

# CHAPTER 2

## PHYSIOLOGICAL AND EMOTIONAL CHANGES DURING PREGNANCY

### LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Describe basic embryonic and fetal development
- Describe the maternal physiological and emotional changes that occur during each trimester of pregnancy.
- Name the primary influential hormones of pregnancy and their effects on the mother's body.
- Discuss relevant bodywork considerations related to the changes of pregnancy.
- Describe specific physiological changes to the organ systems that are unique to pregnancy.
- Explain the rationale for common bodywork and massage precautions during pregnancy.

*A*s a massage therapist, you may see a pregnant client from the conception of her baby all the way through her birth and postpartum period. Understanding the physiological and common emotional changes occurring during this time will influence your work and help you better support her, as with each visit she will be a different woman, with a different balance of hormones, different energy of the baby within her, and different needs for bodywork. In this chapter we will review the process of conception and fetal development through the trimesters, hormonal changes and the maternal experiences of these changes, and general considerations for bodywork

appropriate to each trimester. We will also consider how the pregnant client's various organ systems adapt during pregnancy.

### CONCEPTION

Each pregnant client has had the experience of hosting a microscopic and energetic dance between hormones, sperm, and an egg. Each month hormones are released from a woman's pituitary gland with the special duty of helping one egg to mature in the woman's ovary. Simultaneously, the ovary sends estrogen to prepare the womb to receive the egg, just as a garden is fertilized to prepare for planting so that the seed will be well-nourished. Once the egg is fully matured, it emerges from the ovary and is urged into the waving tentacle arms of the fallopian tube fimbriae. The egg (the largest cell in the human body) is caught by these arms and propelled down the fallopian tubes. Microscopically viewed, the fallopian tube can be seen repeatedly undulating as it gradually squeezes the egg toward the womb. Meanwhile, millions of sperm (30 times smaller than the egg, and the smallest cells in the male body) which have been ejaculated—or, often these days, artificially inseminated—into the vagina or uterus are swimming toward the fallopian tubes, drawn by chemical attractants released by the egg. Of these millions of sperm, only about 2000 will survive long enough to get close to the traveling egg, and when

they do, they begin to wiggle against her protective cell wall. Eventually, one sperm passes through the cell wall of the egg. The egg then secretes an impassable film around its walls, preventing other sperm from entering. Sometimes, two eggs are released during ovulation and make their way through the fallopian tubes. If each becomes fertilized, fraternal twins develop.

The sperm and egg—now a zygote—fuse their chromosomes and begin to divide repetitively for the next 3 to 7 days. On occasion, the zygote will split in two, and identical twins will develop. During this period, the zygote is being propelled through the fallopian tube to the uterus, dividing continuously until it is a clustered ball of cells called a blastocyst.

Meanwhile, the corpus luteum, a mass left in the ovary after the egg departed, produces hormones that continue to prepare the uterus for eventual implantation of the egg. The corpus luteum is a primary source of hormones for about 12 weeks, until the placenta is formed and fully functioning.

When the blastocyst enters the womb, it searches for the most desirable area of the uterine lining in which to implant itself, normally in the upper regions of the uterus. There it burrows into the endometrium and is nourished; the earliest development of a new life begins. A placenta begins to form from the trophoblastic cells on the outside of the blastocyst. This placenta will eventually take over the role of the corpus luteum, producing progesterone and estrogen and helping to nurture a healthy fetus.

All this has taken place in the span of 7 to 10 days *since ovulation*. Ovulation is assumed to be approximately 14 days after the last menstrual period, although that is merely an average. When calculating the length of a 40-week pregnancy, measurement usually begins from the last day of the woman's menstrual period, *not from ovulation and conception, even if the woman knows exactly when she conceived*; therefore, when we discuss a fetus at 3 weeks of *development*, the woman's dates of pregnancy may actually be measured at 5 weeks' *gestation*.

## FETAL DEVELOPMENT AND MATERNAL SENSATIONS

What is a woman experiencing during this development of new life in her body? Pregnancy is divided into 3 time periods, each about 13 weeks long, called **trimesters**. We will now look at each trimester in more detail.

### Traditional Birth Practices:

#### Mysteries of Creation

Not all people believe our scientific stories describing the making of life as a journey of a microscopic egg and a sperm. Some tribal South Africans believe that conception occurs if a woman lies down in the rain, allowing the seeds inside her body to be germinated, just like those in the land.

A Nepalese way of understanding the creation of life is that the souls of those who have died in the past 40 days visit with couples who are making love, slipping into the woman's body during intercourse. It is the "buttermilk," or semen, that creates the baby's bones and the mother's menstrual blood that forms the baby's body.<sup>1</sup>

In Malaysia, it is believed that the fetal spirit is conceived in the father's brain and heart, where it learns first of the world through the father's perspective. The spirit then enters its mother in the father's semen during intercourse.<sup>2</sup>

The Trobriand Islanders of New Guinea, whose culture is entwined with the sea, believe that the souls of babies float in seaweed and attach themselves to women as they swim in the ocean. This soul, carried on a surge of the mother's blood rising to meet it, enters her womb and is nourished by the mother's menstrual blood.<sup>2,3</sup>

### First Trimester: Weeks 1 to 13

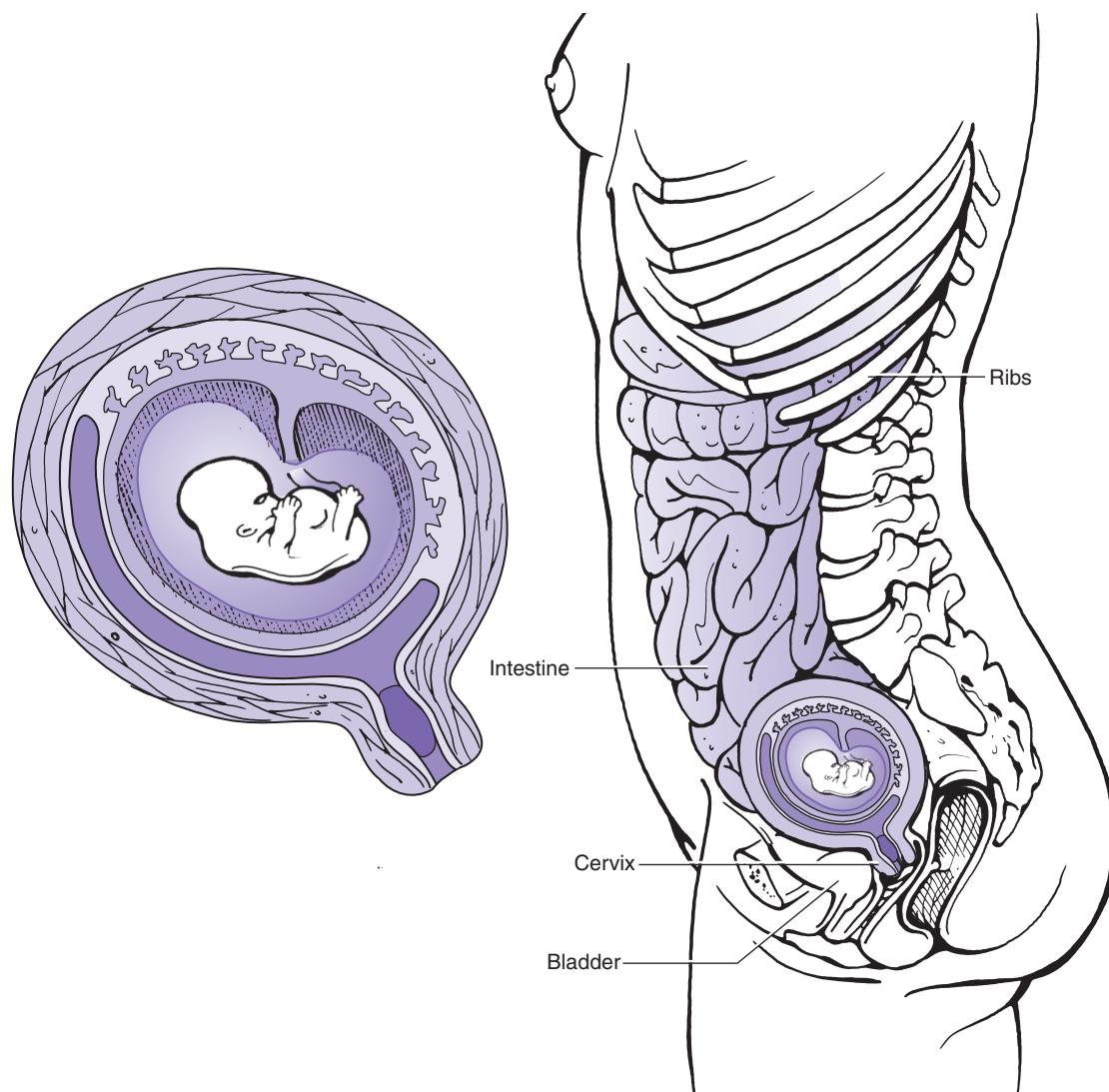
The most critical development and growth for an embryo and fetus occurs in the first trimester and begins immediately on implantation of the blastocyst in the landscape of a woman's body. All of the mother's vital energies shift at once to support and nurture the growing embryo with increased blood, oxygen, and nutrients. The organs, brain, spine, and the fetal nervous system all begin to form early on. This early time period in the first trimester is developmentally critical, and a woman's well-being should be protected carefully (Figure 2.1). It is during the first trimester that a mother is urged to avoid extended immersion in hot water, drinking alcohol, and partaking in other activities that might disrupt healthy formation of this nervous system. The first trimester is also critical in that it is the most common time for **miscarriage** (delivery of the fetus before 20 weeks' gestation) to occur. Of women who know they are pregnant, 15% to 25% experience

miscarriage, while the rate is speculated to be as great as 60% to 70% when including in the statistics of the women who had not yet realized that they were pregnant before they miscarried.<sup>4,5</sup> *Eighty percent of these miscarriages occur within the first trimester.*<sup>5</sup> Some important bodywork restrictions, covered in detail in Chapter 4, are related to this risk of miscarriage in the first trimester.

While a tiny life is developing deep in a mother's womb, this newly pregnant woman may have a variety of experiences. Some women soar through the first trimester feeling strong and healthier than ever. Others experience fatigue, indigestion, nausea, and vomiting. For many, it is a time of great joy and excitement, while for some it may be

a time of ambivalence, irritability, or anxiety, especially if the pregnancy is unplanned, unwanted, or particularly challenging. A massage therapist will want to know if her or his pregnant client is in the first trimester, respecting the client's possible vulnerability due to any of the above issues and while offering nurturing and supportive touch to this mother who is incubating new life. Massage can be extremely helpful at this time, as a woman comes to terms with the physical, emotional, and possibly spiritual changes and prepares to transition into a new role and identity.

See Table 2.1 to review embryonic development, maternal experiences, and bodywork considerations in the first 3 months of pregnancy.



**FIGURE 2.1** First trimester, second month.

*The fetus is approximately 2 cm long and the nervous system is forming. The mother may be experiencing nausea, breast tenderness, and more frequent urination.*

**Table 2.1 First Trimester: Embryonic and Fetal Development, Maternal Experience, and Bodywork Considerations**

Embryonic and Fetal Development	Possible Maternal Experience	Bodywork Considerations
<b>First month of pregnancy</b>		
<b>Overall:</b>		
<ul style="list-style-type: none"> <li>Lungs, brain, digestive tract, neural tube develop—the rudimentary nervous system.</li> </ul>	<ul style="list-style-type: none"> <li>Many know instantly they are pregnant.</li> <li>A woman may feel shifting, swirling energy in her core.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid deep abdominal work.</li> <li>Avoid scented oils that may trigger nausea.</li> <li>If nausea present, may need to position in semi-reclining.</li> </ul>
<b>1st week:</b>		
<ul style="list-style-type: none"> <li>Fertilized egg divides.</li> <li>Corpus luteum produces progesterone and estrogen to prepare uterine lining.</li> <li>Day 7–10, egg implants itself in uterine lining.</li> </ul>	<ul style="list-style-type: none"> <li>Food cravings are common.</li> <li>Increased urination occurs.</li> <li>Breast soreness develops.</li> <li>Hormonal mood swings are common.</li> <li>Some choose not to share with others about their pregnancy until after the first trimester when it is more secure.</li> </ul>	<ul style="list-style-type: none"> <li>Study accupressure points that alleviate nausea.</li> <li>Place pillow under ribs or position side-lying if breasts are sore in prone positioning.</li> </ul>
<b>2nd week:</b>		
<ul style="list-style-type: none"> <li>Distinction of amniotic sac and yolk sac begins.</li> <li>Pre-placenta cells produce human chorionic gonadotropin (HCG) and estrogen 10 days after fertilization.</li> <li>HCG encourages the corpus luteum in the ovaries to produce high levels of estrogen and progesterone.</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety about miscarriage may be present.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid deep, intensive work on sacral area, which can be stimulating to uterus.</li> <li>Do thorough health intake especially assessing history of miscarriage or previous high-risk pregnancies.</li> <li>Avoid electric heating pads on massage table in first trimester due to unknown effects of electromagnetic radiation on developing fetus.</li> <li>Avoid contraindicated accupressure points.</li> </ul>
<b>3rd–4th week:</b>		
<ul style="list-style-type: none"> <li>Embryo is the size of rice grain or smaller.</li> <li>Embryo is attached to uterus.</li> <li>Placental circulation is established.</li> <li>Definitions of tiny head with rudimentary eyes, ears, nose, and tail with yolk sac.</li> <li>Heart has begun a rhythmic beat.</li> </ul>		
<b>Second Month of Pregnancy</b>		
<b>Overall:</b>		
<ul style="list-style-type: none"> <li>Facial features, gonads, and brain development are foremost.</li> </ul>	<ul style="list-style-type: none"> <li>There may be a growing excitement.</li> <li>She may not have told others about pregnancy.</li> </ul>	<ul style="list-style-type: none"> <li>Same as first month.</li> <li>Avoid vigorous stimulating massage in the first trimester.</li> </ul>
<b>5th week:</b>		
<ul style="list-style-type: none"> <li>Rudimentary brain and spine form.</li> <li>Embryo floats in oceanic amniotic fluid, attached to uterine wall and pre-placenta by tiny veins and arteries that will become umbilical cord.</li> </ul>	<ul style="list-style-type: none"> <li>Breast soreness and size increase.</li> <li>Nipples become more prominent.</li> <li>Nausea or “morning sickness” may occur.</li> <li>Urination frequency increases.</li> <li>General fatigue occurs.</li> <li>Increased vaginal discharge develops.</li> </ul>	<ul style="list-style-type: none"> <li>Check for diastasis recti if she has had previous pregnancies, and teach abdominal strengthening techniques.</li> </ul>
<b>6th week:</b>		
<ul style="list-style-type: none"> <li>Embryo is size of large raisin.</li> <li>Clearly defined head with basic eyes, ears, and brain.</li> <li>Brain grows rapidly.</li> <li>Tiny buds of arms and legs appear.</li> <li>Two-chambered, beating heart.</li> <li>Defined bloodstream.</li> <li>Digestive organs developing.</li> </ul>	<ul style="list-style-type: none"> <li>May only now become aware of pregnancy with missed menstrual cycle.</li> <li>Anxiety about miscarriage may be present.</li> </ul>	

Table 2.1 (Continued)

Embryonic and Fetal Development	Possible Maternal Experience	Bodywork Considerations
<p><b>7th week:</b></p> <ul style="list-style-type: none"> <li>• More facial details: nostrils, lips, tongue, and teeth buds.</li> <li>• Spine and brain mostly formed.</li> <li>• Spine straightens.</li> <li>• Legs grow.</li> <li>• Heart develops two more chambers.</li> </ul> <p><b>8th week:</b></p> <ul style="list-style-type: none"> <li>• By 8–10 weeks, embryo is called a “fetus,” from Latin meaning “young one” or “offspring.”</li> <li>• Fetus is 2 cm long.</li> <li>• Ear becomes more fully defined.</li> <li>• Functioning 4-chambered heart pumps blood through vasculature.</li> </ul>		
<b>Third Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>• Fetus grows from size of small quarter to about 3 inches long, weighing about 1 ounce.</li> <li>• Eyes develop with eyelids covering but not yet opened.</li> <li>• Skin is translucent.</li> <li>• Elbows and knees develop.</li> <li>• Hands and legs start to move.</li> <li>• Fingers and toes webbed but developing with fingernails.</li> <li>• Genitalia become defined.</li> <li>• Fetal heart beats 160–180 beats per minute.</li> </ul>	<ul style="list-style-type: none"> <li>• Feeling more settled in security of pregnancy.</li> <li>• Constipation may begin.</li> <li>• Headaches may develop.</li> <li>• Dizziness may occur.</li> <li>• Anxiety about miscarriage may be present.</li> <li>• Mood swings are common.</li> <li>• Fatigue is common.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as first two months.</li> <li>• Address chronic postural issues before advanced and problematic in pregnancy.</li> <li>• Suggest client empty bladder before massage.</li> </ul>

## Second Trimester: Weeks 14 to 27

Rapid changes continue in the second trimester, and by its end, the pregnancy will be much more obvious with an enlarged belly and fetal movements felt by the mother. By the time a woman reaches the second trimester, the majority of concerns for miscarriage are alleviated (though all risk is not gone).

At the beginning of the second trimester, the fetus is still only 6 to 9 inches long and the placenta—which has taken 3 months to form—is now ready to replace the corpus luteum in estrogen and progesterone production. The placenta also takes on the role of the still-developing fetal lungs, stomach, intestines, and kidneys by filtering blood and waste. Through her own circulatory system, a woman processes her baby’s cellular wastes, yet the baby’s blood does not ever actually make contact with its mother’s; their circulatory systems are separated by the placental

membrane, and thus they may have different blood types.

Fetal skeletal muscles become more functional. Maternal blood nourishes the baby. With every breath a mother takes, oxygen travels through the placenta and the umbilical cord, oxygenating the baby’s blood. Encouraging full belly breathing during bodywork sessions helps “feed” the baby while the mother is relaxing and enjoying the benefits of increased oxygen to her cells.

A woman may grow especially excited around 5 months of pregnancy, as she feels the baby’s tiny flutters or movements, called **quickening**. According to some theories, quickening indicates the baby’s first consciousness of its physical form.<sup>6</sup> The signs of life inside are undeniable. The mother will feel and begin to look more pregnant this trimester and may have more energy than earlier. Her breasts grow larger, and hormonal changes cause new discomforts that she

**MESSAGE  
THERAPIST  
TIP** **Fatigue**

Fatigue is a normal experience in the early stages of pregnancy. Many women fight fatigue, trying to keep up with the normal demands of their daily lives. They may complain about their exhaustion to their massage therapist. Gently remind your client that she is harboring and growing a human being in her body—no small task.

Every body system and every cell in her body is adjusting itself in some way to support fetal development. It is no wonder that she is tired. In most creation stories, it is only a supernatural being who can do this, and usually even he or she had to rest after creating the world!

may be coping with, such as nasal congestion, nosebleeds, mild swelling in the legs, leg cramps, the appearance of varicose veins, and an increase in vaginal discharge. The massage therapist can be assured that these are common and generally normal experiences for some women during this time.

Now the uterus is the size of a cantaloupe, and the woman's center of gravity is shifting backward to accommodate the forward-growing weight. Without postural adjustments, she may begin to experience cramping of the legs and feet, low backache from increased lumbar lordosis, and overstretching of her abdominal muscles (Figure 2.2).

Your client will probably feel less nauseous and have less urgent needs for urination since the baby is higher and putting less pressure on the bladder. Energetically, a woman's sleep may be filled with more vivid dreams as her connection deepens with the kicking and pulsing life inside. Many women may now come to terms with any previous ambivalence and rest more comfortably in the reality of their emerging role as mother, with fewer mood swings. For those whose history precludes a happy resolve with this pregnancy, the ambivalence or resentments may continue or increase. This may be especially true for women with a history of abuse or with financial, emotional, or medical challenges associated with the pregnancy.

Table 2.2 reviews embryonic development, maternal experiences, and bodywork considerations in the second trimester of pregnancy.

### Third Trimester: Weeks 28 to 40

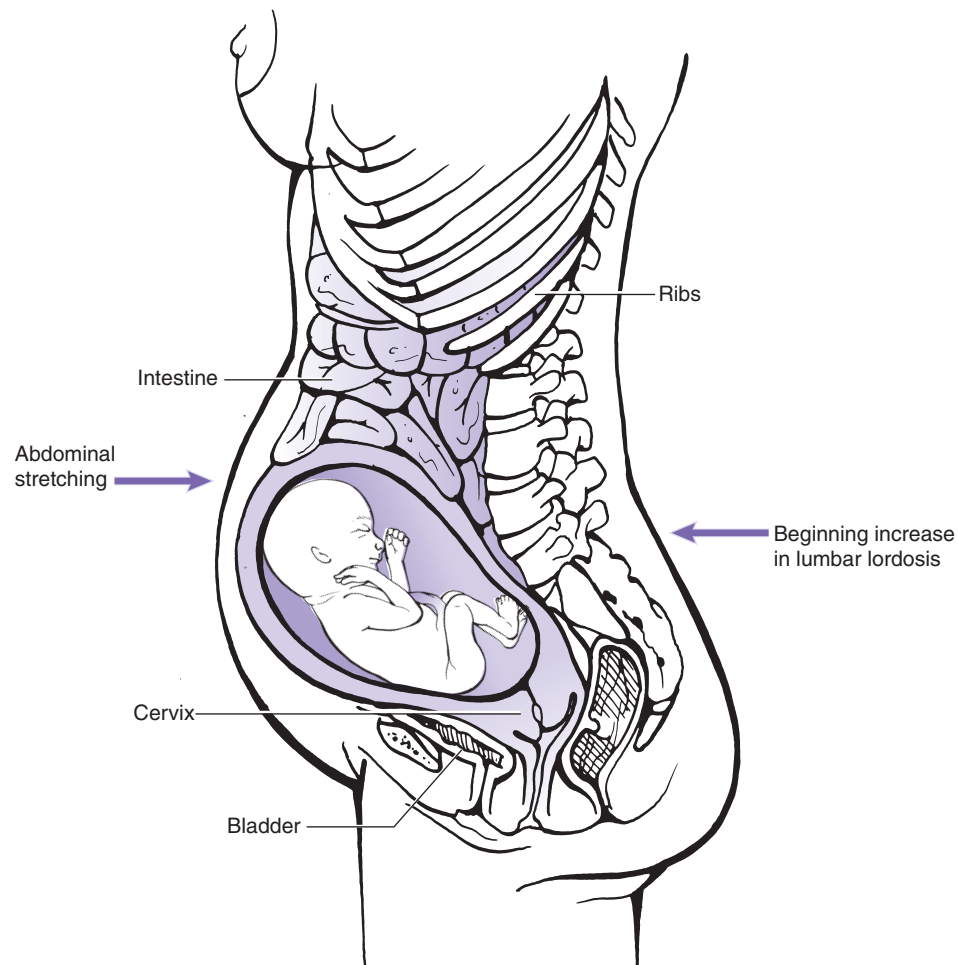
The third trimester is the time of the most perceptible fetal growth as a woman's belly continues to grow large and fetal movements become palpable and noticeable by observers. By the early part of the third trimester, the average baby weighs about 2 to 3 pounds and has at least a 50% survival rate outside the womb. The lungs are not fully developed yet, and this

will be a serious liability if the baby is born too early. The vital organs have been formed, and the baby is developing reserves of energy and thermoregulation abilities for outside the womb by growing "baby fat."

Some women feel better than ever now, and onlookers may comment on the woman's proverbial "rosy glow" of pregnancy. But it is not uncommon for the mother to have one or more complaints that interrupt her potential enjoyment of feeling the now-frequent baby movements. The top of the uterus is near her xiphoid process, and the baby may be pushing up into her diaphragm, causing her shortness of breath. She may have back pain, pelvic heaviness, ankle edema, and uterine ligament spasms. Her organs are compressed in the abdomen, and she may experience constipation, heartburn, indigestion, and leg cramps.

The mother may have an increase in hair and nail growth, sweating, and skin allergies, and the development of stretch marks, also called **striae gravidarum**. The etiology of stretch marks is still uncertain,<sup>7</sup> but there seems to be a genetic component that increases the effects of the rapid stretching of the abdominal skin and underlying collagen and elastin. Many women ask if massage can help with these marks. Moisturizer or oils can help nourish the skin, but there is very little research that indicates it will prevent these marks from developing, and none that proves a way to reduce them once they have developed.<sup>8</sup> Accepting their presence, some women choose to appreciate these lines as the permanent story of their child written on their body.

After 36 weeks, the baby drops down into the pelvis and maternal breathing difficulties are relieved—this drop is called **lightening** (Figure 2.3). She now has more pressure on her bladder and may need to urinate more frequently. Your client may be more anemic, as blood composition changes, increasing chances of her feeling dizzy or fatigued. She may be restless at night, awakening frequently to urinate, to process dreams or nightmares, or to try to find a



**FIGURE 2.2** Second trimester, sixth month.

The fetus may be in any position. Her movements are felt regularly by the mother. Signs of pregnancy are quite obvious now, with changing posture and a visibly protruding belly.

comfortable position. Her joints begin to feel “wobbly,” as the hormone **relaxin** loosens the pelvic joints in preparation for birth. She may be having irregular “practice contractions,” called **Braxton-Hicks contractions**, as the uterus prepares for labor. These are mild and irregular contractions or uterine tightenings, and do not cause changes to the cervix, but are thought to help the uterus and pelvis prepare for labor. This uterine tightening is not to be mistaken for **preterm labor contractions**, which are contractions that occur before 37 weeks, are generally more consistent than Braxton-Hicks, and can cause cervical changes or delivery of a baby before fetal development is fully completed.



**CAUTION:** Your client should always be directed to her prenatal care provider if she is having contractions that have not been positively identified as Braxton-Hicks.

Reading about all these symptoms at once may make pregnancy sound like a horrendous experience. Yet, many women do not experience any discomforts, and others find these symptoms are mild or perhaps only one of them is experienced. Rarely, for those who are happy about being pregnant, do these symptoms override the overall sense of enjoyment of the pregnant experience during this trimester, until the very end of pregnancy, when many women feel tired of carrying the extra weight and are ready for labor to begin. Offering comfortable positioning and relaxation massage during this time will help ease some complaints. Considering all the potential problems associated with pregnancy, we can appreciate why it was listed as the twelfth most stressful event in a woman’s life on the Social Readjustment Rating Scale—one of the first life event stress-measuring scales. On the more contemporary “Peri Life Events Scale,” the birth of a first child rates as the sixth most stressful life event while pregnancy ranks 32 out of

**Table 2.2 Second Trimester of Fetal Development and Maternal Experience**

Embryonic and Fetal Development	Possible Maternal Experience	Bodywork Considerations
<b>Fourth Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>Fetus is 6–9 inches long, 5–6 ounces.</li> <li>Body is completely formed, muscles contract.</li> <li>There is an active sucking reflex.</li> <li>Fine hair exists all over body called lanugo.</li> <li>Tooth buds grow.</li> <li>Eyes are large, eyelids still closed.</li> <li>Lungs and organs are still developing.</li> <li>Amniotic fluid is swallowed, producing meconium (the first feces) in intestines.</li> <li>Fetus moves, kicks, making its presence known.</li> </ul>	<ul style="list-style-type: none"> <li>There may be increased excitement as feeling baby movements and belly showing more.</li> <li>Breast size increases and breasts may leak colostrum.</li> <li>There may be darkening of linea alba, nipples, face.</li> <li>Increasing forgetfulness may occur.</li> <li>Body and self-image changes.</li> <li>Energy and libido may increase.</li> <li>There may be a sense of well-being or possibly an increase in anxiety.</li> <li>There is increased vaginal discharge.</li> <li>Increase in dreams or nightmares may occur.</li> <li>There may be nasal congestion, nosebleeds, headaches related to vascular changes.</li> <li>There is often less pressure on bladder with baby higher in abdomen.</li> <li>Anemia-induced fatigue may occur.</li> <li>There is an increase in lumbar lordosis/backache.</li> <li>Varicosities and hemorrhoids may appear.</li> <li>Mild edema of ankles and wrists may occur.</li> <li>Carpal tunnel syndrome may occur.</li> <li>There is stress to upper spine and pectoralis due to growing belly and breasts.</li> <li>Uterine round ligament spasms may occur.</li> <li>Stretch marks may develop.</li> <li>Leg cramps can be common at night.</li> </ul>	<ul style="list-style-type: none"> <li>Practice varicose vein and thrombosis precautions.</li> <li>Avoid contraindicated acupressure points.</li> <li>Avoid strong scents that may stimulate nausea.</li> <li>Begin sidelying positioning. Generally avoid supine and prone positioning.</li> <li>Encourage postural awareness.</li> <li>Teach abdominal, perineal, and back strengthening exercises.</li> <li>Belly rubs in late second trimester help mother connect with baby.</li> </ul>
<b>Fifth Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>Fetus is 8–12 inches long, weighing about 1 to 1.5 pounds.</li> <li>Placenta and umbilical cord are fully functioning.</li> <li>Fingerprints form.</li> <li>Fetus startles when stimulated with loud sound.</li> </ul>		
<b>Sixth Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>Fetus is fully formed, 14 inches long and 1.5–2.5 pounds.</li> <li>Eyes are open and have rapid movements.</li> <li>Fetus sucks thumb, makes frequent gross body movements, cries, and practices breathing movements in water.</li> <li>Brain is still developing.</li> <li>Lungs are very immature, but baby may live, with assistance, if born at this time.</li> </ul>		

102 events. Still, plenty of women experience pregnancy as the most nourishing time of their lives and are reluctant to let go of that experience when labor begins.

Table 2.3 reviews embryonic development and maternal experiences in the third trimester.

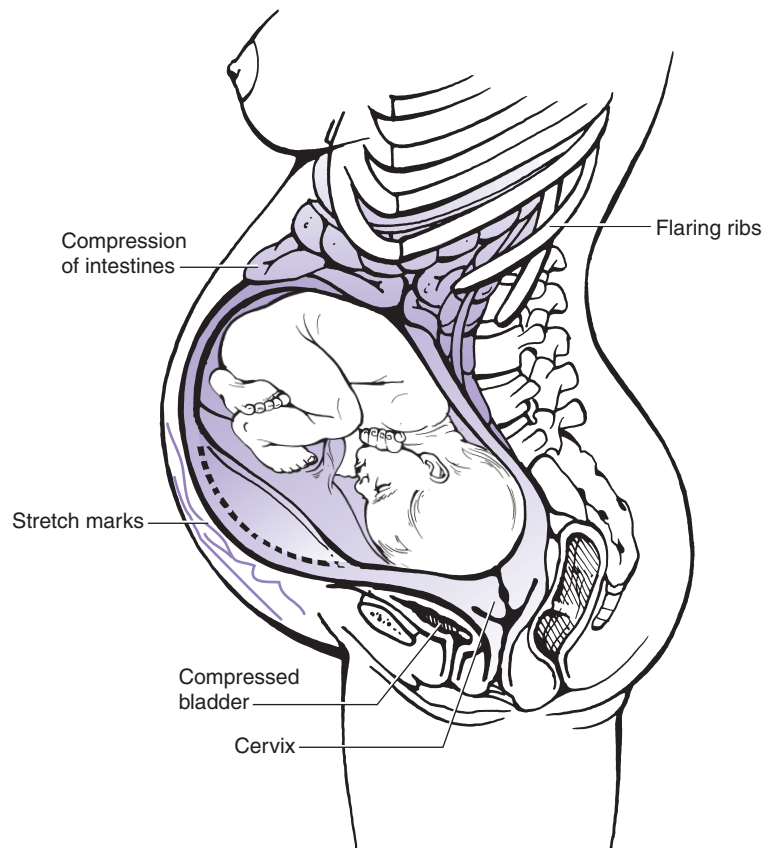
### Past the Due Date

Even though the baby may not be technically “overdue,” the passing of the expected due date, which was determined early in the pregnancy and based on the last menstrual period, may leave a woman

feeling nervous, frustrated, or impatient as the baby grows larger and more confined. For many, this may be a great time for extra brisk activities or deeply relaxing full-body labor-preparation massages. Despite people’s attachments to the due date, few births actually occur on that day, and it is not unusual to go up to 2 weeks past the due date. You might remind your client that forces beyond our understanding are at work that can delay or speed a labor. When the time is optimum for the baby, labor will commence.

Table 2.4 reviews embryonic development and maternal experiences when past the due date.





**FIGURE 2.3** Third trimester, ninth month.

After lightening, the baby has dropped into the mother's pelvis, compressing her bladder but making maternal breathing easier. The baby will now be in vertex, or head-down, position 98% of the time.

## HORMONAL CHANGES DURING PREGNANCY

We have looked at cellular, embryonic, and fetal development and maternal experiences of these changes. Now let us consider more specifically the effects of maternal hormonal changes and relevant bodywork concerns.

As soon as conception occurs, hormones begin to flood a woman's body. Progesterone, estrogen, relaxin, and prolactin are a few of the hormones that help prepare her body for nurturing new life. To supply the pregnant woman with extra hormones, some of the endocrine glands actually increase in size during the pregnancy, including the pancreas, thyroid gland, and the pituitary gland, which increases in size by 30% to 50%.<sup>9,10</sup>

### Progesterone

"I hate being pregnant these days! I'm always constipated, I have hemorrhoids and a bladder infection,

and my feet keep swelling." These complaints are not uncommon in the last months of pregnancy, and **progesterone** is the prime culprit behind them. The massage therapist will likely encounter some of the effects of progesterone during pregnancy massage.

The corpus luteum produces progesterone for the first 2 to 3 months of embryonic development. When the placenta is formed and fully functioning, it takes over production of this hormone. Progesterone helps prepare the uterus for the implanting of the egg by thickening the uterine lining and increasing the lining's secretory and nourishing qualities. Progesterone also aids breast development and relaxes the smooth muscle of the body, including the uterus, thereby preventing preterm labor contractions. This relaxation of the smooth muscle is vital for preventing uterine contractility, but progesterone affects more than the uterus—the primary organs such as the intestines, vasculature, and bladder are all composed of smooth muscle and are therefore all affected by progesterone.

What happens when these smooth muscles relax? The common complaints of pregnancy develop. Constipation occurs as a result of decreased

**Table 2.3 Third Trimester of Fetal Development and Maternal Experience**

Embryonic and Fetal Development	Possible Maternal Experience	Bodywork Considerations
<b>Seventh Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>• Baby is 15 inches long, 2–3 pounds.</li> <li>• Vernix covers entire body.</li> <li>• Movements clearly visible through abdomen.</li> <li>• By 26 weeks, baby can recognize voices outside womb and respond with movement.</li> </ul>	<ul style="list-style-type: none"> <li>• There may be symphysis pubis separation; sacroiliac pain; sciatica.</li> <li>• Diastasis recti may develop.</li> <li>• Edema of extremities may develop.</li> <li>• There is often increased heartburn, constipation, hemorrhoids, varicose veins, indigestion.</li> <li>• There may be lower and upper backache, hip pain, pelvic ache, calf cramps, wobbly hips.</li> <li>• Uterine ligament pain may occur.</li> <li>• Carpal tunnel syndrome may occur.</li> <li>• There may be shortness of breath and sore ribs.</li> <li>• Baby typically drops in last weeks, easing shortness of breath, increasing urinary frequency.</li> <li>• Stretch marks may develop.</li> <li>• There may be increased dependence on others for help.</li> <li>• Baby movements are usually visible.</li> <li>• Breasts are sore and enlarged.</li> <li>• Braxton hicks “practice” contractions occur.</li> <li>• There may be insomnia or dreams about baby.</li> <li>• There may be bouts of general discomfort; sometimes frustration, irritability, impatience with process.</li> <li>• There is anticipation and excitement about pregnancy, birth process, and baby.</li> <li>• There is changing identity, especially if no longer working.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid contraindicated acupressure points until 38 weeks.</li> <li>• There should be no supine positioning for greater than 5 min. Use only if client is comfortable.</li> <li>• Do not use prone positioning.</li> <li>• Do not perform hip mobilizations with diastasis symphysis pubis.</li> <li>• Attend to hip pain, sciatica, low back pain.</li> <li>• Perform labor preparation massage.</li> <li>• Offer belly rubs in low-risk pregnancy.</li> <li>• Teach perineal massage methods.</li> <li>• Teach partner massage techniques for labor.</li> <li>• Use varicose vein and thrombosis precautions.</li> <li>• Provide postural awareness education.</li> <li>• Teach visualizations and breathing to help relax with current discomforts.</li> <li>• Massage all stressed muscle groups.</li> <li>• Perform frequent passive pelvic tilts, lengthening low back.</li> </ul>
<b>Eighth Month of Pregnancy</b>		
<ul style="list-style-type: none"> <li>• Baby is about 16–18 inches long, 4–5 pounds.</li> <li>• Body fat and lung surfactant are still developing.</li> <li>• By 7th or 8th month, baby is head-down in vertex position.</li> <li>• One quart of amniotic fluid surrounds baby, made up of albumin, urea, fat, fructose, lecithin, bilirubin, white blood cells.</li> </ul>	<ul style="list-style-type: none"> <li>• There may be symphysis pubis separation; sacroiliac pain; sciatica.</li> <li>• Diastasis recti may develop.</li> <li>• Edema of extremities may develop.</li> <li>• There is often increased heartburn, constipation, hemorrhoids, varicose veins, indigestion.</li> <li>• There may be lower and upper backache, hip pain, pelvic ache, calf cramps, wobbly hips.</li> <li>• Uterine ligament pain may occur.</li> <li>• Carpal tunnel syndrome may occur.</li> <li>• There may be shortness of breath and sore ribs.</li> <li>• Baby typically drops in last weeks, easing shortness of breath, increasing urinary frequency.</li> <li>• Stretch marks may develop.</li> <li>• There may be increased dependence on others for help.</li> <li>• Baby movements are usually visible.</li> <li>• Breasts are sore and enlarged.</li> <li>• Braxton hicks “practice” contractions occur.</li> <li>• There may be insomnia or dreams about baby.</li> <li>• There may be bouts of general discomfort; sometimes frustration, irritability, impatience with process.</li> <li>• There is anticipation and excitement about pregnancy, birth process, and baby.</li> <li>• There is changing identity, especially if no longer working.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid contraindicated acupressure points until 38 weeks.</li> <li>• There should be no supine positioning for greater than 5 min. Use only if client is comfortable.</li> <li>• Do not use prone positioning.</li> <li>• Do not perform hip mobilizations with diastasis symphysis pubis.</li> <li>• Attend to hip pain, sciatica, low back pain.</li> <li>• Perform labor preparation massage.</li> <li>• Offer belly rubs in low-risk pregnancy.</li> <li>• Teach perineal massage methods.</li> <li>• Teach partner massage techniques for labor.</li> <li>• Use varicose vein and thrombosis precautions.</li> <li>• Provide postural awareness education.</li> <li>• Teach visualizations and breathing to help relax with current discomforts.</li> <li>• Massage all stressed muscle groups.</li> <li>• Perform frequent passive pelvic tilts, lengthening low back.</li> </ul>
<b>Ninth month of pregnancy</b>		
<ul style="list-style-type: none"> <li>• Baby is about 20 inches long and 6–7.5 pounds, and gaining 1/2 pound/week.</li> <li>• Rapid brain cell development occurs.</li> <li>• Lanugo starts to disappear.</li> <li>• Inner ear forms.</li> <li>• Lungs mature.</li> <li>• Ideally, baby has dropped further into pelvis.</li> <li>• By 9 months, heart circulates 300 gallons of blood daily.</li> </ul>	<ul style="list-style-type: none"> <li>• There may be symphysis pubis separation; sacroiliac pain; sciatica.</li> <li>• Diastasis recti may develop.</li> <li>• Edema of extremities may develop.</li> <li>• There is often increased heartburn, constipation, hemorrhoids, varicose veins, indigestion.</li> <li>• There may be lower and upper backache, hip pain, pelvic ache, calf cramps, wobbly hips.</li> <li>• Uterine ligament pain may occur.</li> <li>• Carpal tunnel syndrome may occur.</li> <li>• There may be shortness of breath and sore ribs.</li> <li>• Baby typically drops in last weeks, easing shortness of breath, increasing urinary frequency.</li> <li>• Stretch marks may develop.</li> <li>• There may be increased dependence on others for help.</li> <li>• Baby movements are usually visible.</li> <li>• Breasts are sore and enlarged.</li> <li>• Braxton hicks “practice” contractions occur.</li> <li>• There may be insomnia or dreams about baby.</li> <li>• There may be bouts of general discomfort; sometimes frustration, irritability, impatience with process.</li> <li>• There is anticipation and excitement about pregnancy, birth process, and baby.</li> <li>• There is changing identity, especially if no longer working.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid contraindicated acupressure points until 38 weeks.</li> <li>• There should be no supine positioning for greater than 5 min. Use only if client is comfortable.</li> <li>• Do not use prone positioning.</li> <li>• Do not perform hip mobilizations with diastasis symphysis pubis.</li> <li>• Attend to hip pain, sciatica, low back pain.</li> <li>• Perform labor preparation massage.</li> <li>• Offer belly rubs in low-risk pregnancy.</li> <li>• Teach perineal massage methods.</li> <li>• Teach partner massage techniques for labor.</li> <li>• Use varicose vein and thrombosis precautions.</li> <li>• Provide postural awareness education.</li> <li>• Teach visualizations and breathing to help relax with current discomforts.</li> <li>• Massage all stressed muscle groups.</li> <li>• Perform frequent passive pelvic tilts, lengthening low back.</li> </ul>

gastrointestinal motility and increased water reabsorption in the intestines. Swelling in the ankles and hands also increases due to the new permeability of the vascular system. Progesterone increases heartburn due to prolonged gastric emptying; bladder infections due to urinary stasis; and increased body temperature, perspiration, and varicose veins due to vasodilatation and distention of the veins.

The progesterone level rises steadily from the tenth day of conception until 36 weeks of pregnancy, at which point it begins to decline, bringing on the Braxton-Hicks contractions.

Following is an overview of progesterone effects:

- Carpal tunnel syndrome (due to increased edema involving peripheral nerves)
- Constipation
- Dyspnea (shortness of breath)
- Heartburn

- Epistaxis (nose bleeds)
- Edema from vasodilatation
- Nasal congestion
- Orthostatic hypotension
- Spider angioma, varicosities in legs or vagina, hemorrhoids (hereditary and due to increased pelvic pressure)
- Urinary tract infections

Following is an overview of bodywork considerations for progesterone effects:

- Use semi-reclining positioning for women with heartburn.
- Avoid prone position that increases nasal congestion.
- Ask client to sit up slowly and wait before standing after massage to avoid dizziness from orthostatic hypotension.

**Table 2.4 Past the Due Date (After 40 Weeks)**

Fetal Experiences	Possible Maternal Experience	Bodywork Considerations
<ul style="list-style-type: none"> <li>• Baby activities continue but less room to move.</li> <li>• Lanugo—downy fetal body hair—decreases, and vernix—the creamy skin protector—is absorbed</li> <li>• Lines of hands and feet become more defined.</li> <li>• Placenta gradually deteriorates, losing best ability to nourish baby.</li> <li>• Amniotic fluid production may begin to diminish.</li> </ul>	<ul style="list-style-type: none"> <li>• Impatience increases for labor to begin.</li> <li>• Tension may develop impeding natural commencement of labor.</li> <li>• Friends and family may call often, questioning whether she is in labor, increasing pressure and anxiety.</li> <li>• Irritability increases.</li> <li>• Crying episodes and anxiety may occur.</li> <li>• All discomforts are magnified.</li> <li>• Insomnia may occur.</li> </ul>	<ul style="list-style-type: none"> <li>• Perform massage to hips, thighs, low back.</li> <li>• Perform full body massage for relaxation.</li> <li>• Perform acupressure and labor stimulating massage.</li> <li>• Teach visualizations and breathing for releasing tension, other fears, and obstacles to birth.</li> <li>• Offer belly rubs in low-risk pregnancy.</li> <li>• Provide nurturing supportive space for possible emotional release.</li> <li>• Teach resistance techniques with hip adductors to help relaxation of pelvic area.</li> <li>• Encourage long walks, hikes, and distracting activities.</li> <li>• Encourage meditation, observation of breath and thoughts, reminding mother that baby knows best when it's time to be born.</li> </ul>

- Massage intercostals and diaphragm area to help relieve shortness of breath.
- Practice varicose vein and thrombosis precautions.
- Beware of low backache that could be related to urinary tract infection.
- Keep office cooler than normal if client is warm due to progesterone-related vasodilation.

## Estrogen

“My breasts are sore and I am still throwing up several times a day.” These are common estrogen symptoms in the first trimester. **Estrogen** is a hormone normally produced by the ovaries and adrenal cortex, but during early pregnancy its principal source is the corpus luteum, until the placenta takes over production. Along with the hormone relaxin, estrogen helps soften connective tissue, contributing to musculoskeletal aches and pains.

Estrogen helps build tissues in smooth muscles, preparing the endometrium for taking care of the fertilized egg, embryo, and fetus. Estrogen also affects the mammary glands by increasing breast size, vascularity, and the number and size of milk-producing ducts and lobes.

Estrogen and adrenocorticoid hormones contribute to the arrival of “spider veins” or **spider angioma**—tiny thin blood vessels near the surface of the skin. They also contribute to the darkening of the skin on the nipple areola and the **linea alba**—a fibrous

band down the center of the abdomen where the abdominal muscles join. As the linea alba line darkens during pregnancy, it becomes known as the **linea negra** (black line). The skin of the face may also darken with a so-called “pregnancy mask,” known as **chloasma**. These changes will disappear after pregnancy.

Estrogen contributes to extra blood flow to the nasal mucosa, causing swelling, stuffiness, and sometimes bloody noses. Estrogen decreases production of hydrochloric acid and pepsin, thereby contributing to heartburn already increased by the effects of progesterone. In late pregnancy as progesterone decreases, the relative increase in estrogen allows uterine contractions to begin.

Following is an overview of estrogen effects:

- Enlargement of uterus and breasts and lactation preparation
- Breast tenderness
- Palmar erythema (red palms)
- Softening of connective tissue; backache, flank pain, tenderness of symphysis pubis
- Decreased secretion of hydrochloric acid and pepsin causing nausea, indigestion, and heartburn
- Chloasma, linea negra, freckles, darkening of nipples
- Change in substernal angle from 68 to 103 degrees, expansion of intercostal spaces
- Increased blood, lymph, and nerve supply to uterus

Following is an overview of bodywork considerations for estrogen effects:

- Beware of possible nausea with horizontal positioning, passive range of motion, incense or scented oils.
- Beware of breast tenderness if positioning prone in first trimester.
- Exercise caution with hip mobilizations and potential for symphysis pubis pain.
- Massage in intercostal spaces to address spreading angle of ribs.

## Relaxin

“I feel like I’m walking on water—I’m so loose in my hips.” The effects of the hormone relaxin are felt by every pregnant woman. Relaxin is produced by the ovaries beginning in the tenth week of pregnancy and increases 10-fold, peaking in the last weeks of pregnancy between 38 to 42 weeks of gestation. Its primary effect is to relax and loosen connective tissues and ligaments, including the cervix and the pelvic joints, to provide just the extra mobility needed for the baby’s head to pass through the birth canal. Relaxation of the symphysis pubis and sacroiliac joints is considerable. The symphysis pubis may expand from its normal 0.5 mm to as much as 12 mm or more. A separation of 10 mm or greater is called a **diastasis symphysis pubis** and can cause severe pain in the pubic area. Relaxin can also cause hypermobility of the sacroiliac joint, causing anterior or posterior rotation of one or both ileum and sometimes causing sharp pain in the sacroiliac area and low back.

Just as relaxin *relaxes* the skeletal body, a woman’s emotional-psyche body relaxes as well. Boundaries become less distinct between her and the world at large. She may feel like she is melding into a unity with an energy much greater than herself as she harbors within her body the processes of fetal development, which have a life of their own; the growing baby, who has her or his own personality; and the psychological and emotional shifts that occur through dreams, hormonal surges, and cellular changes. The therapist can help support the client during a relaxation massage through this sometimes overwhelming loss of distinct personal boundaries by encouraging slow, deep respirations and positive visualizations that the client has indicated help her feel supported and safe.

Following is an overview of relaxin effects:

- Increased joint mobility and instability of sacroiliac joint, sacral area, and hips
- Breast tenderness

- Increased skin elasticity
- Relaxation of the articulation between sacrum and coccyx allowing coccyx to move posteriorly at birth to increase pelvic outlet

Following is an overview of bodywork considerations for relaxin effects:

- Maintain awareness of hypermobility of joints if doing mobilizations and passive range of motion.
- Avoid passive movements or resistance on legs/hips with separated symphysis pubis.
- Be aware of possible anterior or posterior ileum rotations causing sacroiliac pain or sciatica.
- Be aware of client’s relaxing boundaries psychically, physically, psychologically, emotionally; reinforce positive visualizations about self, pregnancy, birth.

## Other Important Hormones in Pregnancy

You may hear mention of the following hormones as your pregnant clients share about their experiences. **Oxytocin** is released from the hypothalamus. It causes the uterus to rhythmically contract during labor and stimulates the milk “let down” or **milk ejection reflex**—the stimulation of contractions in the milk glands that squeeze breast milk toward the nipple during lactation. Its presence is also thought to support mothering behaviors and the feelings of “maternal love.”<sup>11</sup>

**Prolactin** is a hormone released from the anterior pituitary gland. It stimulates milk production, reduces anxiety, and has such strong analgesic effects that it may be considered for use with opioid dependency treatment.<sup>12,13</sup>

## ORGAN SYSTEM ADAPTATIONS DURING PREGNANCY

The changes in pregnancy are not limited to musculoskeletal and hormonal ones. All organ systems undergo changes, some of which can be quite dramatic. This section reviews specific changes in several systems along with relevant bodywork considerations.

### Respiratory System

The massage therapist may notice some of the effects of pregnancy on the client’s respiratory system by observing the rate and depth of her breathing or by the increase in trigger points as the intercostal spaces

widen. It is normal for pregnant women to breathe faster than when not pregnant, and after the twenty-fourth week of gestation, they also begin to breathe in the chest more than in the abdomen. As the baby presses up against a mother's diaphragm, the ribcage will actually expand laterally by 50%. Intercostal spaces become wider, ribcage circumference increases to 2 to 3 inches, and the substernal angle widens to 103 degrees, all helping to increase her respiratory ability. As these changes occur, the intercostals may develop trigger points and tight areas in response to the flaring ribs and shift in breathing.

The entire respiratory tract is affected by the extra blood volume of pregnancy. The trachea, larynx, Eustachian tubes, and nasal passages all become congested with blood, and a woman's tone of voice may actually change because of this. See the Massage Therapist Tip regarding bodywork considerations related to maternal respiratory changes.

### Gastrointestinal System

Many women will experience an increase in or new development of constipation from uterine pressure against the intestines and from progesterone slowing intestinal motility. Heartburn and burping with reflux will increase due to the delay in gastric emptying time and relaxation of the sphincter at the junction of the esophagus and stomach. Nausea and vomiting increase, probably due to hormonal changes, but also due to the slowed motility, increased reflux, and general laxity of the GI system. See the Massage Therapist Tip for bodywork considerations related to heartburn.

### Cardiovascular System

A pregnant woman is carrying, processing for, and feeding two people. Her heart must work harder and needs more blood. Total blood volume increases by 30% to 40% during pregnancy (nearly 2 to 3 pounds of extra blood!), and by mid-way through her pregnancy, her heart will be beating more rapidly and pumping nearly twice as much blood with each beat as when not pregnant. (By 6 weeks postpartum, the blood volume will have returned to normal.) This increased volume causes heart murmurs and new heart sounds in many pregnant women. According to one source, 93% of women develop nonpathological heart murmurs during their pregnancy.<sup>14</sup>

The heart literally grows larger in pregnancy—the heart weight increases and the cardiac chambers increase in size to compensate for the increase in volume. As the heart enlarges, it moves up in the chest to make room for the baby, perhaps even lying horizontally or rotated to the left. With extra blood

and a whole new circulation flowing between the mother and the baby, your client may feel warmer than usual and sweat more. Fluctuations in blood pressure are normal. It is not uncommon for pregnant women to experience **orthostatic hypotension**—a sudden drop in blood pressure due to reduced peripheral resistance and pooling of blood. This may occur after lying down for a period of time and then standing.



**CAUTION:** Be aware that your client may feel sudden dizziness, nausea, blurred vision, headache, or fatigue when standing after a massage due to orthostatic hypotension. Instruct her to move slowly, and to sit for a moment before standing, allowing her body to adapt between position changes.

Your client also will have nearly twice as much **interstitial fluid** as a nonpregnant woman has, and some of this fluid may end up as edema in her ankles and hands. This interstitial fluid is made up of water and electrolytes and is similar to plasma, though with much fewer proteins.

The extra blood that the body produces during pregnancy is needed at birth to replace the blood and fluids that are lost during delivery, so that the mother does not go into hypovolemic shock. To help prevent serious blood loss, there is also an increase in the **fibrolytic activity** of the blood—the blood clots faster than normal. This is helpful in cases of hemorrhage, but it also means that *a woman has 5 to 6 times greater risk for developing dangerous blood clots during pregnancy.*<sup>15-17</sup> This risk is further increased because of decreased circulation in the iliac, femoral, and saphenous veins of the legs caused by increased pelvic pressure and relaxation of the vascular system (Figure 2.4). If a woman has a high-risk pregnancy and is limited to bedrest, the risk for clots rises even further.

### Bodywork Considerations Related to the Cardiovascular System

Due to the increased blood volume and adaptations of the cardiovascular system during pregnancy, there are some special points to consider when performing bodywork:

- Always use care when your client sits up after a massage. Encourage her to sit for several moments before standing.
- Keep your massage office cooler than usual, or keep a fan blowing if your client desires, to compensate for her increased warmth.

**MESSAGE  
THERAPIST  
TIP**
**Maternal Respiratory Changes**

Shortness of breath or difficulty filling lungs to capacity are common complaints during late pregnancy due to the baby pressing up into the mother's diaphragm and ribs.



**CAUTION:** This is not related to more serious shortness of breath that may be manifested as wheezing, sweating, faintness, and increasing anxiety. Difficulties breathing of this nature need to be referred to a medical health care provider immediately.

Below are some ways to address respiratory complaints when performing bodywork:

- A fan blowing fresh air across client's face can provide comfort for stuffy sinuses.

- After the first trimester, avoid prone positioning, which increases nasal congestion and compresses ribs and abdomen.
- Massage the superior chest area, including the scalenes, pectoralis attachments, and intercostals superior to the breasts to assist respiration and reduce trigger points.
- Use stretches and strokes that lengthen, open, and expand the chest, countering the compressing forces of weight and gravity on the chest and increasing respiratory capacity.

- Follow the precautions for varicose veins and deep vein thrombosis indicated in Chapter 4.
- Be aware that your client may be encouraged to elevate her legs and rest several times a day on her left side to help improve circulation and reduce edema, circulatory-related leg cramps, and varicosities. (The left side is believed to be more efficient for blood circulation during pregnancy due to the slightly right-sided location of the inferior vena cava.)



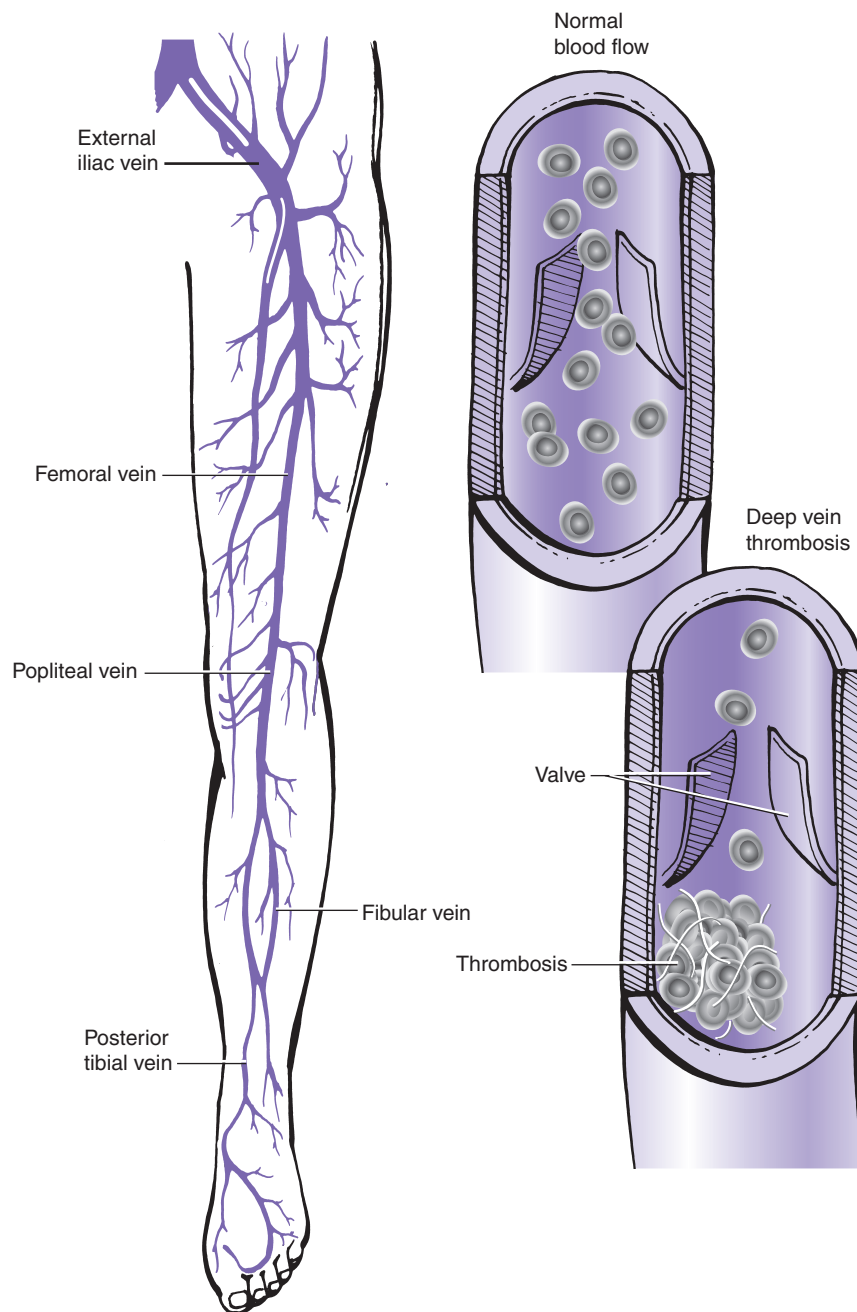
**CAUTION:** With the excessive circulatory load in pregnancy, women who have a history of cardiac problems will be at increased risk in the third trimester when the cardiac load is greatest. Do a particularly thorough health intake interview for such women, and avoid performing excessively stimulating circulatory massage, especially in the third trimester.

**MESSAGE  
THERAPIST  
TIP**
**Heartburn**

It is not uncommon for pregnant women to complain of heartburn during their pregnancy. This can become uncomfortable for women during a massage. Below are several considerations when addressing gastrointestinal complaints during bodywork:

- A client with heartburn may be more comfortable in the semi-reclining position, with her head above her stomach.
- Encourage your clients to avoid heavy meals and foods that she knows cause her heartburn before massage her sessions.

- Be aware that if your client has found relief from her heartburn by using prescribed antacids and she begins to experience heartburn and reflux during your massage, she may ask to stop the session for a moment to take her antacid. If this is the case, she may find that she is more comfortable during the rest of the massage. It is not in the massage therapist's scope of practice, however, to suggest that a client use antacids.



**FIGURE 2.4** Most common vasculature for occurrence of deep vein thrombosis.

*Great saphenous, femoral, and iliac veins of legs and groin. Clots are 5 to 6 times more likely to develop during pregnancy due to increased blood fibrinogen and decreased lower extremity circulation.*

### Excretory System: Kidneys, Bladder, and Skin

While the kidneys clear waste more efficiently during pregnancy, the risk of developing a urinary tract infection (UTI) increases significantly. Women with bladder infections have more risk for preterm

contractions and kidney infections. Two physiological causes of UTIs are as follows:

1. Progesterone's effect of relaxing the entire urinary tract, including the ureters, causes urinary stasis in the bladder. As the bladder is emptied less completely or effectively, the risk for infection increases.

2. The angle at which the ureter enters the bladder shifts to perpendicular due to uterine pressure, resulting in a reflux of urine out of the bladder and back into the ureters.

With blood volume nearly doubled, there is an increase in blood flow through the kidneys. However, the blood flow and the rate of glomerular filtration (the kidneys' processing of fluids) actually *decrease* when a woman is standing or sitting since uterine pressure on the groin impedes the return flow of blood from the legs to the heart. When your client lies on her side, both kidney and cardiac functions and rates are increased and she produces more urine. This leads to the common frustrated comment, "It seems like I have to get up and use the bathroom every hour at night!" It also means that your client may need to use the restroom in the middle of a massage session.



**CAUTION:** Sharp, unrelenting back pain or a dull aching in the low back could indicate a bladder or kidney infection. Do not assume that all back pain is necessarily musculoskeletal.

### **Bodywork Considerations Related to the Excretory System**

The therapist must remember that the client's excretory system undergoes certain stresses during pregnancy. Remember the following tips in relation to this system when doing pregnancy bodywork:

- Offer your client water after each session. Massage will increase cellular waste release into the bloodstream. To help maintain blood volume and maximize waste processing, it is recommended that pregnant woman drink at least 4 quarts of water per day.
- Have the client empty her bladder before massage, and ask if she needs to use the restroom before changing position during a massage.

## **CHAPTER SUMMARY**

Each trimester of pregnancy presents significant physical and emotional changes and challenges that your pregnant client must adapt to. Some of these physiological changes are tremendous, including enlargement of endocrine glands and cardiac chambers, increase in blood volume and shift in position

of the heart, and loosening of ligaments and expansion of the pelvic joints. Accompanying these changes are occasional discomforts, such as nasal congestion and orthostatic hypotension due to hormonal and cardiovascular adjustments, or feeling warmer than usual or having more urinary frequency. To accommodate some of these possible conditions, the massage therapist can offer simple modifications during a massage session to increase the pregnant client's comfort. A few practical and common ways to support your client are: having a fan available in a massage room if the client complains of stuffy sinuses or increased warmth, shifting her position to semi-reclining if she complains of heartburn, or offering the use of the restroom before shifting positions. In the following chapters, you will learn specific techniques of bodywork as well as contraindications during pregnancy so that your massage will be optimally oriented to the special needs of this population.

## **CHAPTER REVIEW QUESTIONS**

1. Why might a mother experience an increase in urinary frequency and a decrease in shortness of breath sometime after 36 weeks' gestation?
2. Explain why some women may develop an increase in trigger points in their ribs during pregnancy.
3. What type of positioning might be most appropriate for a woman experiencing heartburn during pregnancy?
4. Describe four changes in the cardiovascular system during pregnancy and the risks and complaints that may develop because of these changes.
5. Name three office accommodations you might need to make specifically for your pregnant clients.
6. Explain why is it important to have your client sit for a moment on the edge of the table, before standing up to walk after a massage.
7. Compare the scientific view of conception and fetal development with some of the traditional views of conception and explore possible similarities in the beliefs. Consider whether a woman's spiritual view of her pregnancy would impact your work with her in how you approach her body and pregnant belly, or in the direction of your conversation.
8. What kinds of physical complaints might a mother have during the third trimester of pregnancy?
9. What effects caused by the hormone relaxin would be of concern to the bodyworker?



### Case Study 2.1: MAKING THE CLIENT COMFORTABLE

As was often necessary with her pregnant clients, Pearl made several accommodations during a massage to ensure that Tobin, who was 36 weeks pregnant, was comfortable and safe.

Tobin said that one of the things she was enjoying about being pregnant was that she was much warmer than normal for her. In bed at night she did not have cold feet anymore and did not need as many covers as usual. She said she often felt warm and was currently wearing a T-shirt, while Pearl needed a sweater when not doing massage. Tobin mentioned that the other new thing she was noticing was the development of a brown discoloration on her face which the doctor had said was not unusual and would go away. Pearl knew this was called chloasma and was a result of the extra estrogen in Tobin's system.

Tobin requested to have her feet uncovered during the massage and appreciated the fact that Pearl had aired out the room and decreased the temperature so that it was not stuffy. Tobin said that she at times felt congested nasally, and she liked to have air moving about her. The therapist offered to turn on the fan so that the air could blow lightly across the client's face, which she agreed to.

Pearl massaged Tobin in the left-sidelying position, and before repositioning on the right, asked if Tobin needed to use the restroom. Tobin

said she needed to urinate frequently, and did need to do so now, as the baby was pushing down on her bladder often. Before Pearl could slow Tobin down, she had pushed herself up and gotten off the table. Suddenly Tobin leaned back against the table, saying she felt lightheaded. Pearl stood by her until she felt stable, a moment later. Pearl explained that it was not uncommon to experience orthostatic hypotension during pregnancy—a sudden drop in blood pressure when changing positions from lying or sitting to standing, and that she just needed to move more slowly when shifting from one position to another to give her body a chance to adapt. Tobin said that this happened to her now and then at home as well when she jumped out of bed or stood up from the couch too quickly.

Before getting off the table at the end of the massage, Pearl reminded Tobin to push herself up to a sitting position, and then to sit for a moment before standing up. She had no further episodes of lightheadedness. If she had continued to feel lightheaded, rather than being a momentary passing event, Pearl would have had Tobin lie down again on her side to improve blood flow to the head and avoid a fall, and then would have helped her to call her prenatal care provider if it seemed Tobin's symptoms were not going away.

10. Name three comfort measures a massage therapist might take for a client experiencing mild shortness of breath due to the pressure of the baby against her diaphragm.

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