus is not in continuous contraction but is providing a relaxation time during which blood vessels can fill to supply the fetus with adequate oxygen.

**Frequency of Contractions.** Next, time the frequency of contractions. The frequency is timed from the beginning of one contraction to the beginning of the next (see Fig. 18.10).

Use as light a touch as possible on a woman's abdomen while timing contractions or estimating their strength manually. The fundus of the uterus becomes tender if it has to push against the extra weight of a hand with each contraction. This is an unnecessary discomfort for a woman in labor.

## Initial Fetal Assessment

Although passive in labor, a fetus is subjected to extreme pressure by uterine contractions and passage through the birth canal, so it is important to ascertain that the FHR remains within normal limits despite these pressures.

## Auscultation of Fetal Heart Sounds

Fetal heart sounds are transmitted best through the convex portion of a fetus, because that is the part that lies in closest contact with the uterine wall. In a vertex or breech presentation, fetal heart sounds are usually best heard through the fetal back; in a face presentation, the back becomes concave so the sounds are best heard through the more convex thorax. In breech presentations, fetal heart sounds are heard most clearly high in the uterus, at the woman's umbilicus or above. In cephalic presentations, they are heard loudest low in the abdomen. In an ROA position, the sounds are heard best in the right lower quadrant; in an LOA position, in the left lower quadrant. In posterior positions (LOP or ROP), heart sounds are loudest on a woman's side. Figure 18.16 shows how to locate heart sounds for various fetal positions.

Hearing fetal heart sounds in these positions provides confirmatory information about fetal position. Conversely, recognizing fetal position aids in locating fetal heart sounds.

Determine the FHR every 30 minutes during beginning labor, every 15 minutes during active labor, and every 5 minutes during the second stage of labor. This can be done by viewing the FHR monitoring strip or by periodic auscultation.

To auscultate fetal heart sounds, use either a stethoscope or a fetoscope (a modified stethoscope attached to a headpiece), or obtain them with a Doppler unit, which uses ultrasound waves that bounce off the fetal heart to produce echoes or clicking noises (Fig. 18.17). These clicks reflect the FHR.

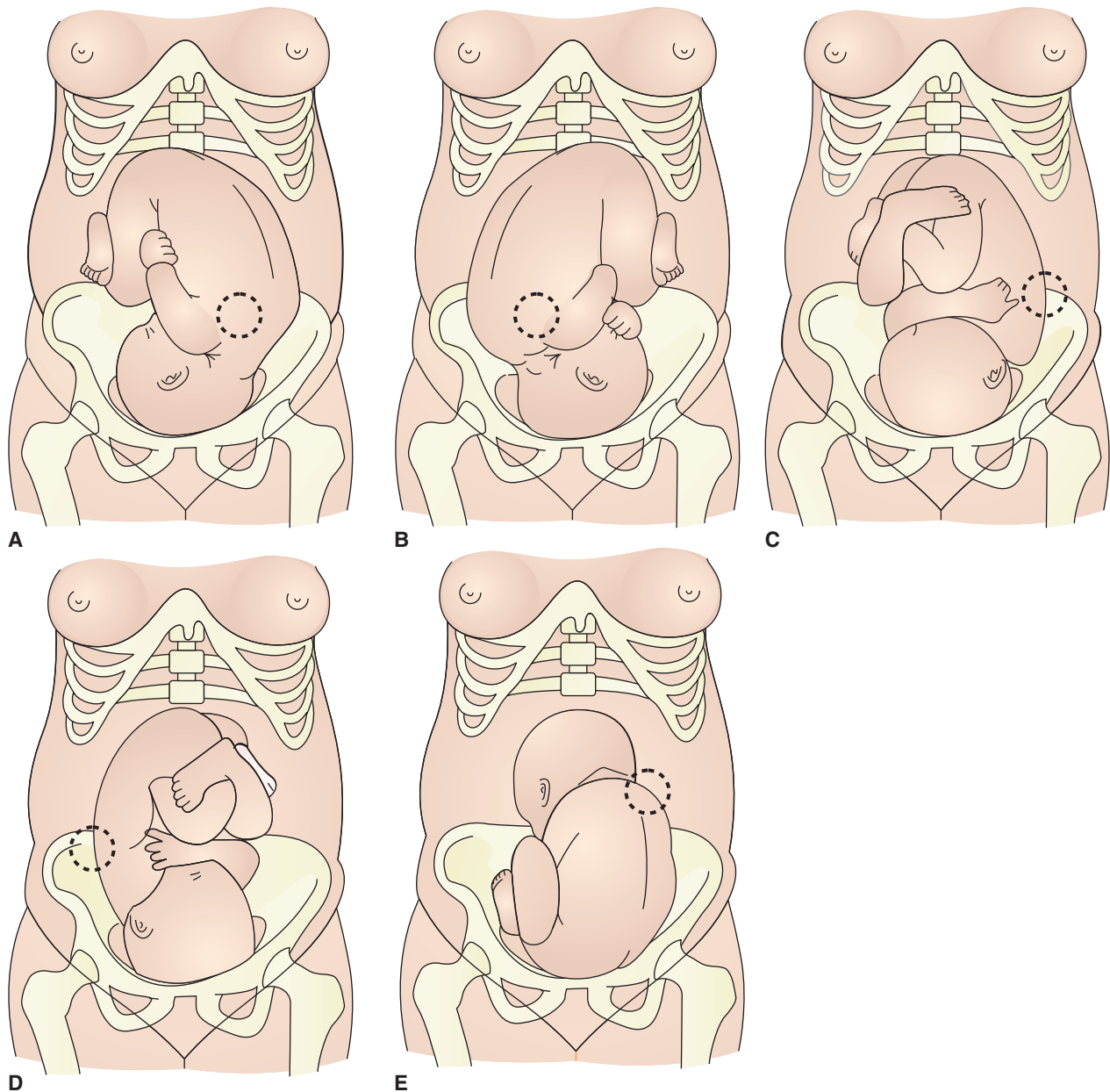
## Electronic Monitoring

In most settings, FHR is screened at least for a short time in early labor by an external electronic monitoring system. The monitor is left in place for continuous monitoring on women who are categorized as high risk for any reason or who have oxytocin stimulation.

The use of fetal monitors has provoked one of the biggest controversies in modern obstetric health care. Monitors were widely adopted in the mid-1970s as a means of immediately detecting variations in FHR. However, prepared childbirth advocates have long criticized the overuse of monitoring devices, arguing that they intrude on the childbirth experience, causing needless discomfort and distraction to the mother. The medical profession readily admits that monitors contribute to the growing number of cesarean births (National Center for Health Statistics, 2005). Advocates of monitoring would say that the prevention of complications in even one baby is worth this increase. However, others believe that monitors often point to a problem where none exists, resulting in unnecessary cesarean births (which carries its own set of risks) and unnecessary frightening of parents (which could adversely affect early parent–infant bonding).

Monitoring does offer many advantages from a health care provider's standpoint. Observing the FHR on a monitor is easier than listening with a stethoscope or fetoscope. In addition, most health care providers have grown accustomed to monitors and may feel insecure without them. Few people advocate a return to the use of stethoscopes





**FIGURE 18.16** Locating fetal heart sounds by fetal position. (A) LOA, (B) ROA, (C) LOP, (D) ROP, (E) LSA.

for total assessment; use of monitors for periodic assessment rather than continuous monitoring is a compromise solution.

Be certain to tell parents that the FHR can vary greatly during labor and that the monitor is only an aid and should not be the focus of their attention. Parents can become so focused on what is happening on the monitor that they lose the ability to concentrate on previously learned relaxation and breathing techniques.

### External Electronic Monitoring

External electronic monitoring is useful for monitoring both uterine contractions and FHR continuously or inter-

mittently. The information is obtained from sensors strapped to the woman's abdomen (Fig. 18.18).

Contractions are monitored by means of a pressure transducer or tocodynamometer (*toko* is Greek for contraction). Place the transducer over the uterine fundus or the area of greatest contractility. Verify that it is securely held in place by an adjustable strap or stockinette girdle (Fig. 18.19A). The transducer converts the pressure registered by the contraction into an electronic signal that is recorded on graph paper.

The FHR is monitored with the use of an ultrasonic sensor or monitor (see Fig. 18.19A) also strapped against a woman's abdomen at the level of the fetal chest. The small Doppler unit converts fetal heart movements into



**FIGURE 18.17** (A) Auscultation of the fetal heartbeat using a fetoscope. (B) A Doppler ultrasound device can be used to monitor fetal heart rate intermittently in low-risk labor. (Photos by Kieth Cotton.)

audible beeping sounds and also records them on graph paper.

A woman who is worried that something will happen to her child during labor will find it reassuring to listen to the regular beeping sound of the undistressed fetal heart from a fetal heart transducer. Many women ask for and can have a short graph tracing to save for their child's baby book.

External monitoring is not as reliable as internal monitoring, because a change in maternal or fetal position can interfere with the quality of the tracing. However, it is

noninvasive and easily applied and does not require cervical dilatation or fetal descent before it can be used. This means it can be introduced early in labor.

Occasionally, a woman may feel discomfort from the strap holding an external monitor in place. The snugness of the sensor head also may limit her ability to breathe deeply. Spreading talcum powder on her abdomen may make the strap more comfortable. Removing the sensor periodically and allowing for a position change is also helpful. If the woman changes her position herself (and she will change position often during labor), the sensor often needs to be repositioned. Remind the woman that the fetal heart signal may stop when she changes position, so she will not think by the silence she hears that her baby's heart has stopped.

Women do not need to lie on their backs for monitoring, so the likelihood of supine hypotension syndrome is not increased. When giving care, be sure not to focus solely on the equipment; continue to communicate and offer support to the woman and her partner as needed.



**FIGURE 18.18** External electronic monitoring in place. Two devices (a transducer for the uterus and an ultrasound sensor for the fetus) are strapped to the woman's abdomen. (© Caroline Brown, RNC, MS, DEd.)



**What if...** you enter Celeste Bailey's room while she has an electronic monitor in place and discover that she is lying on her back, seemingly frozen in one position? Would you urge her to turn or let her lie in a position that is comfortable for her?

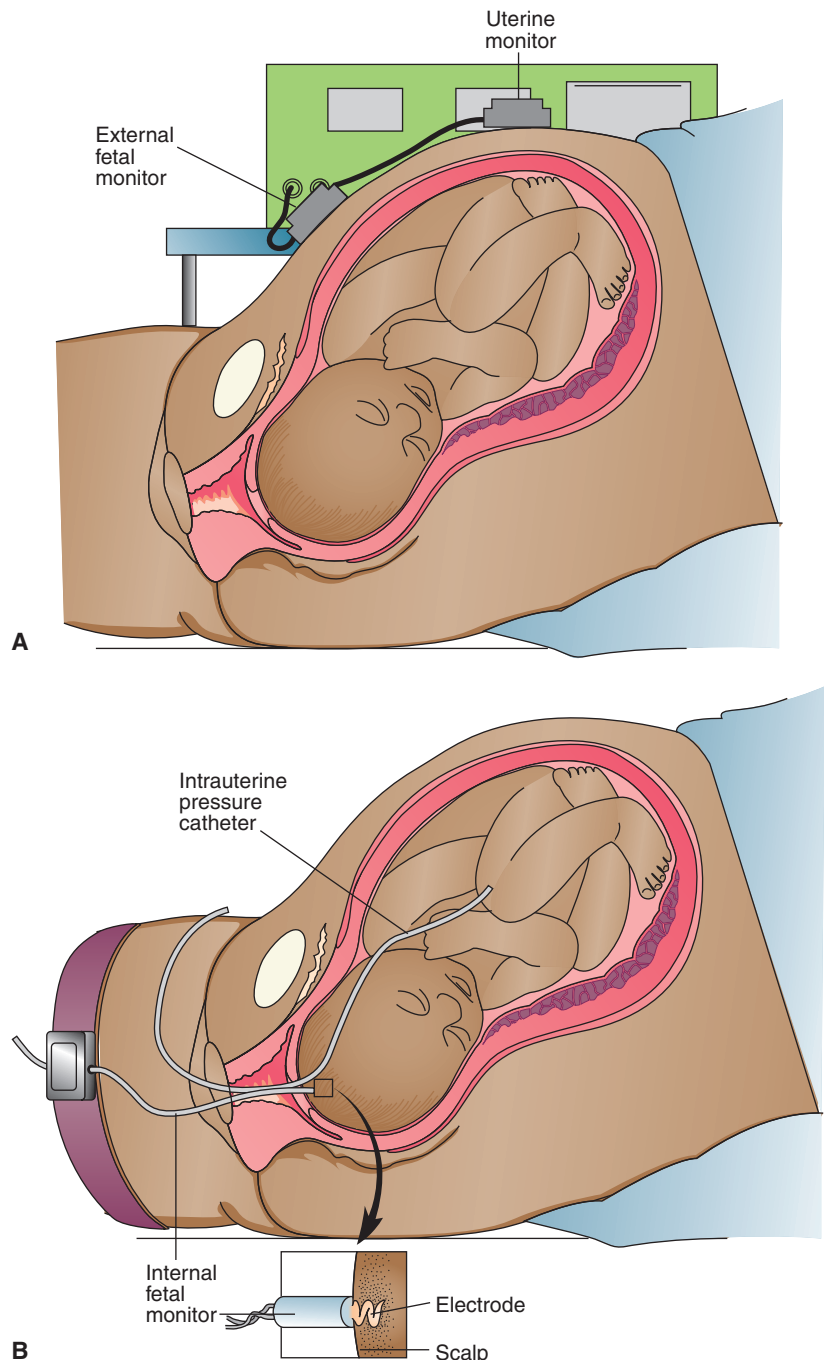
### Internal Electronic Monitoring

Internal electronic monitoring is the most precise method for assessing FHR and uterine contractions. A pressure-sensing catheter is passed through the vagina, into the uterine cavity and alongside the fetus, after the mem-

branes have ruptured and the cervix has dilated to at least 3 cm (see Fig. 18.19B). The end of the catheter extending from the vagina is attached to a pressure recorder. As each contraction puts pressure on the uterine contents, the pressure exerted on the catheter is recorded. When uterine contractions are monitored by an internal pressure gauge in this way, the frequency, duration, baseline strength, and peak strength of contractions can all be evaluated. Strength of contractions is evaluated by the height of the peak of the contraction on the tracing. Equally important to evaluate is the return of the uterine tone to baseline strength between contractions. This ensures placental filling between contractions.

With contractions during the latent phase, the baseline level is usually less than 5 mm Hg; with active contractions, it is about 12 mm Hg. During the second stage of labor, the baseline may be as high as 20 mm Hg. Baseline readings that do not return to 20 mm Hg or less indicate uterine hypertonia and a possible compromise of fetal well-being.

The FHR recording is obtained from a fetal scalp electrode. Once the fetal head is engaged, the electrode is inserted vaginally and attached to the fetal scalp. A fetal electrocardiograph signal is obtained, amplified, and then fed into a cardiometer. The output from the cardiometer is recorded on permanent graph paper.



**FIGURE 18.19** Placement of electronic monitoring leads. (A) External leads to monitor for FHR and uterine contractions. (B) An internal fetal heart rate lead in place on the fetal scalp. Uterine contractions are monitored by the intrauterine catheter.

The level of information obtained by internal monitoring cannot be matched by external monitoring, which records only the frequency and duration of contractions. The detail on fetal heartbeats is also clearer with internal monitoring (described later). On the other hand, internal monitoring is invasive, carries the risk of uterine infection, and limits a woman’s movement. Because of these drawbacks, it is not used as routinely as external monitoring but is reserved for women who are at high risk during labor.

Telemetry

Telemetry allows monitoring of both FHR and uterine contractions to be carried out free of connecting wires that could hamper the woman’s movements in labor. An internal pressure uterine lead is inserted, as in internal monitoring, and a fetal scalp electrode is also attached. A miniature radio transmitter is then placed in the vagina to transmit the FHR and uterine contraction signals to a distant monitor. The major advantage of telemetry is that it allows the woman to ambulate while being internally monitored. Because it is more expensive than other equipment, not all birth settings use telemetry.

Fetal Heart Rate and Uterine Contraction Records

Traditional abdominal monitors trace both the FHR and the duration and interval of uterine contractions onto paper rolls (Fig. 18.20). Uterine contraction information is recorded on the bottom half of the paper, FHR on the top half. Time can be calculated by counting the number of bold vertical lines on the paper (the space between two bold lines represents 60 seconds).

Fetal Heart Rate Patterns

Assessing and interpreting FHR patterns involves evaluating three parameters: the baseline rate, variabilities in the baseline rate (long-term and short-term), and periodic changes in the rate (acceleration and deceleration) (Spong, 2003).

Baseline Fetal Heart Rate

A baseline FHR is determined by analyzing the range of fetal heartbeats recorded on a 10-minute tracing that was obtained between contractions. A normal rate is 120 to 160 bpm. The rate fluctuates slightly (5 to 15 bpm) when

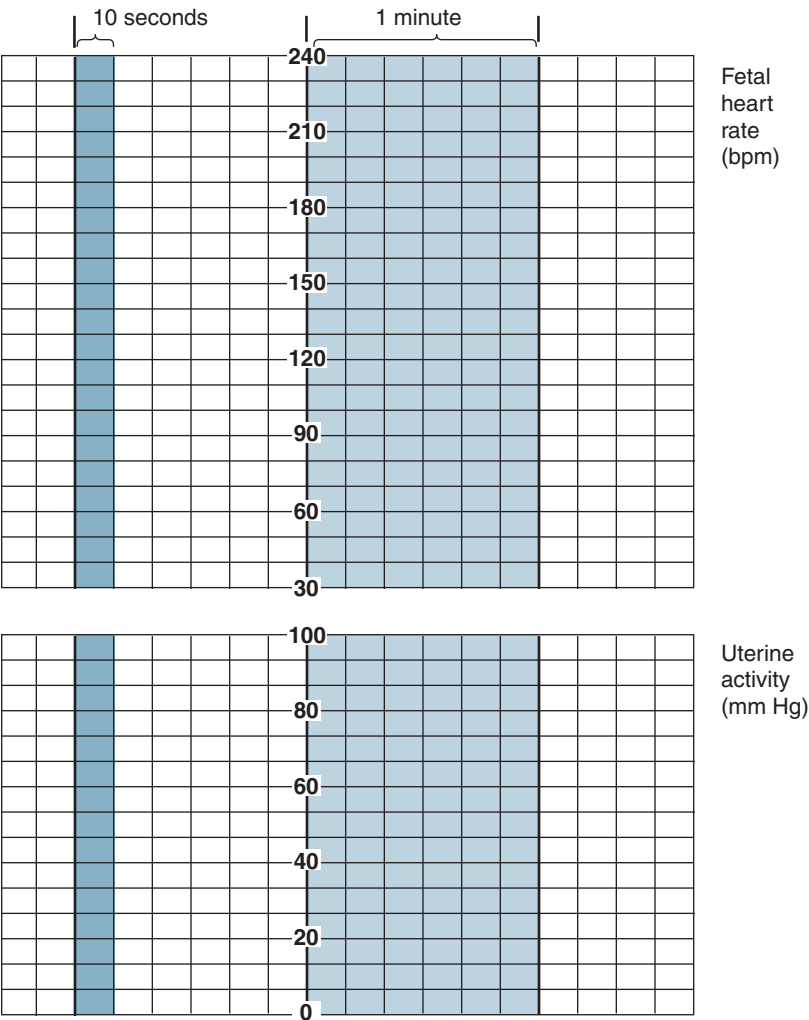


FIGURE 18.20 Paper strip for recording electronic fetal monitoring data.



a fetus moves or sleeps. If an increase or decrease occurs and is sustained for a 10-minute period, then a new baseline or a baseline change is established. Abnormal patterns in the baseline rate include fetal bradycardia and fetal tachycardia.

Fetal bradycardia occurs when the FHR is lower than 120 bpm for 10 minutes. A moderate bradycardia of 100 to 119 bpm is not considered serious and is probably due to a vagal response elicited by compression of the fetal head during labor. Marked bradycardia (less than 100 bpm) is a sign of possible hypoxia and is considered dangerous.

Fetal tachycardia occurs when the rate is 160 bpm or faster (for a 10-minute period). Moderate tachycardia is 161 to 180 bpm. Marked tachycardia is a rate greater than 180 bpm. Marked fetal tachycardia may be caused by fetal hypoxia, maternal fever, drugs, fetal arrhythmia, or maternal anemia or hyperthyroidism. In all instances, the cause needs to be investigated.

## Variability

FHR variability is one of the most reliable indicators of fetal well-being. Baseline variability is the variation or differing rhythmicity in the heart rate over time and is reflected on the FHR tracing as a slight irregularity or “jitter” to the wave. The degree of baseline variability increases when the fetus is stimulated and slows when the fetus sleeps. If no variability is present, it indicates that the natural pacemaker activity of the fetal heart (effects of the sympathetic and parasympathetic nervous systems) has been affected. This may occur as a response to narcotics or barbiturates administered to a woman in labor, but the possibility of fetal hypoxia and acidosis must be investigated. Very immature fetuses show diminished baseline variability because of reduced nervous system response to stimulation and immature cardiac node function.

Baseline variability is defined as being either long-term or short-term (beat-to-beat) (Fig. 18.21). Long-term variability is seen on a broad view of the recording and results from fluctuations in the FHR, of 6 to 10 bpm, that occur 3 to 10 times per minute. Short-term or beat-to-beat variability refers to the difference between successive heartbeats, usually about 3 to 5 bpm. These changes are very subtle and can be picked up only with internal electronic

monitoring. Beat-to-beat variability can be rated as “present,” “decreased,” or “absent.” Decreasing variability indicates the development of fetal distress. Absent variability is considered a severe sign, indicating that serious fetal compromise must be present.

## Periodic Changes

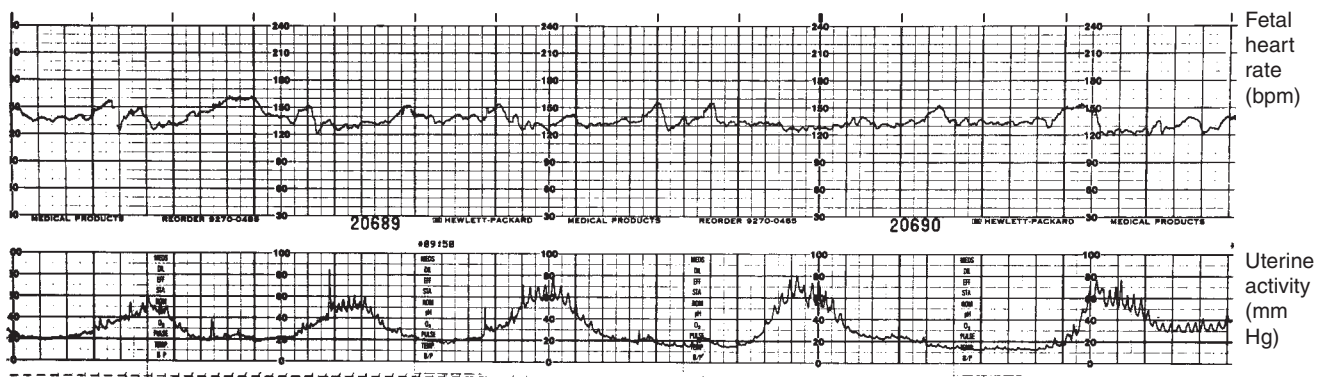
Periodic changes or fluctuations in FHR occur in response to contractions and fetal movement and are described in terms of accelerations or decelerations. Periodic changes are short-term changes in rate rather than baseline; they last from a few seconds to 1 or 2 minutes. Four such responses are acceleration, early deceleration, late deceleration, and variable deceleration.

**Accelerations.** Accelerations are temporary normal increases in FHR caused by fetal movement or compression of the umbilical vein during a contraction.

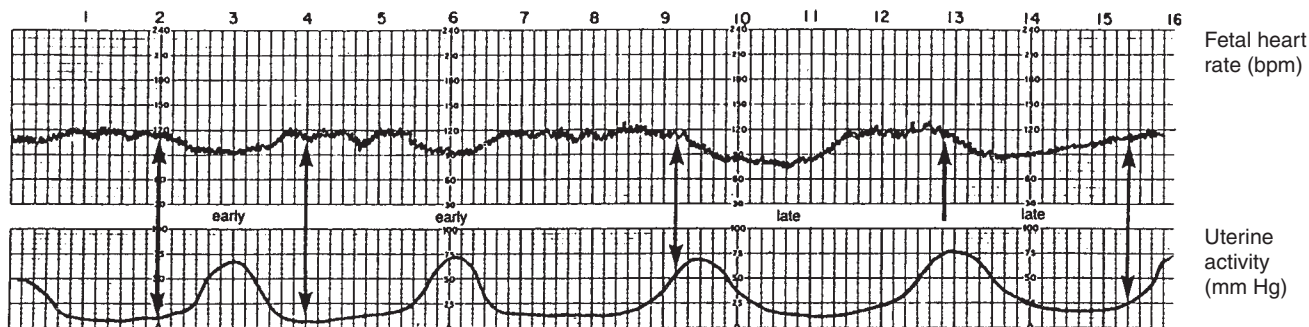
**Early Decelerations.** Early decelerations are periodic decreases in FHR resulting from pressure on the fetal head during contractions. Parasympathetic stimulation in response to vagal nerve compression brings about a slowing of FHR. Early deceleration follows the pattern of the contraction, beginning when the contraction begins and ending when the contraction ends. However, the waveform of the FHR change is the inverse of the contraction waveform, with the lowest point of the deceleration occurring with the peak of the contraction. In this way, it serves as a mirror image of the contraction. The rate rarely falls below 100 bpm, and it returns quickly to between 120 and 160 beats at the end of the contraction (Fig. 18.22).

Early decelerations normally occur late in labor, when the head has descended fairly low. As such, they are viewed as a normal pattern. However, if they occur early in labor, before the head has fully descended, the head compression causing the waveform change could be the result of cephalopelvic disproportion and is a cause for concern.

**Late Decelerations.** Late decelerations are those that are delayed until 30 to 40 seconds after the onset of a contraction and continue beyond the end of the contraction (see Fig. 18.22). This is an ominous pattern in labor, be-



**FIGURE 18.21** Fetal monitoring strip showing both long-term and short-term (beat-to-beat) variability.



**FIGURE 18.22** Schematic drawing of periodic FHR changes. Although the shape and depth of early and late decelerations are similar, note the differences in the onset of the decelerations and the recovery time to the baseline rate.

cause it suggests uteroplacental insufficiency or decreased blood flow through the intervillous spaces of the uterus during uterine contractions. The lowest point of the deceleration (nadir) occurs near the end of the contraction instead of at its peak. This pattern may occur with marked hypertonia or with abnormal uterine tone caused by the administration of oxytocin. Immediate steps to correct the situation must be initiated. If oxytocin is being used, stop or slow the rate of administration. Change the woman's position from supine to lateral (to relieve pressure on the vena cava and supply more blood to the uterus). Administer intravenous fluids or oxygen as prescribed. Prepare for possible prompt birth of the infant if the late decelerations persist or if FHR variability becomes abnormal (absent or decreased).

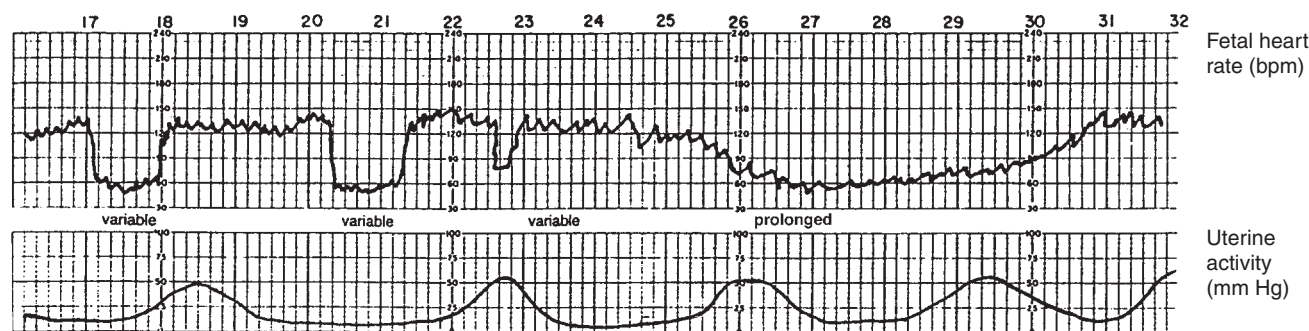
Prolonged decelerations are decelerations that last longer than 2 to 3 minutes but less than 10 minutes. They generally reflect an isolated occurrence, but they may signify a significant event, such as cord compression or maternal hypotension. For this reason, they must be reported and documented (Spong, 2003).

**Variable Decelerations.** The pattern of variable decelerations refers to decelerations that occur at unpredictable times in relation to contractions. They indicate compression of the cord, which can be an ominous development in terms of fetal well-being (Fig. 18.23). Cord compression may occur because of a prolapsed cord, but it also may occur because the fetus is lying on the cord. It tends

to occur more frequently after rupture of the membranes than when membranes are intact, or with oligohydramnios (the presence of less than a normal amount of amniotic fluid), such as occurs in postterm pregnancy or with intrauterine growth restriction. Because the pattern this produces is variable, often exhibited as U-, V-, or W-shaped waves, it can be completely missed if monitoring is not continuous. If this pattern is recognized on the monitor, change the woman's position from supine to lateral or to a Trendelenburg position to relieve pressure on the cord. Administer fluids and oxygen as prescribed. If variable decelerations are not relieved by these measures, amnioinfusion may be prescribed.

**Amnioinfusion.** Amnioinfusion is the addition of a sterile fluid into the uterus to supplement the amniotic fluid. The technique neither shortens nor prolongs labor; it just prevents additional cord compression. A sterile catheter is introduced through the cervix into the uterus after rupture of the membranes. It is attached to intravenous tubing, and a solution of warmed normal saline or lactated Ringer's solution is rapidly infused. Initially, approximately 500 mL is infused, and then the rate is adjusted to infuse the least amount necessary to maintain a monitor pattern without variable decelerations. Throughout the procedure, urge the woman to lie in a lateral recumbent position to prevent supine hypotension syndrome.

Help maintain strict aseptic technique during insertion and while caring for the catheter. Continuously monitor



**FIGURE 18.23** Schematic drawing of variable and prolonged decelerations. Note the abrupt drop in FHR in both types of decelerations. The variable decelerations return to baseline more quickly than the prolonged deceleration at 26–31 minutes, however.

FHR and uterine contractions internally during the infusion. Record maternal temperature hourly to detect infection. Be sure the solution is warmed to body temperature before the infusion, to prevent chilling of the mother and fetus. This can be done by placing the bag of fluid on a radiant heat warmer or by using a blood/fluid warmer before administration.

Because there will be a continuous flow of the infusing solution out of the woman's vagina during the procedure, change her bed frequently. Also assess that there is constant drainage. If vaginal leakage should stop, it usually means that the fetal head is firmly engaged and all fluid being infused is being held in the uterus. This is dangerous because it could lead to hydramnios (presence of excessive amniotic fluid) and possibly uterine rupture.

### Sinusoidal Fetal Heart Rate Pattern

In a fetus who is severely anemic or hypoxic, central nervous system control of heart pacing may be so impaired that the FHR pattern resembles a frequently undulating wave. Long-term variability consists of 5 to 15 bpm every 3 to 5 minutes; beat-to-beat variability is minimal or absent; and there is a lack of specific responses to contractions. Although the cause of this pattern is poorly understood, it is recognized to be as ominous as a late deceleration or variable deceleration pattern.

### Nonperiodic Changes

Nonperiodic changes are deceleration or acceleration changes that occur at times other than when the uterus is contracting. They are the result of events such as fetal movement, a change in maternal position, or administration of analgesia. Treatment may not be necessary and depends on the causative factor.

## Other Assessment Techniques

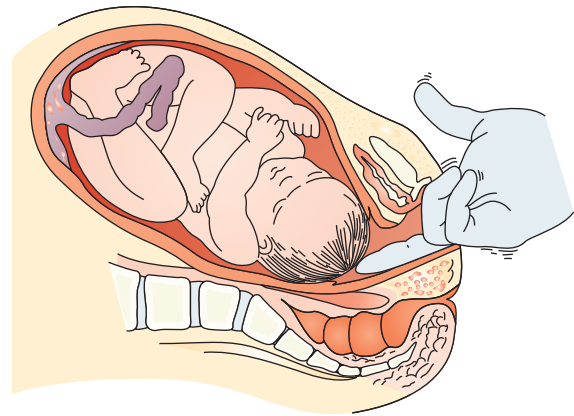
### Scalp Stimulation

If FHR variability is depressed, the welfare of the fetus can be further assessed by scalp stimulation. This is done by applying pressure with the fingers to the fetal scalp through the dilated cervix (Fig. 18.24). This causes a tactile response in the fetus that momentarily increases the FHR. If the fetus is in distress and becoming acidotic, FHR acceleration will not occur. Scalp stimulation, therefore, is an assessment of acid-base balance in a fetus.

### Fetal Blood Sampling

Monitoring of the fetal blood composition may reveal hypoxia in a fetus before it becomes apparent on an electrocardiogram or external monitoring system. This is because changes in blood composition lead to alterations in FHR. It is unnecessary and impractical to monitor all fetuses by blood sampling during labor. The procedure is reserved for high-risk fetuses.

The oxygen saturation, partial pressures of oxygen ( $\text{PO}_2$ ) and carbon dioxide ( $\text{PCO}_2$ ), pH, bicarbonate excess, and hematocrit of fetal blood may all be determined during labor if a sample of capillary blood is taken from the



**FIGURE 18.24** Technique for scalp stimulation. (Redrawn from *Journal of Perinatal and Neonatal Nursing*, 1, 16; with permission from Aspen Publishers, Inc.)

fetal scalp as it presents at the dilated cervix. After cervical dilatation of 3 to 4 cm and rupture of the membranes, the fetal head is visualized by the use of an amnioscope—a small, cone-shaped instrument with a light source at the far end. The scalp is cleaned with povidone-iodine and sprayed with silicon. A small scalpel is introduced vaginally into the cervix, and the fetal scalp is nicked. The silicon causes blood to form in beads, which are caught by a capillary tube. The incision is then compressed until the bleeding has stopped. After the procedure, the woman must be observed after two or three contractions to be certain that no new scalp bleeding occurs.

Although a blood sample obtained in this way may be analyzed for many parameters, usually only the pH results are necessary. If the fetus is hypoxic, the pH will fall (become acidotic). A scalp blood pH greater than 7.25 is considered normal for a fetus during labor. A pH between 7.21 and 7.25 should be remeasured in 30 minutes. A scalp blood pH lower than 7.20 is acidotic and signifies a level of fetal distress. This technique may be used to verify a heart rate pattern on a monitor that is becoming ominous. It can also be used to verify that no acidosis is occurring, even if a monitor rate is showing decreased variability. Fetal scalp sampling is becoming less popular because it has been found that firm pressure against the fetal head by a finger inserted vaginally increases monitor strip variability. If a variability increase occurs by this method, blood sampling is not necessary.

Fetal blood sampling involves no pain for the woman, but it may involve an uncomfortable sensation of pressure because of the examining hand in the vagina. Infants who have had internal scalp blood samples taken should not be born by vacuum extraction, because this procedure can lead to renewed bleeding at the puncture site.

### Acoustic Stimulation

Acoustic stimulation, or instrumentally producing a sharp sound next to the woman's abdomen, is used with non-stress tests during pregnancy to produce FHR acceleration (see Chapter 8). It can also be used during labor to demonstrate that the fetus is reactive.





### Checkpoint Question 4

You assess Celeste Bailey's uterine contractions. In relation to the contraction, when does a late deceleration begin?

- Forty-five seconds after the contraction is over.
- Thirty seconds after the start of a contraction.
- After every tenth or more contraction.
- After a typical contraction ends.

## CARE OF A WOMAN DURING THE FIRST STAGE OF LABOR

Six major concepts to make labor and birth as natural as possible are currently stressed by childbirth educators: (1) labor should begin on its own, not be artificially induced; (2) women should be able to move about freely throughout labor, not be confined to bed; (3) women should receive continuous support during labor; (4) no interventions such as intravenous fluid should be used routinely; (5) women should be allowed to assume a non-supine (e.g., upright, side-lying) position for birth; and (6) mother and baby should be housed together after the birth, with unlimited opportunity for breast-feeding (Curl et al., 2004).

The first stage of labor begins with the beginning of uterine contractions and ends when the cervix has reached full dilatation. Most women have had labor contractions for hours before they arrive at a birthing center, because they deliberately stay at home until they are well into the first stage. Most likely, they have been experiencing pain and relying on their own judgment that everything is going well for a long time. One of their chief needs when they arrive at the birthing center, therefore, is to be reassured that everything is going well. For a woman who has been unable to manage pain by breathing exercises, pain relief is a priority need.

## NURSING DIAGNOSES AND RELATED INTERVENTIONS

**Nursing Diagnosis:** Powerlessness related to duration of labor

**Outcome Evaluation:** Client expresses preferences for position and techniques to control pain; asks questions about her progress and states feelings about what is happening.

Care during the first stage of labor centers on helping the woman feel confident in her ability to control the pain and progress of labor and maintain physiologic stability. At first, it is exciting for a woman to feel labor contractions. They are little

more than menstrual cramps and project a “this-is-really-happening” quality. Soon, however, if the woman is not concentrating on controlled breathing exercises, the contractions become biting in their intensity. Despite the fact that she is becoming more and more uncomfortable, however, nothing seems to be happening. A couple can begin to worry that something is going wrong; they may think that because the 9 months are over victory is near, yet it is eluding them. Give couples frequent progress reports during labor, so they do not become discouraged or fearful at this seeming lack of progress (Box 18.10).

A woman wants to feel that she has some control over her situation during labor. Most women accomplish this by stating their preferences, breathing with contractions, and changing their position to the one that makes them most comfortable. In contrast, some women handle the stress of labor by becoming extremely quiet. Others feel most comfortable when they can show their emotions by shouting or crying. Help a woman express her feelings in her own way, one that works the best for her.

**Respect Contraction Time.** Do not interrupt a woman who is in the middle of breathing exercises during labor because, once her concentration is disrupted, she will feel the extent of the contraction. If she has been successfully using breathing exercises to reduce pain, suddenly feeling the full force of a contraction can be frightening. She tenses, the pain becomes worse, and she may doubt her ability to breathe constructively in the face of such sharp pain with the next contraction. Instead of interrupting, allow her to finish breathing with her contraction, then ask questions or announce what procedure needs to be done next, or ask the question but wait patiently for the answer. (See Chapter 19 for a discussion of pain management techniques during labor.)

**Promote Change of Positions.** Because the bed is the main piece of furniture in a birthing room, most women assume that they are expected to lie quietly in bed during labor. In early labor, however, a woman may be out of bed walking or sitting up in bed or in a chair, kneeling, squatting, or in whatever position she prefers (Shilling & DiFranco, 2004) (Fig. 18.25). Reassure the woman that she may move about as needed (Box 18.11).

A woman whose membranes have ruptured should lie on her side until a fetal monitor shows good baseline variability and no variable decelerations or until she has been checked by a physician or nurse-midwife, because, unless the head of the fetus is well engaged (firmly fitting into the pelvic inlet), the umbilical cord may prolapse into the vagina if she walks.

If medication such as a narcotic is given, educate the woman to remain in bed for approximately 15 minutes afterward to avoid a fall if she should become dizzy from the medication. As labor becomes advanced, remaining in bed and assuming a



## BOX 18.10: Focus on Nursing Care Planning

## A Multidisciplinary Care Map for A Woman Who Requires Comfort Measures During Labor and Birth

*Celeste Bailey is a 26-year-old you admit to a birthing room. She tells you she wants to have her baby “naturally” without any analgesia or anesthesia. Her husband is in the Army and assigned overseas, so he is not with her. Although her sister lives only two blocks from the hospital, Celeste doesn’t want her called. She asks if she can talk to her mother on the telephone instead. As you finish assessing contractions, she screams with pain and shouts, “I’m doing everything I’m supposed to! How much longer does this go on?”*

### Family Assessment

Client lives with husband in Marine Base apartment. Husband currently assigned overseas. Finances rated as “horrible. If you want to be rich, don’t marry a Marine.” Both her mother and her married sister live nearby.

### Client Assessment

Gravida 1, para 0. Contractions of moderate intensity, 45 seconds’ duration, 3 minutes apart. Cervix dilated 3 cm, 60% effaced. Membranes intact. FHR 148; fetus in ROA position. Attended childbirth education classes, but is using breathing exercises ineffectively without coach. Brought a red rose to use as a focusing object.

### Nursing Diagnosis

Pain related to uterine contractions and pressure on pelvic structures during labor

### Outcome Criteria

Client confirms that her discomfort is controlled with nonpharmacologic or pharmacologic methods; responds to questions and instructions; identifies need for additional pain relief measures if needed as labor progresses.

Team Member Responsible	Assessment	Intervention	Rationale	Expected Outcome
Activities of Daily Living				
Nurse	Inspect the client’s suprapubic area and palpate for bladder distention.	Encourage client to void every 2 hours.	A full bladder contributes to the client’s discomfort and impedes fetal descent, possibly prolonging labor.	Client has no signs of bladder distention; voids every 2 hours during labor.
Nurse	Assess level of pain from uterine contractions and pelvic pressure by both verbal and nonverbal indicators; use 1 to 10 pain score.	Review and observe Lamaze breathing patterns with client to be certain she is obtaining maximum relief. Inform client about possible pharmacologic relief methods available to her if labor should be different than anticipated.	Pain is a subjective symptom, so only the client can determine her degree of pain or need for analgesia.	Client rates her level of pain from labor contractions as good to tolerable.

(continued)

Team Member Responsible	Assessment	Intervention	Rationale	Expected Outcome
<b>Consultations</b>				
Physician/ Nurse	Determine what personnel are available to prescribe or administer pharmacologic pain relief during labor, such as an epidural block.	Consult with nurse anesthetist about client's wish to not receive any pharmacologic pain relief.	Respecting client's wishes is a prime mode of encouraging self-efficacy.	Pain management team supports client's wish for no pharmacologic interventions; will be prepared to administer pain relief if client's wishes change or an emergency should change the client's goal.
<b>Procedures/Medications</b>				
Nurse	Assess what particular care measures, if any, client desires during labor (e.g., walking or not, birth position).	Establish a birth plan with client so all staff members can be aware of her individual preferences.	Respecting a client's choice helps to maintain self-esteem and a feeling of control.	Client expresses her preferences during labor.
<b>Nutrition</b>				
Nurse	Assess when client last ate. Ask about preferences for fluid during labor.	Provide client with ice chips or hard candy as desired.	Ice chips or hard candy can relieve mouth dryness from breathing exercises.	Client states she has no mouth discomfort and does not feel hungry.
<b>Patient/Family Education</b>				
Nurse	Assess what client knows about the usual process and time intervals of labor.	Provide information to supplement client's knowledge of labor; update client frequently on labor progress.	Teaching is most efficient if it is based on prior knowledge. Frequent updates about client's progress help to alleviate anxiety.	Client states that she understands the process of usual labor; indicates progress reports are helpful.
<b>Psychosocial/Spiritual/Emotional Needs</b>				
Nurse	Assess if physical environment seems conducive to labor without pharmacologic support.	<p>Provide a comfortable environment (e.g., change sheets frequently, adjust room temperature, offer cool washcloths to forehead).</p> <p>Encourage client to assume different positions and to change them regularly. Allow client to walk or sit in chair, if not contraindicated.</p> <p>Respect the need for focusing during contractions. Refrain from intervening with client during a contraction.</p>	<p>A comfortable environment aids in relaxation and minimizes distractions, promoting effective coping to manage discomfort.</p> <p>Position changes promote comfort, reduce muscle tension, relieve pressure, and promote fetal descent.</p> <p>Interrupting client's focusing can be distracting, making the technique ineffective as a pain relief measure.</p>	<p>Client reports that environment is comfortable and she feels secure.</p> <p>Client assumes a variety of positions during labor as desired.</p> <p>Client expresses that she is able to focus during contractions unimpaired by health care providers.</p>
Nurse	Assess if client would like to have a support person with her.	Help client locate a suitable support person (mother?). If none is available, serve as primary support person.	A support person can play a major role in making labor a tolerable experience.	Client names a person she wants as her support person. Person or nurse serves as a support person during labor.

(continued)

Team Member Responsible	Assessment	Intervention	Rationale	Expected Outcome
<b>Discharge Planning</b>				
Nurse	Assess how client evaluates her labor experience.	Help client voice her satisfaction or dissatisfaction with her labor experience.	Reviewing a possibly traumatic experience helps debrief (put it into perspective among life events).	Client states that labor and birth was at worst a tolerable experience; at best, a highlight of her life.

position of comfort may be best, so that, if the birth is precipitous, the infant will not be born while the woman is walking and suffer an injury.

While the woman is in bed, encourage her to lie on her side, preferably the left side. This position causes the heavy uterus to tip forward, away from the vena cava, allowing free blood return from the lower extremities and adequate placental filling and circulation. Most women are comfortable in this posi-

tion and adjust to it readily. Position the chair for the support person facing the laboring woman. Otherwise, she will keep turning to her back to talk.

Some women have learned to do breathing exercises in a supine position and may need additional coaching to do them in a side-lying position. If the woman must turn to her back during a contraction to make her breathing exercises effective, help her to remember to return to her side between



**FIGURE 18.25** Finding a comfortable position during early labor is important. Here, a nurse assists a woman with walking during labor.

#### BOX 18.11 FOCUS ON . . .



#### COMMUNICATION

Celeste Bailey's baby is in an occiput posterior position, so she has had extensive back pain since labor began.

##### Less Effective Communication

**Nurse:** You don't look very comfortable, Celeste. Would you feel better if you sat in the rocking chair rather than staying in bed?

**Celeste:** Can I do that?

**Nurse:** I told you on admission. You can do whatever is most comfortable for you.

**Celeste:** Would it be all right if I walk over to the window?

**Nurse:** I told you on admission. Do whatever is most comfortable for you.

**Celeste:** I guess I'm not being a very good patient.

##### More Effective Communication

**Nurse:** You don't look very comfortable, Celeste. Would you feel better if you sat in the rocking chair rather than staying in bed?

**Celeste:** Can I do that?

**Nurse:** You can use any position that is comfortable for you.

**Celeste:** Would it be all right if I walk over to the window?

**Nurse:** Whatever is most comfortable for you.

**Celeste:** Thank you. You're very understanding.

Most women in labor are enduring so much pain and are under so much stress they don't "hear" or process instructions well. Reminding them that they have not processed information well is not therapeutic, because it can lower their self-esteem and sense of self-control.

contractions. A squatting position is very effective for birth because it helps to align the fetal presenting part with the cervix and also uses the fetal weight to help bring about cervical dilatation.

**Promote Voiding and Provide Bladder Care.** A full bladder or bowel can impede fetal descent, so encourage the woman to void, if possible, at least every 2 to 4 hours. The way a full bladder can impede descent of a fetus is shown in Figure 18.26. You need to remind the woman to do this during labor, because she may mistakenly interpret the discomfort of a full bladder as part of the sensations of labor. Assess for a full bladder by percussion (an empty bladder sounds dull; a full one sounds resonant). If she cannot void and the bladder becomes distended, she may need to be catheterized. Catheterizing a woman in labor is uncomfortable for her and difficult for you: the vulva is edematous from the pressure of the fetal presenting part,

stretching the urethral canal downward and making the urethra difficult to locate. For best results, use a small catheter (No. 12–14F), and insert it between contractions. Use extremely careful aseptic technique to avoid introducing any microorganisms that might result in a urinary tract infection.

**Nursing Diagnosis:** Risk for ineffective breathing pattern related to breathing exercises

**Outcome Evaluation:** Client's respiratory rate is within normal limits; skin is normal color, cool, and dry. No reports of lightheadedness or tingling/numbness in extremities.

Hyperventilation (an accelerated rate of respiration) occurs when a woman exhales more deeply than she inhales. As a result, extra carbon dioxide is blown off and respiratory alkalosis results. This can occur when a woman is practicing breathing exercises in preparation for labor, but it is most apt to occur during actual labor. The woman feels lightheaded and may have tingling or numbness in her toes and fingertips. If allowed to progress, hyperventilation can lead to coma.

To halt hyperventilation, urge the woman to keep a paper bag nearby when doing breathing exercises. Breathing in and out into the paper bag causes her to rebreathe the carbon dioxide she has exhaled, replacing the carbon dioxide lost. If a paper bag is unavailable, she can use her cupped hands instead.

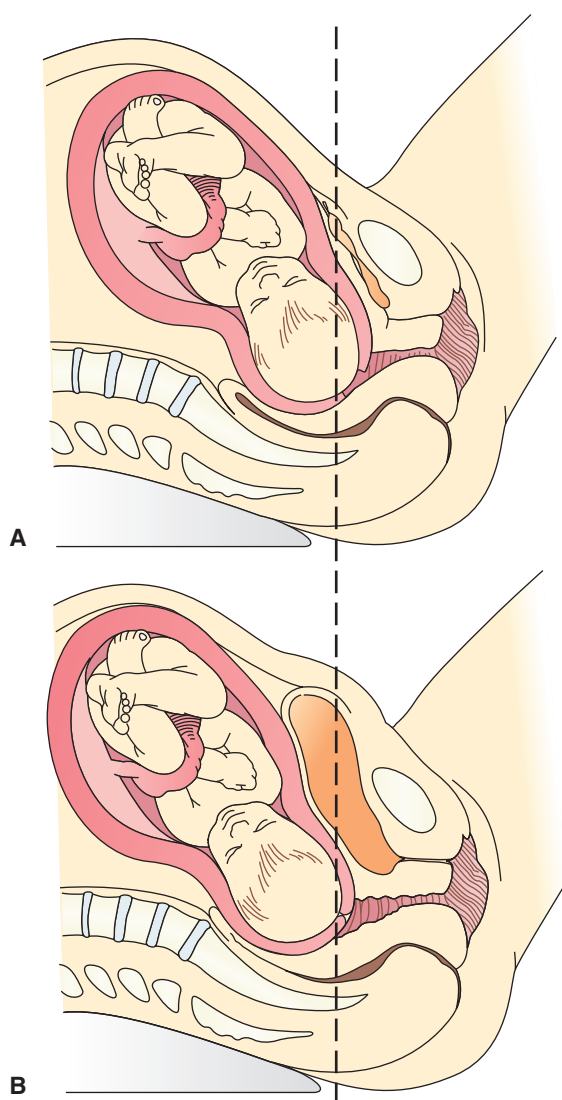
The best way to handle hyperventilation is to prevent it. Be certain when a woman is breathing rapidly that she is not hyperventilating and that she ends all breathing sessions with a long cleansing breath to help restore carbon dioxide balance.

**Nursing Diagnosis:** Anxiety related to stress of labor

**Outcome Evaluation:** Client states she feels somewhat in control of her situation; she and her support person express confidence in themselves and in health care personnel.

Labor is such an intense process that it creates a high level of emotional stress for both a woman and her support person. Ability to tolerate stress (to cope adequately) depends on a person's perception of the event, the support people available, and past experience in using coping mechanisms. Ways to reduce stress in labor, therefore, center on helping a woman to perceive labor clearly and providing the opportunity for her partner to provide support as well.

**Offer Support.** There is no substitute for personal touch and contact as a way to provide support during labor. Patting a woman's arm while telling her that she is progressing in labor, brushing a wisp of hair off her forehead, wiping her forehead with a cool cloth—these are indispensable methods of conveying concern. This caring attitude has several benefits. First, it may make the difference in helping a woman feel safe and able to continue in control. In addition, a woman who is touched, who experiences



**FIGURE 18.26** Effect of a full bladder on fetal descent. (A) Bladder is empty. (B) A full bladder impedes fetal progress.



the warmth and friendliness of human contact during labor—a time when she is physically dependent—may handle her newborn (who is also physically dependent and undergoing an adjustment not unlike the one she has just gone through) more warmly and affectionately. On the other hand, not all women care for physical contact during labor, and enjoyment of touch can be culturally determined.

### **Respect and Promote the Support Person's Activities.**

Admit a woman's support person to the birthing area and allow him or her to remain with the woman throughout the birth. Having someone with her during labor is important, because everything is new and a woman may not be used to the sensation of contractions. Acquaint the woman and her support person with the physical facilities, and point out where supplies such as towels, washcloths, and ice chips are stored, so the support person can get them when necessary. Review procedures and reassure the support person early in labor that he or she is welcome there. Also, be sure that all health care personnel are aware of who the support person is and make him or her feel welcome.

Often the support person will be acting as a labor coach. Ask both the woman and the support person whether they have been to prepared childbirth classes and whether the support person plans to help the woman with her breathing. If so, support this person's role. If he or she is hesitant, it is better to review techniques than to take over. Offer praise not only for the woman but for the support person as well. Relieve the support person as necessary, so that he or she can take a break and get something to eat or visit with older children (Fig. 18.27). If older children will view the birth, be certain that they are oriented and have a child care provider.

In addition to having the father of their baby present, many women choose a doula or another woman to be with them in labor (Pascali-Bonaro & Kroeger, 2004). Fathers may find it hard to provide doula-type support during labor because of their own emotional involvement in the birth. Having such a person present frees the father to enjoy the birth rather than feel occupied with coaching instructions. Although research in the subject is not extensive, there are suggestions that rates of oxytocin augmentation, epidural anesthesia, and cesarean birth can be reduced by doula support.



**What if...** a doula and Celeste Bailey's mother disagree on whether Celeste needs additional medication for pain while in labor? Whose suggestion would you pay most attention to? How could you resolve the issue?

**Support a Woman's Pain Management Efforts.** Some women believe that using a prepared childbirth method will create a pain-free, effortless labor. When they realize this is untrue, they may panic



**FIGURE 18.27** Encouraging the support person, so he can continue to give support, is an important nursing role. (© Barbara Proud.)

and lose the ability to use prepared breathing. Some support people are more nervous than they anticipated and have difficulty being supportive, leaving the woman to manage her anxiety on her own. In these instances, administering an analgesic might be effective in reducing anxiety or taking the edge off contractions. With this degree of relaxation, the woman may be able to return to effective breathing techniques. Sometimes, simply the support of a person, such as a nurse, who is confident that breathing can be effective in reducing the discomfort of labor is all a woman needs to resume her breathing exercises with success.

Many women plan on using nonpharmacologic pain relief measures such as aromatherapy during labor; ask what the woman has planned and what your role should be.

**Nursing Diagnosis:** Risk for fluid volume deficit related to prolonged lack of oral intake and diaphoresis from the effort of labor

**Outcome Evaluation:** Client states she does not feel thirsty; voids at least 30 mL/hour every 2 to 4 hours.

How much fluid or food a woman should ingest during labor is controversial. Most hospitals limit the amount of oral fluid or food intake during labor to ice chips or lollipops, to prevent aspiration if, in an emergency, administration of general anesthesia should be necessary. Because of this, a woman's mouth and lips may become uncomfortably dry from mouth breathing. Applying a cream to her lips or suggesting that she suck on hard candy or ice chips to relieve this discomfort can be helpful. Women in prolonged labor may need isotonic sports drinks to prevent secondary uterine inertia (a cessation of labor contractions) as well as generalized dehydration and exhaustion. If all oral fluids are contraindicated by the birth plan, intravenous glucose solutions may be administered to maintain caloric reserve.

### Amniotomy

Amniotomy is the artificial rupturing of membranes. Rupturing membranes if they do not rupture spontaneously allows the fetal head to contact the cervix more directly and may increase the efficiency of contractions. For this, a woman's cervix must be dilated at least 3 cm. She is placed in a dorsal recumbent position; an amniohook (a long, thin instrument) or a hemostat is passed vaginally. The membranes are torn, and amniotic fluid is allowed to escape. This puts a fetus momentarily at risk for cord prolapse, because there is a possibility that a loop of cord will escape with the fluid. Always measure the FHR immediately after the rupture of membranes to determine that this did not happen (Katz, 2003).



#### Checkpoint Question 5

- Celeste has an amniotomy (artificial rupture of the membranes). After this procedure, which of the following would be an important nursing assessment?
- a. Ask her if her pain level is tolerable postprocedure.
  - b. Assess maternal heart rate to detect possible bleeding.
  - c. Assess fetal heart rate to detect possible cord prolapse.
  - d. Document the amount of amniotic fluid that has been lost.

### CARE OF A WOMAN DURING THE SECOND STAGE OF LABOR

The second stage of labor is the time from full cervical dilatation to birth of the newborn. Even women who have taken childbirth education classes are surprised at the intensity of the contractions in this phase of labor. Because the feeling to push is so strong, some women react to this change in contractions by growing increasingly argumentative and angry, or by crying and screaming. Other women react by tensing their abdominal muscles and trying to resist, making the sensation even more painful and frightening.

The support person plays a vital role during this time, because all of the preparations done up to this point may still not be enough to sustain a woman during these final contractions unless she feels well supported. This participation also creates an important sharing time later, after the birth, that gives a couple a sense of family for the first time.

Women need to have an experienced health care person with them as well as they enter this stage of labor, to reassure them that the change in contractions is normal and to give knowledgeable support that everything is all right.

Assess fetal heart sounds at the beginning of the second stage of labor to be certain that the start of the baby's passage in the birth canal is not occluding the cord and interfering with fetal circulation. A general timetable for second-stage interventions is shown in Table 18.6.

### Preparing the Place of Birth

At one time, women had little say as to the setting where their baby would be born, but today women are allowed a multitude of options. Some choose their own home. In the past, hospitals provided different rooms for labor (labor rooms), for birth (delivery rooms), and for recuperation (postpartal rooms). Today, these rooms are combined into labor-delivery-recovery-postpartal rooms (LDRP or LDR rooms).

### Birthing Room

For a multipara, convert the birthing room into a birth room by opening the sterile packs of supplies on waiting tables when the cervix has dilated to 7 to 9 cm. For a primipara, this can be delayed until the head has crowned to the size of a quarter or half-dollar (full dilatation and descent). A table set with equipment such as sponges, drapes, scissors, basins, clamps, bulb syringe, vaginal packing, and sterile gowns, gloves, and towels, can be left, covered, for up to 8 hours. Be certain that drapes and materials used for birth are sterile, so that no microorganisms can be accidentally introduced into the uterus.

To provide for baby care, open the partition at the end of the room to reveal the "baby island," or newborn care

TABLE 18.6

Time Intervals for Nursing Interventions During Second Stage of Labor

Intervention	Beginning of Second Stage	Continued Frequency	After Birth of Infant	After Delivery of Placenta
<b>Assess and Record</b>				
Temperature	X	q2h		X
Pulse	X	q1h	X	X
Respirations	X	q1h	X	X
Blood pressure	After anesthetic administration	q1h	X	X
Fetal heart rate	X	Continuously by monitor or q5min		
Contractions	X	Continuously by monitor or q5min		
<b>Provide Support</b>	X	Continuously	Continuously	Continuously

area. Such areas include a radiant heat warmer, equipment for suction and resuscitation, and supplies for eye care and identification of the newborn. Turn on the radiant heat warmer in advance, so that the bottom mattress is pleasantly warm to the touch at the time of birth. Place sterile towels and a blanket on the warmer, so that they will also be warm to use to dry and cover the infant.

## Positioning for Birth

A variety of positions can be used for birth. At one time, the lithotomy position was the major position for birth, but it is no longer the position of choice in birthing rooms or alternative birth centers—although the labor beds in these locales usually have attached stirrups to allow birth in a lithotomy position. Alternative birth positions include the lateral or Sims' position, the dorsal recumbent position (on the back with knees flexed), semisitting, and squatting (Keen et al., 2004).

Nurse-midwives tend to favor these alternative birth positions for their clients because they seem to place less tension on the perineum, resulting in fewer perineal tears. An episiotomy can be made in alternative positions, although suturing is more difficult than in a lithotomy position.

If the physician prefers a lithotomy position for birth, position the woman into the table stirrups while the physician is scrubbing and donning a sterile mask, gown, and gloves. Raise both of the woman's legs at the same time to prevent strain on her back and lower abdominal muscles. The strap holding the leg in the stirrups should be secured snugly but not so tightly that it causes constriction. Many women perceive stirrups as an unnatural position for birth, but they provide the best position for performing an episiotomy or a forceps-assisted birth or for viewing the perineum to detect lacerations or other problems at birth, and they are generally not uncomfortable. Pad the stirrups with abdominal pads if a woman has ankle edema; to prevent thrombophlebitis, be certain that there is no pressure on her calves.

Because pushing becomes less effective in a lithotomy position, the top portion of the table can be raised to a 30- to 60-degree angle, so that the woman can continue to push effectively. Lying for longer than 1 hour in a lithotomy position leads to intense pelvic congestion, because blood flow to the lower extremities is impeded. Pelvic congestion may lead to an increase in thrombophlebitis in the postpartal period. It may also contribute to excessive blood loss with birth and placental loosening. For these reasons, place the woman's legs in a lithotomy position only at the last moment.

Once a woman is in a lithotomy position, the table's lower half is folded downward ("broken") so the physician can be in close proximity to the birth outlet. Make sure there is always someone at the foot of a broken birthing room table so that, if birth should occur precipitously, the infant will not fall and be injured.

## Promoting Effective Second-Stage Pushing

For the most effective pushing during the second stage of labor, a woman must push with contractions and rest be-

tween them. The best approach is to allow her to push when she feels the urge and to use the position and technique she feels are best for her. Pushing is usually best done from a semi-Fowler's, squatting, or "all-fours" position rather than lying flat, to allow gravity to aid the effort (Fig. 18.28). A woman can use short pushes or long, sustained ones, whichever are more comfortable. Holding the breath during a contraction could cause a Valsalva maneuver or temporarily impede blood return to the heart because of increased intrathoracic pressure. This could also interfere with blood supply to the uterus. To prevent her from holding her breath during pushing, urge her to breathe out during a pushing effort.

In a multipara, to keep the second stage of labor from moving too fast, it may be necessary to prevent the woman from pushing. To accomplish this, ask her to pant with contractions. Because it is difficult to push effectively when she is using her diaphragm for panting, this limits pushing. Remember that pushing is involuntary. Regardless of how much a woman wants to cooperate, stopping this overwhelming urge to push is almost beyond her power. Demonstrating "panting like a puppy" and panting with her may be most effective. Be sure she is inhaling adequately. Otherwise, she might hyperventilate and become lightheaded while panting. Have her take deep cleansing breaths between contractions to prevent this.

## Perineal Cleaning

Clean the perineum with a warmed antiseptic (cold solution causes cramping), and then rinse it with a designated solution before birth, according to the policy of the physician, nurse-midwife, or agency. Always clean from the vagina outward (so that microorganisms are moved away from the vagina, not toward it), using a clean compress for each stroke. Be sure and include a wide area (vulva, upper inner thighs, pubis, and anus). Figure 18.29 shows a typical pattern for cleaning. After cleaning, help place sterile drapes around the perineum.

As the woman pushes, the pressure of the fetal head on the bowel may cause fecal material to be expelled from the rectum. The physician or nurse-midwife will sponge this away as it occurs, to prevent contamination of the birth canal.

## Episiotomy

An **episiotomy** is a surgical incision of the perineum that is made both to prevent tearing of the perineum and to release pressure on the fetal head with birth (Carroli & Belizan, 2005).

An episiotomy incision is made with blunt-tipped scissors in the midline of the perineum (a midline episiotomy) or is begun in the midline but directed laterally away from the rectum (a mediolateral episiotomy) (Fig. 18.30). Mediolateral episiotomies have the advantage over midline cuts in that, if tearing occurs beyond the incision, it will be away from the rectum, creating less danger of complication from rectal mucosal tears. However, midline episiotomies appear to heal more easily, cause less blood loss, and result in less postpartal discomfort.

Obstetric practice varies as to which type of episiotomy is done and how often. At one time this procedure





A

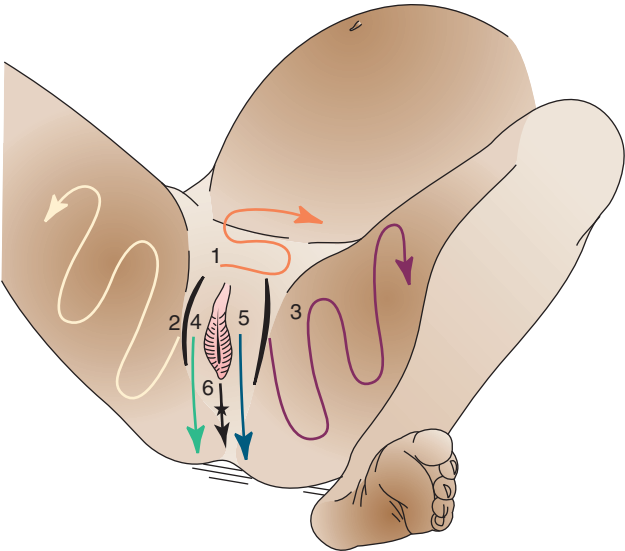


B



C

**FIGURE 18.28** Positions for pushing during second stage labor: (A) squatting with support person; (B) all-fours; (C) all-fours with chest support. (© Barbara Proud.)

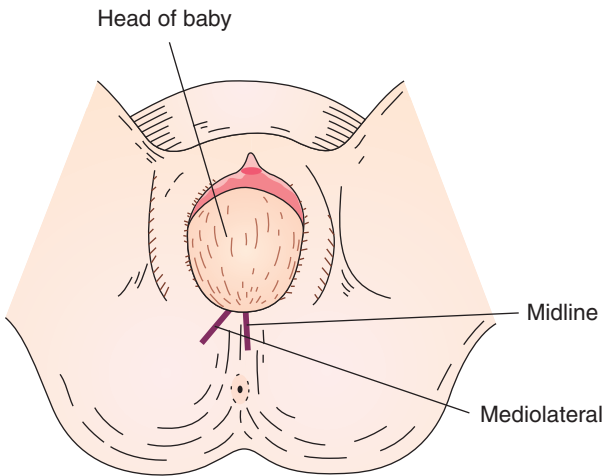


**FIGURE 18.29** Pattern for cleaning perineum before birth. Cleaning from the birth canal outward moves bacteria away from, not into, the vagina. Numbers refer to steps of the procedure.

was done only if tearing seemed imminent; later, it was considered routine with a normal birth; and now it is used less frequently, again. The advantage of an episiotomy is that it substitutes a clean cut for a ragged tear, minimizes pressure on the fetal head, and may shorten the last portion of the second stage of labor.

The pressure of the fetal presenting part against the perineum is so intense that the nerve endings in the perineum are momentarily deadened. This lack of sensation allows an episiotomy to be done without anesthesia. For some women, a pudendal block may be done beforehand to ensure that there is no pain; lidocaine is injected via a long needle through the vaginal wall near the ischial spine, numbing the lower vaginal area and the perineum.

At the time of the episiotomy incision, there is a slight loss of blood, but the pressure of the presenting part im-



**FIGURE 18.30** Position of episiotomy incision in a woman during second stage of labor. Baby's head is presenting to vagina outlet (crowning).



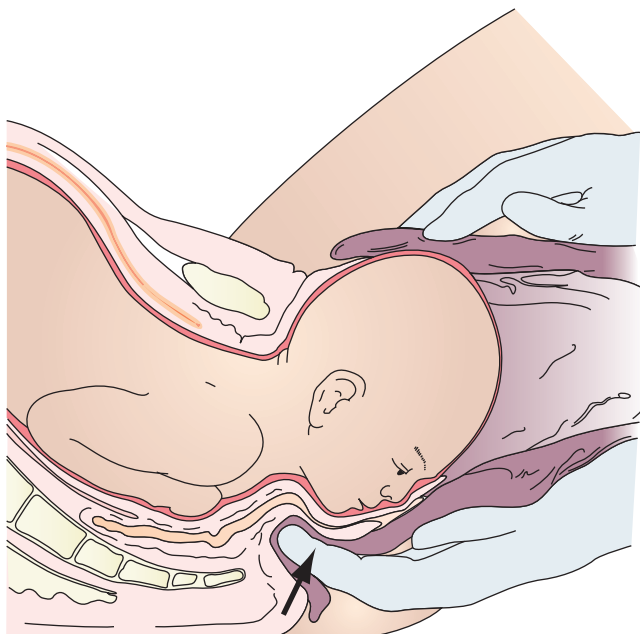
mediately seals the cut edges and minimizes bleeding. The fetal head usually moves forward considerably once the tension on the perineum is relieved.

## Birth

As soon as the head of a fetus is prominent (approximately 8 cm across) at the vaginal opening, the physician or nurse-midwife may place a sterile towel over the rectum and press forward on the fetal chin while the other hand is pressed downward on the occiput (a Ritgen maneuver) (Fig. 18.31). This helps a fetus achieve extension, so that the head is born with the smallest diameter presenting. This also controls the rate at which the head is born. Pressure should never be applied to the fundus of the uterus to effect birth, because uterine rupture may occur.

The woman is asked to continue pushing until the occiput of the fetal head is firmly at the pubic arch. Then the head is born between contractions. This helps to prevent the head from being expelled too rapidly. It also helps to avoid perineal tears and a rapid change in pressure in the infant's head (which could rupture cerebral blood vessels). The woman may be asked to pant deliberately, so that she does not push during a contraction. She may be asked to push again without a contraction present to deliver the shoulders. Instructions should be repeated as necessary, because often the woman is so involved with the coming birth that she does not hear. Offer guidance and support to the partner as well, because he or she may be almost as overwhelmed by the birth process as the mother.

A woman who has not had anesthesia experiences the birth of the head as a flash of pain or a burning sensation, as if someone had momentarily poured hot water on her perineum. It is a fleeting sensation and is not particularly uncomfortable.



**FIGURE 18.31** Ritgen's maneuver. The arrow shows direction of pressure.

Immediately after birth of the baby's head, the physician or nurse-midwife suction out the infant's mouth with a bulb syringe and then passes his or her fingers along the occiput to the newborn's neck, to determine whether a loop of umbilical cord is encircling the neck. It is not uncommon for a single loop of cord to be positioned this way (termed a nuchal cord). If such a loop is felt, it is gently loosened and drawn down over the fetal head. If it is too tightly coiled to allow this, it must be clamped and cut before the shoulders are born. Otherwise, it could tear and interfere with the fetal oxygen supply.

After expulsion of the fetal head, external rotation occurs. Gentle pressure is exerted downward on the side of the infant's head, and the anterior shoulder is born. Slight upward pressure on the side of the head allows the anterior shoulder to nestle against the symphysis as the posterior shoulder is born. The remainder of the body then slides free without any further difficulty.

A child is considered born when the whole body is born. This is the time that should be noted and recorded as the time of birth—a nursing responsibility. (Most physicians and nurse-midwives regard it as their responsibility or pleasure to announce the sex of the infant.) With the birth of the infant, the second stage of labor is complete (Fig. 18.32).

## Cutting and Clamping the Cord

While the newborn is held with his or her head in a slightly dependent position, to allow secretions to drain from the nose and mouth, the mouth may be gently aspirated by a bulb syringe to remove additional secretions. The infant is then laid on the abdominal drape of the mother while the cord is cut. The cord continues to pulsate for a few minutes after birth, and then the pulsation ceases. There are a number of theories about the best time for cutting the cord. Delaying the cutting until pulsation ceases and maintaining the infant at a uterine level allows as much as 100 mL of blood to pass from the placenta into the fetus; this helps ensure an adequate red blood cell count in the newborn. On the other hand, late clamping of the cord could cause overinfusion with placental blood and the possibility of polycythemia and hyperbilirubinemia,



**FIGURE 18.32** A child is considered born when the whole body is delivered. (© B. Proud.)

a particular concern in preterm infants. The timing of cord clamping, therefore, varies depending on the physician's or nurse-midwife's preference and the maturity of the infant. Placing the infant on the mother's abdomen may modify the amount of blood infused as well as allowing the parents a free, unobstructed view of their new child.

The cord is clamped with two Kelly hemostats placed 8 to 10 inches from the infant's umbilicus and then is cut between them. A cord blood sample is obtained to provide a ready source of infant blood if blood typing or other emergency measures need to be done. An umbilical clamp is then applied (Fig. 18.33). The vessels in the cord are counted to be certain that three are present. In most births, the woman's partner may have the privilege of cutting the cord.

Cutting the cord is part of the stimulus that initiates a first breath. With this, the infant's most important transition to the outside world, the establishment of independent respirations, has begun.

## Introducing the Infant

After the cord is cut, it is time for the new parents to spend some time with their newborn. Take the infant from the physician or nurse-midwife and wrap him or her in a sterile blanket. Be sure to hold newborns firmly, because they are covered with slippery amniotic fluid and vernix. Lay the infant on a radiant heat warmer and dry him or her well with a warmed towel. Rewrap the infant snugly and cover the head with a wrapped towel or cap. Assuming that his or her respirations are good, take the infant to the head of the table to visit with the new parents.

Both the mother and her partner usually want to see and touch their newborn immediately; this assures them the baby is well and is an important step in establishing a parent-child relationship. Do not administer prophylac-

tic eye ointment to the infant until after the parents have had this chance to see their infant (and the infant has had a chance to see them). (See Chapter 24 for infant care after birth.) If the woman wishes to breast-feed, this is an optimal time for her to begin. An infant sucking at the breast stimulates the release of endogenous oxytocin, encouraging uterine contraction and involution, or the return of the uterus to its prepregnant state.

## CARE OF A WOMAN DURING THE THIRD AND FOURTH STAGES OF LABOR

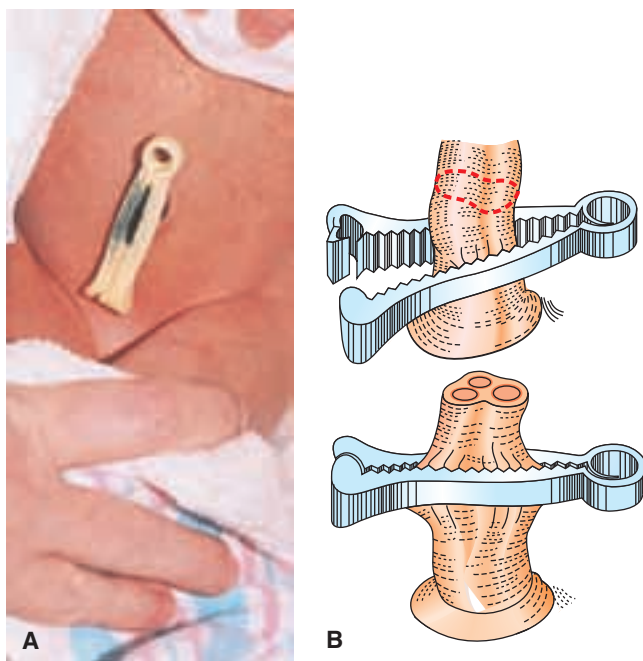
The third stage of labor is the time from the birth of the baby until the placenta is delivered. For most women, this is a time of excitement, because the infant has safely been born, but also a time of feeling anticlimactic, because the infant has finally arrived after being expected for so long. The fourth stage includes the first few hours after birth. It signals the beginning of dramatic changes because it marks the beginning of a new family.

## Oxytocin

Once the placenta is delivered, oxytocin is usually ordered to be administered intramuscularly or intravenously to the mother. Such medication increases uterine contractions and thereby minimizes uterine bleeding (Elbourne et al., 2005).

Oxytocin (Pitocin) may be added to an existing intravenous line (20 to 40 U/L in intravenous fluid) or given as 10 U intramuscularly (Karch, 2004) (Box 18.12).

The administration of this drug is a nursing responsibility in most health care facilities. Do not administer it until the physician or nurse-midwife indicates it is appropriate. Although the agent may be given as early as the



**FIGURE 18.33** (A) Umbilical clamp applied to cord. (© Caroline Brown, RNC, MC, DEd.) (B) Placing clamp; locking clamp.

### BOX 18.12 FOCUS ON . . .



#### PHARMACOLOGY

##### Oxytocin (Pitocin)

**Action:** A synthetic form of the hormone produced by the hypothalamus and stored in the posterior pituitary. An oxytocic, it stimulates the uterus to contract to control postpartum hemorrhage.

**Pregnancy Category:** X

**Dosage:** Add 10–40 units to 1,000 mL of a nonhydrating intravenous solution, or administer 10 units intramuscularly after delivery of the placenta.

**Possible Adverse Effects:** Hypertension, excessive uterine contractility.

##### Nursing Implications

- Do not administer after delivery of the placenta until the physician or nurse-midwife approves the drug's use.
- Monitor the woman for blood pressure, because hypertension can occur.

birth of the fetal anterior shoulder, the physician or nurse-midwife may want to inspect the placenta first to ensure that it is intact and without gross abnormalities and that none of its cotyledons remains in the uterus. Because oxytocin causes hypertension by vasoconstriction, be sure to obtain a baseline blood pressure measurement before administration. Question the use of such a drug with women who have elevated blood pressure.

Intravenous administration of oxytocin may be continued for up to 8 hours after birth to ensure uterine contraction. Continue to monitor blood pressure during this time.

## Placenta Delivery

If the placenta does not deliver spontaneously, the physician or nurse-midwife will need to remove it manually. After delivery, the placenta is inspected to be certain that it is intact and normal in appearance and weight. Normally, a placenta is one-sixth the weight of the infant. If it is unusually large or small, you may be asked to weigh it.

## Perineal Repair

After delivery of the placenta, any necessary perineal stitching is performed. This process can be a long, tedious one from the mother's perspective. She must lie on her back and wait for the procedure to be completed, while the attention of others is riveted on the newborn lying in the warmer off to one side. It is important to be sensitive to the mother's needs at this time. Be certain to include her in explanations and appreciate how anticlimactic she may feel at this time.

Theoretically, if suturing of an episiotomy is done immediately after the birth of the placenta, a woman who gave birth without anesthesia will still have so much natural-pressure anesthesia of the perineum that she will not require an anesthetic. In actuality, by the time the placenta is delivered (approximately 5 minutes), enough sensation has returned to the perineum that the woman will probably need some type of medication for comfort. Women who received a regional anesthetic during labor (e.g., pudendal block) and those who have had epidural anesthesia will probably not need additional medication during episiotomy repair.

## Immediate Postpartum Assessment and Nursing Care

Once the episiotomy repair is complete, the drapes are removed and the woman's legs are simultaneously and carefully lowered from the stirrups, if they were used, to prevent back injury.

Obtain vital signs (i.e., pulse, respirations, and blood pressure) every 15 minutes for the first hour and then according to the agency's policy. Pulse and respirations may be fairly rapid immediately after birth (80 to 90 bpm and 20 to 24 respirations per minute), and blood pressure slightly elevated due to the excitement of the moment and recent oxytocin administration. Palpate the woman's fundus for size, consistency, and position and observe the amount and characteristics of lochia. Perform perineal care, and apply a perineal pad.

If the birth was in a birthing room, return the birthing bed to its original position. Offer a clean gown and a warmed blanket, because a woman often experiences a chill and shaking sensation 10 to 15 minutes after birth. This may be due in part to the low temperature of the birthing room, but may also be a result of the sudden release of pressure on pelvic nerves or of excess epinephrine production during labor. In any event, it is a normal phenomenon but can be frightening to the mother. She may associate the shaking chill with fever or infection and worry she will be ill at a time when she most wants to be well to care for her new child. You can reassure her this is a normal, transitory sensation.

## Aftercare

This is the beginning of the postpartal period or the fourth stage of labor. Because the uterus may be so exhausted from labor that it cannot maintain contraction, there is a high risk for hemorrhage. In addition, a woman often is so exhausted that she may be unable to assess her own condition or report any changes. Specific assessments done during this time are continued throughout the postpartal period. These assessments are discussed in Chapter 22.

## UNIQUE CONCERNS OF A WOMAN IN LABOR

### A Woman Without a Support Person

Some women have chosen to reject or want to labor without the infant's father, who is the usual support person during labor. Such women may appreciate having a family member or close friend act as their support person. A woman who has no support person needs a supportive nurse to be with her.

A woman whose acceptance of her pregnancy was slow to develop due to lack of adequate support people may not have completed the psychological tasks of pregnancy by the time she is in labor. This could make her more apprehensive about a new life role and calls for increased assessment of parent-child bonding in the immediate postpartal period.

### A Woman Who Will Be Placing Her Baby for Adoption

Even if a woman has decided to place her baby for adoption, she needs to be an active participant in her labor and birth experience. She should watch the baby being born and be allowed to hold it as desired. Each state has a set number of days in which a mother must decide whether to keep her baby. Although this decision may have seemed easy to make during pregnancy, once she holds the baby in her arms, the prospect of giving up the child may be more painful than she realized. She needs support no matter what decision she eventually makes. Be certain you do not offer influencing advice, because the woman is the only person who knows whether keeping this child is right for her.



## Vaginal Birth After Cesarean Birth

Women who have had a previous cesarean birth that involved a low transverse uterine incision are usually candidates for vaginal birth with their next pregnancy (Horey et al., 2005). The length of labor for vaginal birth after cesarean birth (VBAC) is usually comparable to that of primiparas, not multiparas, because it is their first vaginal birth. Most women are anxious for vaginal birth to be successful so that they do not have to undergo surgery again. At the same time, they may be surprised and dismayed at the length and discomfort of labor and wish that they could have another cesarean. Keep the woman well informed, and urge her to breathe with contractions and to push effectively to make the experience a positive one for her. Afterward, many women are relieved to realize that, although they did have more discomfort before birth, they have appreciably less pain afterward.

If during the previous labor a complication occurred that necessitated the cesarean birth, a woman cannot help but worry that this will happen again. She needs a support person with her and health care providers who are aware of her possible level of apprehension. Women having a VBAC usually have external electronic monitoring because of the risk for uterine rupture.

The outcome of VBAC is usually without complication. If necessary, oxytocin augmentation (see Chapter 21) can be used to strengthen uterine contractions; vacuum extraction and forceps birth can be used as necessary.



### Key Points

Labor is the series of events by which uterine contractions expel a fetus and placenta from a woman's body.

The exact reason why labor begins is unknown. It most likely occurs because of an interplay between fetal and uterine factors.

Effective labor depends on interactions between the passage, the passenger, the power of contractions, and a woman's psychological readiness ("psyche").

Labor is an almost overwhelming experience because it involves such intense sensations and emotions. Women need a support person with them to help them cope with this experience.

Fetal presentation (the fetal body part that will initially contact the cervix) and position (the relationship of the fetal presenting part to a specific quadrant of the woman's pelvis) are both important in determining the success of labor.

The first stage of labor lasts from the onset of cervical dilatation until dilatation is complete (10 cm). The second stage extends from the time of full dilatation until the infant is born. A third or placental stage lasts from the time the infant is born until after delivery of the placenta. A fourth stage comprises the first few hours after birth.

Danger signs of labor include an abnormal FHR, meconium staining of amniotic fluid, abnormal maternal pulse or blood pressure, inadequate or prolonged contractions, formation of a pathologic retraction ring, development of an abnormal lower abdomen contour, and increasing apprehension.

Monitoring of uterine contractions and FHR is an important nursing responsibility. Fetal bradycardia, tachycardia, and late and variable decelerations are important observations to make. Interventions such as keeping the woman on her left side and promoting voiding help to prevent fetal distress. Offering psychological support is crucial to maternal well-being.

Pushing during the second stage of labor should be guided by the woman's need to push. Urge her to breathe out while pushing, if possible.

The placental stage follows birth and consists of placental separation and expulsion. Observe for excessive bleeding during this time. Do not pull on the cord to hasten separation, because this can lead to uterine inversion.

A fetus is in potential danger when the membranes rupture because of the possibility of cord prolapse. Always assess FHR at this point to safeguard the fetus.

A woman is at potential risk for hemorrhage throughout labor because of the possibility that the placenta could be dislodged. Assess for vaginal bleeding and vital signs to be sure this is not occurring.



### Critical Thinking Exercises

1. Celeste Bailey, the woman you met at the beginning of the chapter, was certain her labor was not normal because it had lasted for 6 hours. Is this an unusually long time for a first stage of labor? Do you think she would have been comforted by learning the usual length?
2. Suppose that, when Celeste is admitted to a birthing room, she states she has read nothing during her pregnancy about labor and so has no idea what to expect. Would it be better to educate her or to let her proceed with not knowing? If you decide to teach her, what would you tell her early in labor? Midway in labor? Why might a woman enter labor without having read about it?
3. Most women today accept fetal monitoring equipment as an expected part of labor care. What would you do if Celeste Bailey tells you she does not want this type of fetal monitoring?
4. Examine the National Health Goals related to labor process. Most government-sponsored money for nursing research is allotted based on these goals. What would be a possible research topic to explore pertinent to these goals that would be applicable to the Bailey family and also advance evidence-based practice?





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