

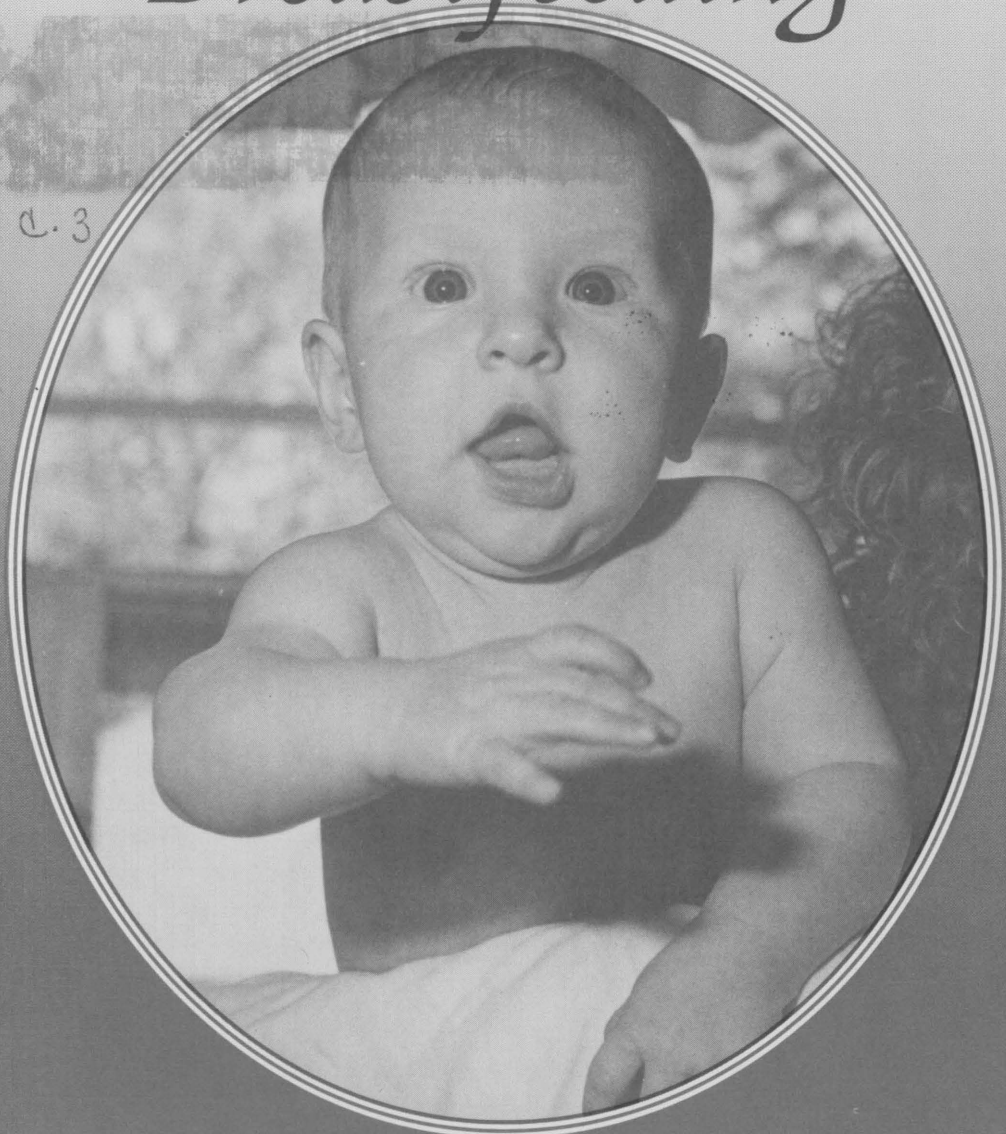
Facts About *Breastfeeding*

THE LIBRARY OF THE

MAY 16 1988

UNIVERSITY OF ILLINOIS
URBANA-CHAMPAIGN

C.3



University of Illinois at Urbana-Champaign
College of Agriculture
Cooperative Extension Service
Circular 1281

Cover photograph by Dean J. Meador.
Illustrations by Lynn Hawkinson Smith.

Urbana, Illinois

April 1988

Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, *William R. Oswald*, Director, Cooperative Extension Service, University of Illinois at Urbana-Champaign. The Illinois Cooperative Extension Service provides equal opportunities in programs and employment.

4M-4-88-68154-MET

Q. 630.7

I l6c

no. 1281-1284

copy 3

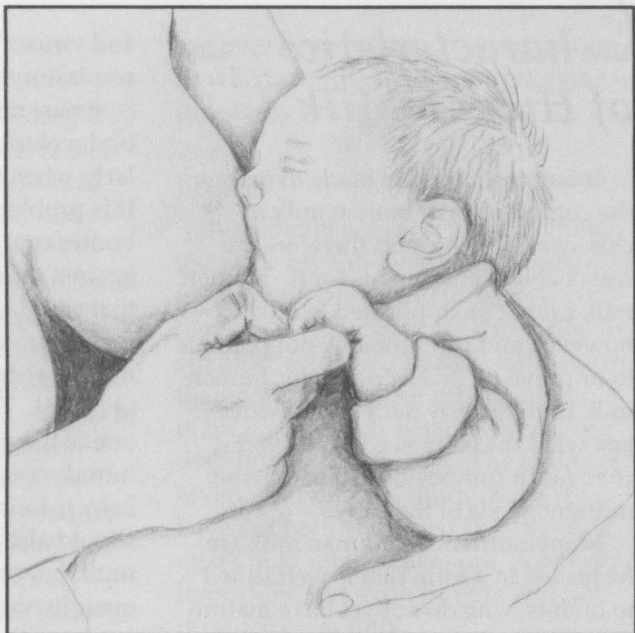
Facts About Breastfeeding

University of Illinois at Urbana-Champaign
College of Agriculture
Cooperative Extension Service
Circular 1281

This circular was prepared by Rebecca Matheny, graduate assistant;
Sheila Ashbrook, Extension specialist, foods and nutrition;
and Mary Frances Picciano, professor, foods and nutrition.

Contents

CHARACTERISTICS OF HUMAN MILK	2
MOTHER'S DIET	3
Fluids	3
Weight Loss During Nursing	3
DRUGS AND OTHER CONSIDERATIONS	4
FEEDING PATTERNS OF THE BREASTFED INFANT	5
Introduction of Solid Foods	5
Liquids	6
Weaning	6
Colic	7
Vitamin and Mineral Supplements for the Infant	7
THE BREAST AND ITS FUNCTION	8
PREPARATION AND ASSESSMENT OF THE BREAST FOR NURSING ..	9
Preparation of the Breasts During Pregnancy	9
Assessment of the Nipples	10
THE PROCESS OF BREASTFEEDING	10
When To Start Nursing	10
Suckling Action of the Infant	11
Positioning the Infant at the Breast	12
Alternating Breasts	14
Burping	15
MANAGEMENT OF PROBLEMS WITH BREASTFEEDING	15
Breast Rejection	15
Pain	15
Nipple Soreness	16
Breast Engorgement	16
Caking of the Breasts	17
Mastitis	17
THE WORKING MOTHER	18
Supplementing with Formula	18
Hand Expression and Breast Massage	18
Nursing Devices	20
Storing Human Milk	22
EQUIPMENT AND CLOTHING	22
BREASTFEEDING IN SPECIAL SITUATIONS	23
Caesarian Birth	23
Prematurity	24
Twins	24
Cleft Palate and Lip	25
Jaundice	26
CONTRAINDICATIONS TO BREASTFEEDING	26
REFERENCES	27
APPENDIX	29



*M*ost women are able to breastfeed their babies and should seriously consider doing so because human milk is usually the

best possible food a newborn can have. The American Academy of Pediatrics has stated that "the ideal food for the full-term infant is human milk" [1].*

Many women find that breastfeeding is easy, convenient, and enjoyable. You are more likely to experience similar success if you understand something about the "mechanics" of breastfeeding and know how to take care of yourself. It is also beneficial to know that problems may arise and that these problems can almost always be easily solved.

Because breastfeeding declined in popularity for a generation, traditional learning about breastfeeding from a mother or older relative frequently does not take place. This publication provides this "traditional" knowledge along with accurate information from new research, and it describes the many available breastfeeding aids and products, which the mothers of nursing women today never dreamed possible. The decision to breastfeed should be made during pregnancy and discussed with an obstetrician or nurse practitioner. It is a good idea to talk to family and friends about the decision so that they can learn about the process. A physician should also be consulted later if more than minor problems occur or there are concerns about the course of breastfeeding. Most problems are easiest to deal with when they are caught early, and it is better to find out that concerns are unjustified than to let things go. If you are like most women, you will have a successful breastfeeding experience.

* References cited in the text appear in brackets.

Characteristics of Human Milk

Infant formulas are made to imitate the composition of human milk as closely as possible and therefore are reasonable replacements for it. Human milk cannot be duplicated exactly, however, and it is probably not possible to improve on it. Nutritionally, human milk from healthy mothers provides just what the baby needs and even changes in composition to match the nutrient needs of the baby.

Many nutrients in human milk are furnished in a form that is well suited to infants, who do not yet have mature digestive and absorptive capabilities [2]. For example, infants have a limited ability to digest fat. The type of fat in human milk and the presence of substances that break it down enable infants to digest this fat easily in two hours. It has also been shown that iron in human milk is well absorbed and that much more must be provided if an infant is fed a formula. Similarly, the zinc in human milk is absorbed by infants in considerably greater amounts than the zinc in formula.

There is evidence that breastfed infants have fewer episodes of diarrhea, vomiting, and ear and respiratory infections than have formula-fed infants [3]. The reduced incidence of these illnesses may be due to the fact that in addition to essential nutrients, human milk contains many protective substances that at this time cannot be added to formula. These substances include antibodies, lactoferrin and other proteins, and the bifidus factor, a milk sugar. They act together to destroy harmful bacteria

and viruses in an infant's intestinal and respiratory tracts [4].

Breast milk may also reduce the risk of developing food allergies, particularly when there is a family history of this problem [5]. Human milk antibodies coat the intestine and guard against the absorption of substances that could cause allergies.

The protective quality of breast milk may be reduced if formula or solids are given [6]. This reduced protection is one of the many reasons for waiting to introduce solid foods until after the baby is four months old. The infant should also be exclusively breastfed until that time, but this ideal is frequently not possible, and there is no evidence that supplementing with formula is actually harmful.

Formerly, there was concern that the protective substances in human milk could prevent infants from properly responding to immunization. Current recommendations for immunization schedules are similar for breastfed and formula-fed infants [7]. Temporary withdrawal of human milk and extra dosages of vaccine are unnecessary.

Breastfeeding differs from formula-feeding in a few other ways that may be beneficial. The skin-to-skin contact during breastfeeding is believed to enhance the bonding between a mother and her infant [8]. The suckling action of breastfeeding is different from that of bottle-feeding and may better promote proper dental and facial development [9]. With breastfeeding, there is no concern about the temperature, spoilage, or dilution of the milk. Preparation and washing of bottles are avoided, and night feedings are easier [10].

Mother's Diet

A good diet while breastfeeding is essential to maintain the best levels of nutrients in the milk. Low intakes of some nutrients, such as certain vitamins, result in decreased amounts in milk [2]. Nursing mothers require more nutrients to provide the energy and nutrients for producing breast milk [11]. For example, their need for protein increases by about 45 percent, and their need for calcium by 50 percent over their usual needs [11]. The primary change is an increase in dairy product consumption from 2 servings to 3 to 4 servings per day. To assist nursing mothers in selecting foods that contain essential nutrients, a daily food guide is given in the appendix [12, 13, and 14].

The nursing mother is often advised to continue taking her prenatal vitamin and mineral supplements, but these supplements cannot make up for a poor diet. It is important to eat a nutritionally adequate diet during pregnancy and breastfeeding. The supplements are just a little added insurance.

The recommended caloric intake for nursing mothers is 2,500 calories daily. Recent studies [15, 16] are challenging this recommendation and suggesting that it is too high. There is evidence that 1,600 to 2,000 calories are often sufficient to maintain adequate milk quantity and quality, while permitting a gradual loss of the extra weight gained during pregnancy.

Vegetarian mothers who avoid all dairy products and other animal foods are at risk for deficient intakes of vitamin B-12, iron, zinc, riboflavin, and vitamin D [7, 14]. Supplementation of the mother's diet and dietary counsel-

ing may be necessary in this situation or whenever the mother is following an unusually limited diet.

Fluids

A common notion is that if a mother increases her fluid intake, the amount of milk she produces will increase accordingly. Such an idea is not supported by scientific evidence. Studies have shown that mothers produce similar amounts of milk while increasing or decreasing their fluid consumption. The effects of severe restriction of fluids, however, have not been evaluated [17, 18]. Adequate fluid intake, therefore, is probably important, but extra liquids will not produce extra milk.

Weight Loss During Nursing

Easy weight loss is one of the benefits frequently given for breastfeeding. It does seem to help some women lose the extra weight gained during pregnancy. Nursing mothers certainly seem to burn up more calories than non-nursing mothers. Not all women lose weight during breastfeeding, however, so their appetite probably increases to keep up with caloric needs, or they are much less active than when they are not nursing. These women may find it easier to wait to lose weight until they gradually eliminate feedings or stop nursing.

Severe restriction of calories during breastfeeding is not advised: nutrient intake is likely to be inadequate, and the nursing mother is likely to find herself feeling exhausted. A prolonged, very low intake of calories would probably diminish the production of breast milk.

Over-the-counter diet pills, which usually contain amphetamines, are not

recommended for nursing mothers. Infants nursed by mothers taking these preparations develop symptoms of wakefulness and giddiness, which are reversed when these preparations are no longer used.

Drugs and Other Considerations

While breastfeeding, women should consult a physician before taking any drug. Many drugs may be passed on to an infant through its mother's milk. In many cases, it is simply not known whether or not this is harmful. Just to be as safe as possible, however, it is best to avoid drugs unless they are absolutely necessary and to consult a physician before they are used.

A few mothers have no choice but to take drugs that are known to enter the milk and that may harm infants. Usually they discontinue nursing. Some drugs are not necessarily harmful if administered when transfer to the milk is minimized. A physician can advise the mother on when and how to use these drugs [7, 19].

Several drugs merit discussion because of their widespread use. Aspirin taken occasionally in normal dosages is considered safe for the nursing infant [7]. Infants whose mothers are taking tetracyclines for breast infections can develop stained or mottled teeth if the drug is taken for more than 10 days [7]. Oral contraceptives can decrease milk production [19] and may not be recommended for nursing mothers. Breastfeeding itself does not prevent pregnancy and cannot be relied on as a birth control measure.

The nursing mother should be aware that even non-oral medications can be harmful to the nursing infant. For instance, a breastfed infant whose mother used an iodine-containing douche was exposed to potentially toxic levels of iodine through the mother's milk [20].

We tend to forget that alcohol and caffeine are drugs. Large amounts of either are probably best avoided during nursing. There is no evidence, however, that small or moderate amounts of either are harmful. Excessive consumption of herbal teas is not recommended because the composition and effects of the herbs are not known.

Smoking need not be an obstacle if a mother truly wishes to nurse. Concentrations of nicotine found in human milk generally are not hazardous to the nursing infant, but excessive smoking in the presence of the infant is not recommended. Smoking marijuana is also not a good idea because it exposes the infant to tetrahydrocannabinol, the active compound in marijuana. Very little is known about its effect on the infant [19, 21].

Insecticides, such as DDT, PCB, and PBB can appear in the fatty substances of human milk, but the usual amounts found in human milk are very small and not considered unsafe. In most cases, breastfeeding should not be abandoned on the basis of insecticide contamination.

The few mothers at greater risk include those women working with or eating large amounts of fish caught in locally contaminated waters. Women living near waste disposal sites or other environmentally contaminated sites may also have been exposed to enough of a substance to be concerned. The State Health Department will warn lactating women about the possibility of excessive exposure in a particular area. The

amount of weight loss during nursing can influence the amount of some fat-soluble contaminants in the milk because they may be released from the fat stores of the mother. The release of contaminants is another reason that active weight loss while nursing is not recommended [19].

Feeding Patterns of the Breastfed Infant

Normal feeding patterns of breastfed infants differ greatly from those of formula-fed infants. For example, breastfed infants typically nurse 7 times a day at 2 weeks of age and 5 times a day at 12 weeks [22]. But the feeding patterns of normally growing breastfed infants do show great variation. Time spans between nursings can range from 2 to 5 hours. Nursing every 2 to 3 hours is encouraged from birth [9] as opposed to every 4 hours as is typical for formula-fed infants.

Breastfed infants are often kept on rigid 4-hour feeding schedules that are only appropriate for formula-fed infants. This practice ignores these facts: less human milk is taken in at a single feeding, and it is more rapidly digested than formula preparations. Also, frequent suckling is necessary to maintain, encourage, and enhance the production of milk.

In an attempt to reduce nipple soreness, nursing time at the breast is often restricted to 5 minutes per breast. Recent studies, however, show that such short nursing periods are more often associated with nipple soreness and engorgement than are longer nursing

periods [23]. The time an infant nurses at each breast is greatly influenced by the vigor of sucking, but total nursing time rarely exceeds 30 minutes. In one study, breastfed infants received about 40 percent of the total milk for a feeding in the first 4 minutes on the first breast and 40 percent in the first 4 minutes on the second breast, the transfer occurring about 15 minutes into the feeding [7]. Based on this study, 20 minutes is recommended as a typical nursing time.

Right after birth, breastfed infants may lose from 6 to 8 ounces before starting to gain weight [24, 25]. The loss may be less for infants whose mothers have previously nursed because the mother's milk flow may start earlier. Milk flow of mothers expecting their first infants, however, may not start until 3 to 4 days after birth. Breastfed infants can double their birth weight between 4 and 6 months of age and triple it at 1 year. Growth spurts occur around 2 weeks, 6 weeks, 2 1/2 to 3 months, and 4 1/2 to 6 months of age. Infants may fret or cry more easily during growth spurts and may require more frequent feeding [26].

Adequate weight gain of the infant is one indication of satisfactory breast-feeding. Another positive sign is that the infant has from 6 to 8 wet diapers daily [26]. Stools of the breastfed infant are soft, loose, and yellow in color [26]. Breastfed infants vary widely in the frequency of their stools, ranging from daily to 2 or 3 a week. Introduction of formula, vitamin-mineral supplements, or food can alter the nature, frequency, and color of stools [27].

Introduction of Solid Foods

The best time to introduce solid foods is when the infant is between 4 and 6

months old. At this time, the infant develops the ability to properly swallow solids and can better control other head and body movements [28]. There is no nutritional or other advantage to introducing foods earlier than 4 months.

New foods should be introduced one at a time with at least 3 days between introductions to aid in identifying possible food allergies. The order is not particularly important. Except for wheat, single-grain dry infant cereals are frequently recommended first because they are not likely to cause allergies and because they are fortified with the iron that infants begin to need at this time. The consistency of infant cereals can also be easily modified. Some infants may prefer to start with very thin cereal.

Pureed, unmixed fruits, vegetables, meats, and egg yolk can be started in any preferred order and are conveniently available as commercial "baby food." Homemade baby food is adequate but not necessarily better than commercial varieties, especially if the latter are unsweetened and unsalted.

As infants get older, they can be introduced to a greater variety of foods and to foods with more texture. Egg whites should not be introduced before babies are 1 year old to prevent a possible allergy.

Liquids

Healthy nursing infants do not require extra fluid except in hot weather. Additional water may be needed when solid foods are introduced and during illness [28].

It may be best to wait to introduce fruit juices until the infant can drink them from a cup. Bottles of juice are

frequently used as pacifiers, but this practice is a poor one for several reasons. The infant may drink very slowly so that the sugar in the juice may stay in the mouth long enough to promote tooth decay, even if the teeth have not yet erupted. In addition, juices may provide calories that, for infants, should be coming from nutritionally superior milk or formula. Finally, there is limited evidence that the more that sweet liquids are consumed in early infancy, the greater the preference for sweet liquids later.

Non-nutritious sweet beverages, like soft drinks and fruit drinks, should not be given to infants. Large quantities of apple juice should also be avoided. New studies indicate that apple juice can initiate or prolong diarrhea in some infants and children.

Weaning

There is no set time for weaning. Ideally, weaning should occur in response to the infant's needs. Infant-initiated weaning most often occurs between 9 and 12 months of age. Introduction of solid foods between 4 and 6 months may initiate weaning. Gradual weaning is desirable because it allows the milk supply to decrease slowly. First drop the one feeding in which the infant is least interested. Substitute with a bottle, a cup, or solid foods depending upon the infant's age. Drop a second feeding after a few days or a week and again substitute. Continue to drop feedings until the infant is no longer nursing [26, 29].

Abrupt weaning is sometimes necessary, for example, for medical reasons. This method of weaning will probably cause discomfort because the breasts will

fill with milk. Applying cold compresses or heat to the breasts will ease this discomfort. Occasionally expressing a small amount of milk will ease the pressure and prevent the pooling of milk, which can lead to mastitis [29].

Colic

Colic due to muscle spasms in the abdominal area occurs most often in early infancy. It is less common but can occur among breastfed infants and includes such symptoms as drawing up of the legs and prolonged periods of crying. Remedies may include medication from a physician, a glass of wine or beer for the mother, or a change in the mother's diet.

Research is unclear as to whether a mother's consumption of cow's milk can cause colic in an infant allergic to cow's milk protein. Mothers may be advised to avoid milk and other dairy products for about a week to see if this avoidance will help relieve severe colic. Infants allergic to cow's milk respond well to such a change [7]. Calcium supplementation of the mother is required if she makes this change in her diet.

Colic can be caused by other foods eaten by the mother, such as eggs or chocolate, but it can also be unrelated to diet. Severe colic in breastfed infants has occurred because of the mother's consumption of onions, garlic, beans, rhubarb, or other strong foods. Infants begin to cry within a few hours, and the colic may continue for up to 24 hours. This temporary colic does not require treatment by a physician, but the mother may want to avoid foods that she suspects to be the cause of the problem. Diet is not always the problem, however, and a physician should be consulted if dietary changes do not help relieve the colic.

Vitamin and Mineral Supplements for the Infant

No vitamin or mineral supplements of any type should be used without consulting a physician. Iron supplements may be recommended by the physician although anemia due to iron deficiency is rare in breastfed infants. The recommended intake of iron is 10 milligrams daily between birth and 6 months and 15 milligrams daily between 6 months and 3 years [30]. The iron in human milk is very well absorbed, and infants consuming only breast milk appear to be meeting the requirement.

Infants are usually born with some stored iron that may be used up by the time they are about 3 or 4 months of age. Less breast milk may be consumed if solids have been started. At this time it is important to include another source of iron in the infant's diet. The preferred sources of iron are the iron-fortified dry infant cereals. The usual serving of 3 to 6 tablespoons of cereal contains between 3 and 6 milligrams of iron. Two servings daily should be sufficient. The cereal should be started as one of the first solid foods for the infant and continued until the baby is at least a year old.

Medicinal iron drops may be used as an alternative source of iron. Some physicians prescribe them on a routine basis. Iron drops can be toxic when taken in larger doses than prescribed. Consuming more than the recommended amount of iron is not advised [30]. If nursing is discontinued before an infant is 6 months old, then an iron-fortified formula should be used as a replacement. Consumption of cow's milk by very young infants may cause intestinal blood loss and increase the chances of anemia [30].

Flouride supplementation may also be recommended for breastfed infants. Breast milk contains little flouride even among mothers living in flouridated communities. Breastfed infants drink little or no water. The American Academy of Pediatrics advises that 0.25 milligrams of flouride drops be started on a daily basis at 2 weeks after birth for infants who will be exclusively breastfed over 6 months. Although infants' teeth have not yet appeared, they have already started forming under the gums. Flouride may help strengthen them and help

prevent later decay. Too much flouride can discolor teeth, so a physician should be consulted about discontinuing the supplements if infants increase the amount of water or formula mixed with water that they consume [31].

A dose of Vitamin K is given to all infants shortly after delivery to prevent any problems with uncontrolled bleeding [1]. Vitamin D supplementation of the breastfed infant is controversial. The current recommendation is 400 I.U. of a Vitamin D supplement for all infants [11]. There is no evidence, however, that it is needed by breastfed infants [11].

The Breast and Its Function

Mothers can best prevent problems with breastfeeding when they have a clear understanding of the breast and its function. The breast consists of twenty segments called lobes. Each lobe consists of smaller sections called lobuli (Figure 1). Each lobule is made up of 10 to 100 alveoli, which are the secretory units of the breast. Alveoli secrete milk into small ductules, which empty into

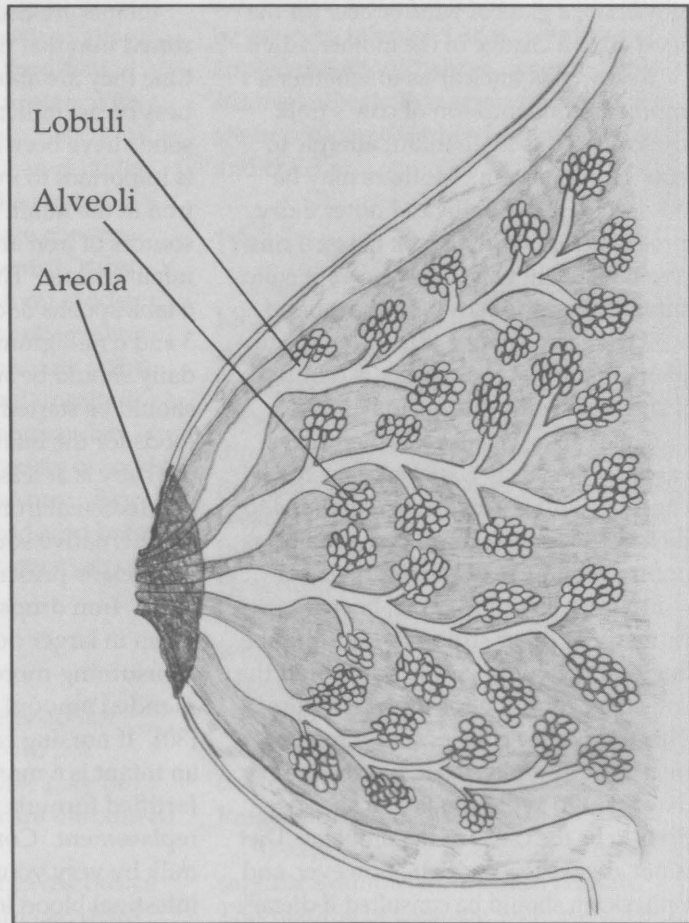


Figure 1. Breast physiology.

larger ducts called the mammary ducts. These mammary ducts widen to become the lactiferous sinuses behind the nipple and areola, the colored portion of the breast. The alveoli and smaller ducts are surrounded by myoepithelial cells, which contract and eject milk into the ducts. The Montgomery glands, located in the areola, produce substances for lubrication and protection of the nipple area [32, 33].

The lobes of the breasts are supported by connective and fatty tissue. The amount of these tissues varies widely among women and determines breast size. Contrary to popular belief, breast size does not affect the ability to nurse.

Hormones during pregnancy prepare the breast for milk production. Maintenance of breastfeeding requires prolactin and oxytocin, two hormones that are released from the pituitary gland. Infant suckling triggers the release of these hormones. Prolactin acts upon the alveoli to produce milk, while oxytocin causes contraction of the myoepithelial cells surrounding the alveoli and ductules. These contractions squeeze the stored milk into larger ducts and sinuses, making milk available to the infant. This reflex is termed milk let-down or milk flow [32, 33].

Milk let-down is accompanied by a tingling sensation at the beginning of nursing that gradually subsides during nursing. Such sensations may be stimulated not only by suckling but also by hearing the cry of the infant or seeing or thinking of it. Let-down may be inhibited by embarrassment, pain, or fear. During let-down, milk may drip from the breast not being suckled. Uterine contractions may also occur because the uterus is sensitive to oxytocin [33].

The more an infant nurses, the more

milk is produced. The milk supply increases when an infant nurses from both breasts at each feeding, when feedings are frequent, and when milk is completely removed from the breasts. Essential to success is not allowing milk to collect in the ducts. This causes tension in the breasts. The pressure from milk buildup in the breasts decreases the ability of the alveoli to produce milk [32, 33].

Colostrum, the first milk, is a clear, yellow fluid with higher protein content and lower fat and sugar content than either transitional or mature milk. The higher protein content reflects a higher level of antibodies. Over the first 4 weeks, milk slowly changes in composition from transitional to mature milk. Each of these three milks is well suited to the infant's changing needs. The composition of mature milk changes during a feeding. Fore milk is released first. The appearance of its clear, thin, bluish fluid reflects its low fat and higher water content. Hind milk, which results from milk let-down, is thick and creamy white and contains more fat. Thus, milk let-down plays a key role in providing the energy-rich milk needed by the infant [33].

Preparation and Assessment of the Breasts for Nursing

Preparation of the Breast During Pregnancy

Many publications suggest such practices as nipple rolling, the application of creams, and hand expression of colostrum during pregnancy to prevent

nipple soreness [34, 35]. Studies indicate, however, that the degree of nipple damage and sensitivity of mothers who observe these practices is not different from those who do not. Expression of colostrum and nipple rolling during pregnancy are not advised because they can bring on early labor or cause a breast infection [7].

Some preparation is recommended for mothers who have experienced nipple soreness with previous infants. Mothers may wish to buff the nipples gently with a soft towel after bathing. Soaps, alcohol, and other drying agents are not recommended because they may dry and irritate the nipple. Wearing a nursing bra with the flaps down prepares the nipples for nursing by allowing clothes to rub them. After an infant is born, proper attachment and suckling, flexible duration time at the breast, and complete drainage of the breast by frequent demand nursing can greatly aid in preventing nipple problems.

Assessment of the Nipples

Nipples should adequately protrude so that the infant can properly grasp the nipple and areola. Breast examination during pregnancy can determine whether or not nipples protrude sufficiently [7, 21]. Assess the nipples by pressing the areola just behind the base of the nipple between the thumb and forefinger. Flat and normal nipples will protrude (Figure 2a), but inverted nipples will remain flat or pull inward toward the breast (Figure 2b). Plastic or glass nipple shields available from drug stores are highly recommended for inverted nipples [7].

The shield, with rubber nipple tip removed, is worn inside a well-fitting

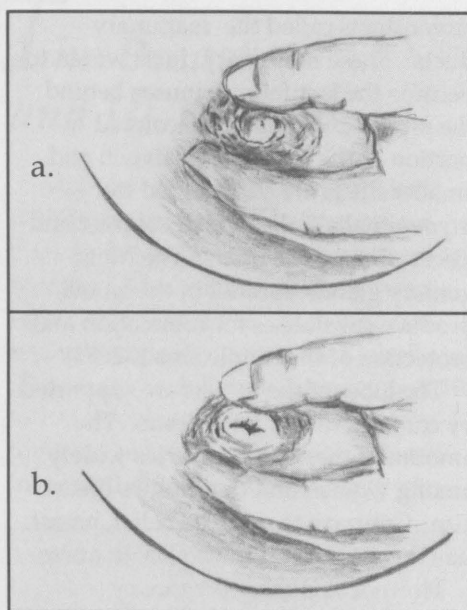


Figure 2.

nursing bra during the last 2 trimesters of pregnancy. Start with an hour or two each day and increase the wearing time gradually. Shields exert a gentle pressure around the areola. This pressure pushes the nipple out through the shield's central opening. Check with your physician if there are problems. Small, flat, or inverted nipples, if treated, should not interfere with successful breastfeeding.

The Process of Breastfeeding

When To Start Nursing

The time of the first nursing depends upon the health of the mother and infant and upon the mother's preference.

Mothers who have had uncomplicated deliveries are advised to nurse immediately afterward and frequently thereafter. Early contact and feeding may result in a more successful experience [21]. Bonding between mother and infant is at its highest, and the suckling reflex is most intense at birth. The contractions of the uterus caused by nursing help expel the placenta and prevent excessive blood loss by the mother.

By encouraging milk flow, early feeding reduces not only the risk of engorgement but also the weight lost by the infant. The infant receives the protective substances of colostrum, and the colostrum stimulates the digestive tract of the infant. Rooming-in arrangements further support these benefits by encouraging frequent demand feeding [21].

Suckling Action of the Infant

When the breast is offered, the infant's lips close around the areola, securing it in place (Figure 3a). The tongue then moves forward to grasp the nipple and areola (Figure 3b). Rhythmically, the tongue moves toward the hard palate, drawing the nipple and areola deep into the mouth (Figure 3c). The cheeks fill the mouth, causing further negative pressure. The tongue returns to the lip and gum and draws back along the areola, releasing milk from the ducts and initiating the flow of milk (Figures 3d and 3e). The infant should be removed from the breast and started again if there is choking due to a rush of milk.

Infants with receding jaws may have difficulty keeping the nipple in place. Mothers may want to give gentle support at the angle of the jaw. Puckering of the infant's lips or dimpling of cheeks suggests that the infant is only sucking

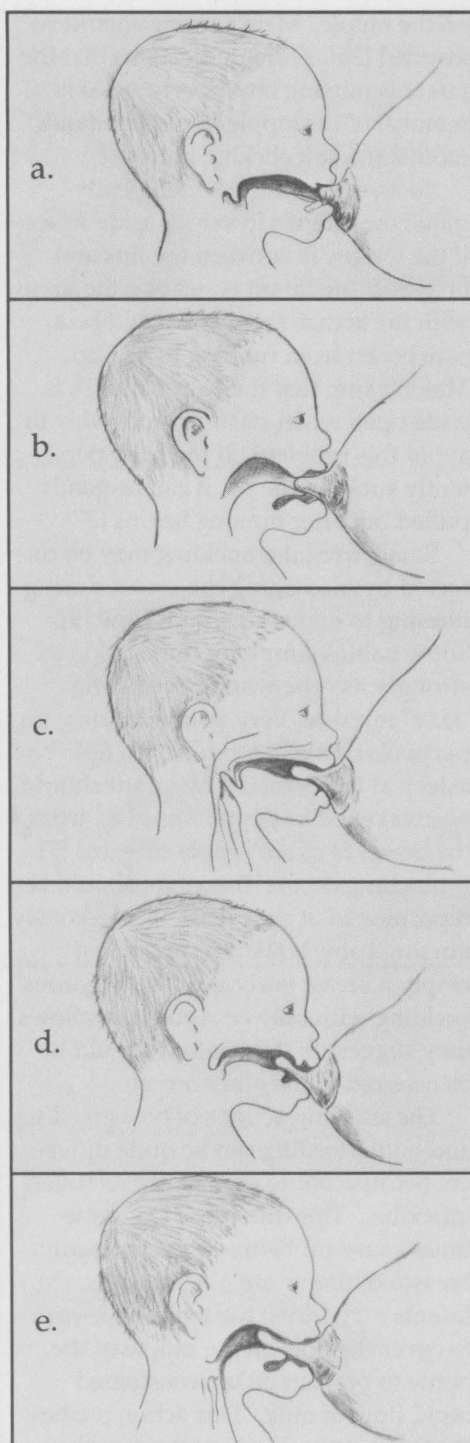


Figure 3.

on the nipple. Mere sucking should be avoided [36]. Other indications that the infant is nursing improperly are easy removal of the nipple from the infant's mouth and soft clicking noises.

To assess suckling better, gently move the infant's lower lip aside to see if the tongue is between the lips and breast. If the infant is sucking the lip in with the breast, the result could be a sore breast from rubbing by the lip. Making sure that the baby's mouth is wide open when starting is one way to avoid this problem. If the baby persistently sucks in the lip, it can be gently pulled out after nursing begins [37].

Small, irregular suckling may be corrected by massaging the breast during nursing to encourage milk flow [9]. Some babies simply do not suckle as strongly as others and prefer long "lazy" nursing. Very young infants, in particular, have a tendency to fall asleep at the breast. The infant should be awakened or gently removed from the breast to avoid nipple soreness [7]. If pinching occurs, the infant should be repositioned at the breast. A vigorously nursing baby, however, can almost empty a breast fairly quickly. Vigorous suckling with only occasional swallows may suggest that the infant should be transferred to the other breast.

The suckling actions of breastfeeding and bottle-feeding can be quite different because bottle nipples are relatively inflexible. This difference can sometimes cause problems when primarily breastfed infants are given bottles. Infants may thrust the tongue forward to cover the hole on the nipple of the bottle to prevent an unaccustomed rapid flow of milk. This action pushes the human nipple out of the mouth when the infant returns to breastfeed-

ing, and it may look as though the infant is now rejecting the breast. Therefore, mothers may want to avoid supplementing with a bottle until nursing becomes well established [7, 37].

For small nipples, pressing the areola flat when offering the breast to the infant makes it easier for the infant to grasp. Shields may be used to initiate nursing but should be removed for the rest of the feeding. Shields may also be used for large nipples, especially when nursing small infants or infants with weak sucks [7].

Positioning the Infant at the Breast

Correct positioning of the infant at the breast can prevent nipple soreness. The Frantz technique is highly recommended [23, 37] and seems to come naturally to most mothers (Figures 4a-4e). The mother sits upright with the infant across her lap and the head in the crook of her arm. An armrest at the appropriate level makes it much easier to hold the baby this way. A low chair that brings the knees up or a pillow between the baby and the mother's lap also helps make the position more comfortable.

The infant is turned toward the mother so that the baby's mouth can come close to the nipple (Figure 4a). The infant is offered the breast by placing the thumb on the upper part of the breast and the remaining fingers on the lower part (Figure 4b). Grasping the areolar area should be avoided because pressure on the areola interferes with proper attachment. The infant should take both the nipple and the areola deep into the mouth although the infant may take only part of an especially large areolar area.

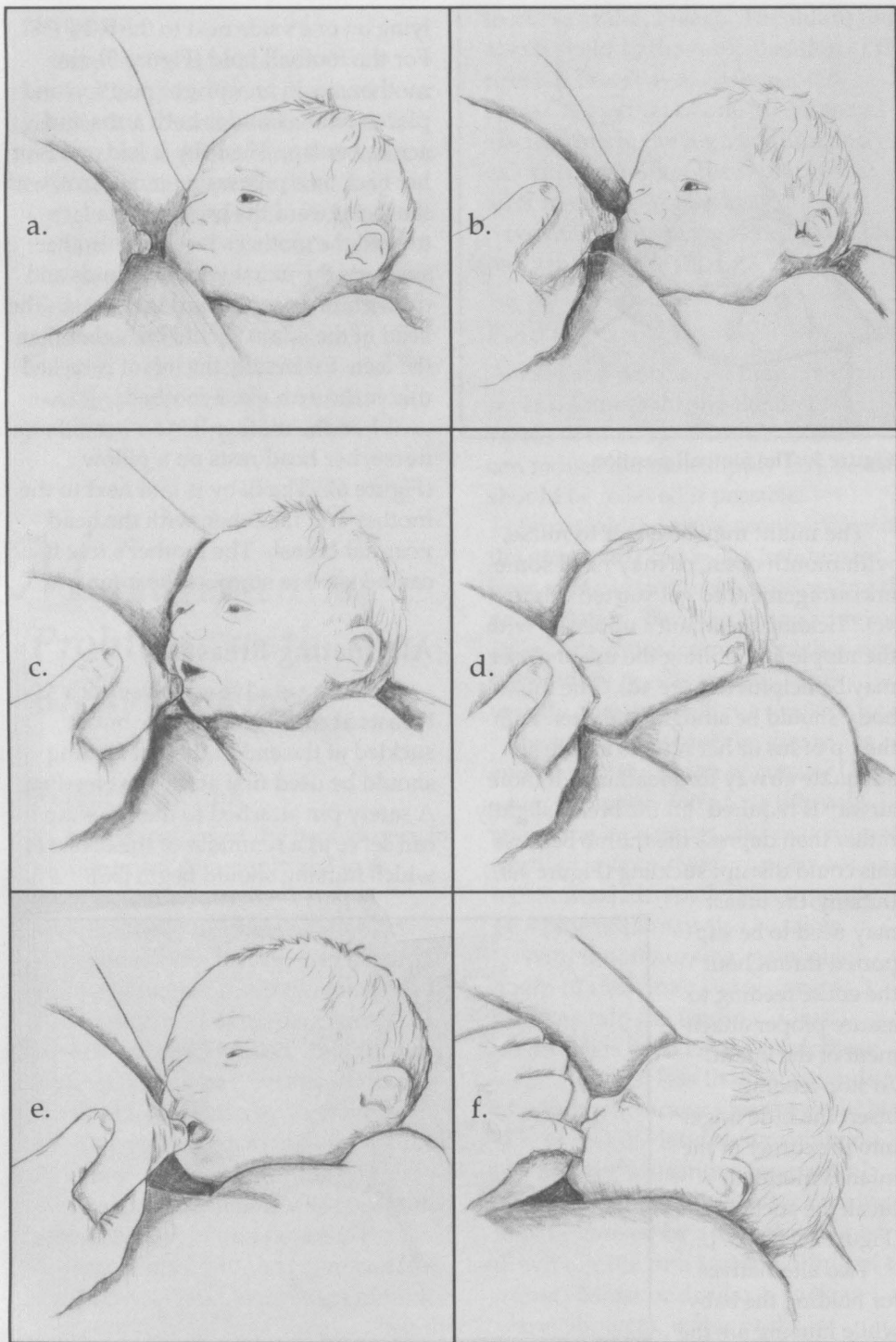


Figure 4. The Frantz position.



Figure 5. The football position.

The infant may be eager to nurse, with mouth open, or may need some encouragement to get started (Figure 4c). Tickling the infant's upper lip with the nipple and pulling the infant closer may be helpful (Figure 4d). The infant's body should be straight and even with the tip of his or her nose to assure an adequate airway for breathing. If more airway is required, lift the breast slightly rather than depress the thumb because this could disrupt suckling (Figure 4e).

Initially, the breast may need to be supported throughout the entire feeding to assure proper attachment of the infant. To stop feeding, insert the little finger into the corner of the infant's mouth to break the suction (Figure 4f) [23, 37].

Two alternatives for holding the baby while nursing are the football position and

lying on one's side next to the baby [38]. For the football hold (Figure 5), the mother sits in an upright position and places pillows under both arms and across her lap. The baby is laid on his or her back on a pillow under one arm, with the feet toward the back and the face toward the mother's face. The mother supports the infant with her hands and draws him or her toward the breast. The head of the infant should be higher than the feet. Essentially the infant is tucked under the arm like a football.

When the mother lies on her side to nurse, her head rests on a pillow (Figure 6). The baby is laid next to the mother and faces her, with the head near her breast. The mother's free hand can be used to support the infant.

Alternating Breasts

Mothers are advised to use both breasts at each feeding. The breast suckled at the end of the last feeding should be used first at the next feeding. A safety pin attached to the bra strap can serve as a reminder of the breast at which nursing should begin [35].



Figure 6. Nursing while lying on one's side.

Burping

Burping the infant once or twice while nursing and once afterward is recommended to remove swallowed air that can cause discomfort. The infant is held upright against the shoulder, upright on the lap, or placed face downward on the lap. The infant's back is then patted or rubbed [35]. It is normal for infants to spit up a small amount of milk after nursing or when being burped. A small cloth or diaper is often used to protect clothing when burping an infant or holding a recently fed baby.

Management of Problems with Breastfeeding

Breast Rejection

Infants may reject the breasts once in a while, most commonly at 3 to 4 months, and return to nursing after several missed feedings or after a day. Rejection of both breasts may occur when the mother resumes menstruating. A day or so of nursing may be missed with each period. Infants may also reject the breast because of strong-flavored foods eaten by their mothers, but they will return to nursing within 24 hours. Bottles of formula or previously expressed milk can be substituted when breast rejection occurs [7].

Infants may have a preference for one breast. Hand expression of milk from the rejected breast may soften the nipple area and encourage the infant

to nurse at that breast. The infant may also be held in the same position at the rejected breast as at the accepted breast. Rejection of one breast may also be due to the high sodium and chloride content of the milk present after mastitis. Your physician may have the milk or breast checked if the problem persists [7].

Pain

Pain and discomfort may arise from several sources during the first few weeks of nursing. Such discomforts can reduce the milk supply [39], so they should be relieved if possible.

Breastfeeding causes contractions of the uterus that can range in intensity from being unnoticeable to equaling the pain of labor. The breathing and relaxation techniques learned for labor can help reduce the discomfort. This pain usually goes away after a week or two.

Incisional pain may be due to the episiotomy, the repair of cuts, or Caesarian delivery. To reduce this pain, relaxation techniques and switching to alternative breastfeeding positions are recommended. Analgesics suggested by a physician may also be taken.

With initial nursing, painful let-down of milk may last as long as 3 minutes into the feeding. Once nursing has been established, these sensations last less than 30 seconds. Mothers who know that they will be able to feel the let-down usually do not find the sensations too painful [39]. Pain in the breast after nursing may be caused by an incomplete let-down of milk or a sudden filling of the breast. Moist or dry heat, such as warm showers, water packs, or heating pads may be helpful.

Nipple Soreness

Initial grasping of the nipple and suckling by the infant may cause temporary discomfort. Milk let-down has not yet occurred, and pressure is put on the unfilled ducts. Proper positioning of the infant at the breast greatly reduces the discomfort and prevents nipple damage.

Allowing the milk with its antibacterial and lubricating qualities to dry on the nipple after each feeding can also reduce the likelihood of soreness. A small amount of breast milk rubbed into the nipple can promote healing if cracking should occur. Mothers may wish to start nursing on the opposite breast to reduce the discomfort caused by placing an infant on a sore nipple [7].

Other measures to reduce nipple soreness involve allowing better air circulation around the nipple. If possible, lowering the flaps of the bra and exposing the nipples to air and sunlight can help [7]. Another measure is to insert a tea strainer with the handle removed into the bra cup to hold the bra away from the nipple [40].

Leaking may cause bra flaps to stick to the nipple. Moistening the flaps before lowering them will loosen the nipple and avoid pulling on the skin [39]. Frequent changing of the bra may be required. Laundering bras in a harsh detergent is not advised because residues of the detergent may irritate the nipple.

Warmth or cold may help relieve nipple soreness. Warmth can be provided by warm showers or by immersing nipples into comfortably hot water [39]. Cracked ice wrapped in a washcloth can be used for a cold pack [39]. For dry heat, a hair dryer on a low setting can be used to dry nipples between feedings, or the nipples can be

exposed to a 60-watt light bulb at 18 inches for 20 minutes 4 times daily [7].

Nipple shields are not advised, but if they are needed, the thin latex shield has been highly recommended [7].

If ointments are used, hydrous lanolin and A and D ointments are preferred, for they do not need to be removed before nursing. Lanolin should not be used by mothers who are sensitive to wool. Ointments containing antibiotics, astringents, bismuth subnitrate, and petrolatum are undesirable [7].

Persistent sore nipples may be due to a thrush infection from yeast in the infant's mouth [40]. Infants who have received antibiotic therapy are most susceptible to an oral thrush infection. Thrush appears as white patches surrounded by redness. Check nipple and areolar areas for inflammation.

Thrush can be suspected if nursing has been without previous problems and soreness suddenly appears. Severe cases of thrush require medical treatment with mycostatin or gentian violet. Upon the advice of a physician, less severe cases can be treated by a home remedy. Mothers may have a yeast infection of the vagina that needs treatment as well.

Breast Engorgement

Engorgement involves an increase in the flow of blood to the breast, causing congestion and accumulation of milk. It may include only the areola, only the body of the breast, or both. Areolar engorgement makes it difficult for the infant to grasp the nipple and nurse properly. Manually expressing a small amount of milk can soften the areola. Mild engorgement may occur when the mother's milk first comes in or when the time between nursings is longer than usual. Wearing a

well-fitting nursing bra and nursing as soon as possible will help avoid discomfort if mild engorgement occurs [7].

Moderate to severe engorgement may occur during weaning or when the infant does not nurse for a much longer time than usual. The breasts become full, hard, and tender. Cold or warm packs may provide some relief. Standing in a warm shower and expressing enough milk to soften the breasts before nursing have been recommended. The breasts should be drained completely by nursing, hand expression, or use of a breast pump. Analgesics, such as aspirin, may be prescribed to relieve tenderness [7].

Caking of the Breasts

When a collecting duct becomes plugged with thickened milk, caking occurs and causes a tender lump. The mother should continue nursing but begin the next feeding on the uncaked breast. If nursing does not help dislodge the lump, the caked area can be massaged toward the areola to help the duct drain completely. Hot packs applied before nursing can help soften the caked area and assist drainage. Caking may be due to the inadequate emptying of a duct. Changing the infant's feeding position slightly may help the duct to drain properly. Some mothers find that caking occurs repeatedly in the same place. Manually draining the duct as soon as any caking is noticed will help avoid more widespread and painful caking. A diet high in polyunsaturated fats is believed to be effective in preventing caking for at least some women [7]. To decrease the saturated fat in the diet, replace some animal fats with vegetable oils.

Mastitis

Mastitis is a bacterial infection of the breasts. It differs from engorgement and caking by the presence of localized pain, redness, heat, swelling, a fever over 101°F, and flulike symptoms. It usually affects only one breast. Mastitis may result from engorgement or caking if the breast is not drained enough to correct these problems. Cracked or painful nipples accompanied by hesitancy to nurse can also lead to mastitis.

A physician should be consulted if mastitis is suspected. An antibiotic that can be tolerated by the infant will be prescribed. Continued nursing and rest are essential for successful treatment. Nursing should begin on the uninfected breast, but both breasts should be used. The infection will not harm the infant. Infective material almost never appears in the milk; but if it does, the milk contains protective agents that prevent harm to the infant [7].

Three complications can arise if mastitis is not treated promptly or adequately. First, mastitis can return. Second, prolonged use of antibiotics may result in a yeast or fungal infection in the milk ducts that can cause extreme pain during nursing. A physician can prescribe an antifungal cream that is applied to the nipple and areola. Infants should be treated orally as well to prevent reinfection of the mother. A third complication may be the formation of an abscess that may require surgical drainage. Breast-feeding can continue, provided that the incision and drainage area are sufficiently far from the areola. Otherwise, breast-feeding should be stopped until healing occurs in about 4 days. Meanwhile, manually expressing the milk will maintain an adequate supply [7].

The Working Mother

It is easiest for working mothers to continue breastfeeding if they do not supplement until nursing is well established. After that, the infant can be given supplementary bottles of formula or expressed breast milk while the mother is at work. There is disagreement as to whether it is worthwhile to "prepare" an infant for the mother's return to work by introducing bottle-feeding while the mother is still home [41]. Infants may be confused or simply refuse a bottle given by the mother. The infant may take a bottle more readily from another person in the absence of the mother.

Working mothers may at least wish to become familiar with hand expression or pumping of the breasts, especially if they plan to express and store milk at work to use later in bottle-feeding. The feasibility of expressing and storing milk at work should be considered before the mother returns. If milk cannot be expressed in a clean, comfortable area or easily kept cold all day, then the mother may not want to attempt to express milk for later use.

Supplementing with Formula

Working mothers can supplement with formula while they are working and continue breastfeeding mornings and evenings. Supplementing with formula may be necessary if the mother does not have adequate facilities available for expressing and storing breast milk. Other mothers may simply prefer the convenience of not having to express breast milk. Some infants will quickly get used to switching both from

the breast to the bottle and from breast milk to formula. Some infants are very resistant to one or the other, however, and may take a while to adjust.

Nursing should be fully established before switching to partial nursing. It is best to breastfeed exclusively for at least a few weeks before cutting back. It is probably easiest to supplement with formula after solids have been introduced into the infant's diet because weaning often occurs at this time.

Hand Expression and Breast Massage

The basic steps (Figures 7a-7d) for expressing milk are as follows [7]:

1. Place the thumb above the nipple and the first two fingers below the nipple about 1 or 1 1/2 inches behind the nipple. Avoid cupping the breast (Figure 7a).
2. Push straight into the chest wall. Avoid spreading your fingers. For large breasts, lift the breast before pushing.
3. Rock thumb and fingers forward to compress and empty the milk sinuses (Figure 7b).
4. Rotate thumb and fingers to a new position and repeat steps 1 to 3. Use both hands on each breast to assure that all areas are drained. Massaging the breasts encourages milk let-down before expressing milk (Figure 7c).

The following basic steps (Figure 8) are used in breast massage:

1. Start massaging on the top of the breast, pressing inward and moving the fingers in a circular motion on one spot. Spiral around the breast toward the areola, massaging a few seconds at each

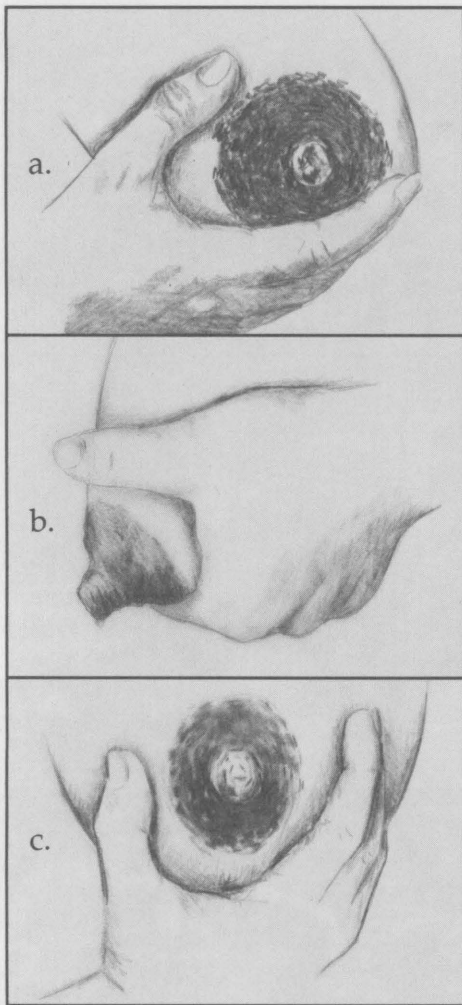


Figure 7. Hand expression.

spot. This massaging motion is similar to that used in a breast examination (Figure 8a).

2. Apply light tickling strokes from the top of the breast to the areola. Continue around the breast (Figure 8b).

3. Lean forward shaking the breast so that gravity will help milk to flow out. Complete drainage of the breasts may require expressing the breasts several times and massaging between expressions. The breast is expressed each time until the flow of milk slows down. Then massage begins. Both breasts can be massaged at the same time. A general guide is as follows: express each breast for 5 to 7 minutes. Massage, stroke, and shake. Express each breast for 3 to 5 minutes. Massage, stroke, and shake. Express each breast for 2 to 3 minutes. This procedure should take from 20 to 30 minutes [7].

The best time for working mothers to learn hand expression of milk is after having nursed for several weeks but well before returning to work. It takes several weeks for let-down to become established and recognized. The most convenient time to experiment with the technique is when milk accidentally lets

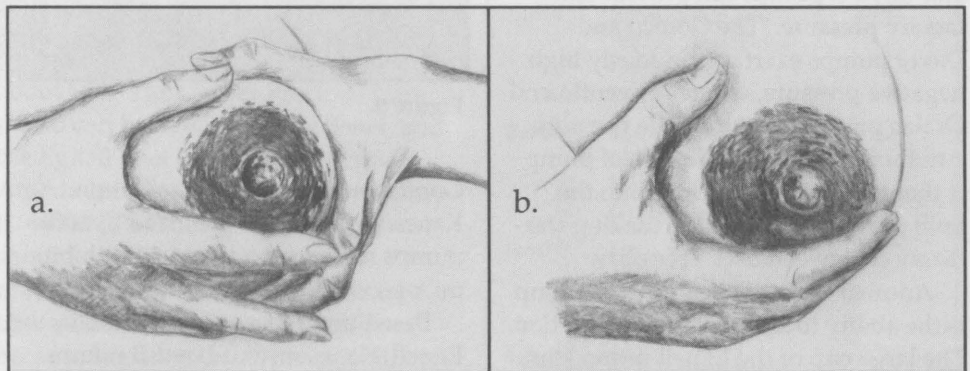


Figure 8. Breast massage.

down and the infant is asleep.

Initially, mothers may want to express their milk into a bowl. Later, milk can be expressed directly into the bottle. Hand expression of milk can be greatly facilitated once milk let-down has occurred. Let-down can be initiated by stimulation of the nipples [42].

Nursing Devices

Breast pumps are useful when mothers wish to maintain their milk supply but cannot feed their infants directly. Normal nursing action creates a negative pressure that allows for adequate milk flow. The action of a good breast pump closely resembles such nursing. Pumps that create too much negative pressure can internally bruise the breast, cause blood to appear in the milk, and injure tissue in the nipple area. Pumps that produce too low a pressure remove milk inefficiently. The pump most likely to avoid these problems is the Egnell pump. This pump is electric and has an intermittent pressure cycle. It is too expensive for home purchase, but rental may be possible.

Other pumps that may be considered for home use have been evaluated for the pressure they exert [43]. Kaneson and Loyd-B pumps can provide satisfactory pressure. The Gomco and Davol pumps exert continuously high negative pressure, whereas Evenflo and Oralac pumps exert too little pressure. Another drawback to the Davol pump is that milk can easily enter into the bulb portion of the pump, making sterilization between uses necessary.

Another desirable feature in a pump is the ability to stimulate milk secretion. The large cup of the Egnell pump stimulates the best. The small cup of the



Figure 9.

Gomco pump inhibits stimulation. Kaneson, Loyd-B, Davol, and Evenflo pumps neither encourage nor inhibit milk production [43].

Based upon these considerations, the Egnell, Kaneson, and Loyd-B pumps have been recommended (Figures 9a-



Figure 10. ©1987 Gerber Products Company. Permission to use granted by Gerber Products Company.

9c). In addition, these three pumps have been highly rated for ease of cleaning and for visibility of pumped milk [43]. For ease of handling, the Egnell pump is better than the Kaneson pump, which in turn is better than the Loyd-B pump [43]. The Egnell pump has the greatest container capacity: it holds 8 ounces. The Loyd-B holds 4 ounces, and the Kaneson holds 3 [44]. These pumps may not be readily available for purchase, so the addresses of their manufacturers are given here.

The Gerber Precious Care electric breast pump [45] and the Egnell Lact B battery-driven pump have more recently become available and were not evaluated in the study cited above (Figures 10 and 11). The price of these pumps is about \$30. The Gerber Precious Care pump can be obtained from Sears, and the Egnell Lact B pump from Egnell-Ameda Inc., 765 Industrial Drive, Cary IL 60013 [(312) 639-2900]. Pumps should not be shared with other mothers unless there is access to reliable autoclaves or gas sterilizers because hepatitis or herpes infections can persist even after the pumps have

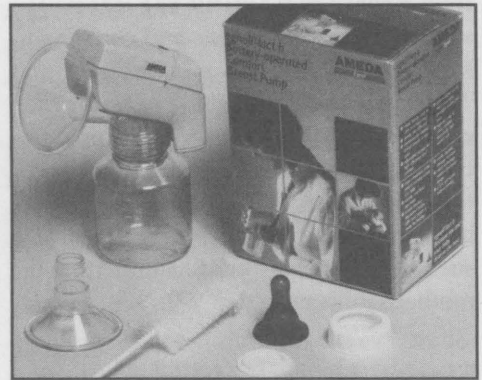


Figure 11.

Pump	Manufacturer	Approximate cost
Egnell	Egnell-Ameda Inc. 765 Industrial Drive Cary, IL 60013 (312) 639-2900	\$920 ^a
Kaneson	Marshall Electronics, Inc. 600 Barclay Boulevard Lincolnshire, IL 60069 (312) 634-6300	\$ 22
Loyd-B	Lopuco Ltd. 1615 Old Annapolis Road Woodbine, MD 21797 (301) 489-4949	\$ 35

^a (Send for a list of rental sites.)

been boiled. A mother may reduce the time and suction required for pumping by stimulating milk let-down beforehand. Ways of stimulating milk let-down include massaging the breasts, stimulating the nipples, using relaxation techniques, applying warm compresses, drinking something warm, or just thinking about the baby [42].

The Lact-Aid Nursing Trainer is often used in cases of premature infants, adopted infants whose adoptive mothers have not been pregnant, and infants whose suckling action has been confused by supplementing with a bottle. The trainer consists of a sterile bag that is worn between the breasts and contains supplemental formula or breast milk. This bag is equipped with a narrow tube running along the breast to the nipple so that the infant can suck at the breast and the feeding tube at the same time. The baby receives nourishment and learns to suck from the breast while stimulating the mother's milk supply [7, 37].

Storing Human Milk

Human milk should be chilled immediately after collection. While sitting in the refrigerator, the cream portion of the milk may separate. Milk should be frozen if not used within 24 hours. Try to freeze the milk in quantities that the infant will take at a single feeding. Infants between birth and 3 months of age average 2 to 4 ounces per feeding [22]. Breast milk may be stored for 2 weeks in the freezer of a single-door refrigerator, several months in a zero-degree Fahrenheit, two-door unit, and longer in the back or bottom of a deep-freeze unit. Mothers may wish to rotate or date the milk to ensure that the oldest milk is used first. To defrost this milk, run it under cold water

and then slowly increase the temperature, shaking it to mix the ingredients. Avoid boiling breast milk because it can curdle. Microwave defrosting of milk is not recommended because the effects of this technique on milk are not known. Also, there is the possibility of burning the infant's mouth with milk that overheated while the container remained cool [42].

Working mothers expressing their milk will need a means of refrigerating it while they are away from home. A thermos container with crushed ice or a cooler with ice cubes or freezing solution are recommended for transporting expressed milk [42].

Equipment and Clothing

The broad, flat type of bottle nipple (Nuk) is recommended because it is more acceptable to the nursing infant, and clear plastic bottles may be better than glass bottles. Plastic bottles do not break. Evidence suggests, moreover, that some of the protective cells of human milk stick to glass and become inactive. Often the convenient plastic liners for nursing sets are used to freeze milk. These bags may break, however, so it is advisable to insert such bags into a more stable container before freezing. Air space should be left for the twist tie [42].

Milk-collecting cups are available that can be inserted into the bra to fit over the nipple. They serve to catch milk from the second breast if leaking occurs. Such milk, if collected in a clean manner, may be refrigerated or frozen. Cups should be washed well, boiled periodically, and

not shared with other mothers. They may not be readily available for purchase, but they can be ordered from the Childbirth Education Association of Greater Philadelphia, 129 Fayette Street, Conshohocken, PA 19428 [(215) 828-0131], or from La Leche League International, 9616 Minneapolis Avenue, Franklin Park, IL 60131 [(312) 455-7730]. The cost at the time of printing was \$5.

The equipment used for pumping, transporting, or storing milk should be washed in hot, soapy water with a clean bottle brush and boiled once in a while. Using the hot cycle in a dishwasher is also recommended. Healthy infants over 6 weeks do not require sterile equipment, but everything should always be clean [42].

Mothers may wish to wear a well-fitting nursing bra during pregnancy and breastfeeding to assure proper support and comfort. Desirable features in a nursing bra include wide, nonelastic straps and easily unfastened cups that enclose the entire breast and allow for breast enlargement. Lowering the bra flaps should expose a large area of the breast for nursing [35].

To deal with leaking breasts, nursing pads without plastic backing can be inserted into the bra cup. These are especially useful in early nursing when leaking is more common. Other ways to deal with leaking include placing the arms tightly across the breasts or applying pressure with the fingers or thumb directly over the nipple [40].

The nursing mother should wear clothing that allows for easy nursing. Tops that can be lifted or unbuttoned in the front are popular. Nursing nightgowns are available that can be unbuttoned or that have hidden slits for nursing.

*B*reastfeeding in *S*pecial Situations

Caesarian Birth

Mothers who have a Caesarian section can nurse successfully. The method of delivery does not alter the time at which milk comes in, nor does it alter the composition of the milk [7, 38]. All techniques suggested for normal births and nursing apply to the Caesarian delivery, for example, assuring proper positioning and frequent nursing. Mothers can often nurse within the first 12 hours after delivery. Sometimes infants are too sleepy to suck strongly at first because a general anesthesia was used [39]. Infants may be kept awake long enough for a good feeding by changing their diaper or by stroking their feet. Another approach may be to nurse frequently for shorter periods of time.

While nursing, mothers may be more comfortable holding their baby in the football position or lying on their side next to the baby. Mothers who have had epidural anesthesia are advised to lie flat and to nurse while lying on their side to prevent headaches. Side rails can be left up on the hospital bed to facilitate turning while nursing. Analgesics are often prescribed. A low-grade fever, not uncommon after Caesarian delivery, should not interfere with nursing [7, 38].

When infants cannot be nursed after delivery, mothers are advised to maintain their milk supply by regularly pumping or hand expressing their breasts until the infant can nurse. The expressed milk can be frozen and used later [38].

Prematurity

Mothers can nurse premature infants if there are no medical complications and if the baby is able to suck adequately. Very small premature infants or those with medical problems require special care. Consult your physician about the possibility of feeding human milk.

Initially, infants may be fed human milk through a tube. Mothers will need to express milk regularly to maintain their supply. When the infant is strong enough to nurse, it may be helpful to squirt some milk from an eye dropper into the corner of the baby's mouth so that the infant does not become too impatient while learning to nurse. Often, tube- or bottle-fed infants lack the rooting reflex, so some means of arousal, such as changing the diaper, may be needed initially [39].

Twins

Individual feeding or simultaneous nursing may be tried by mothers who plan to breastfeed twins. Mothers can

individually feed when one infant wakes before the other. Mothers may wish to alternate the nursing of the infants if both awakened at the same time. A bottle of expressed milk can be given to the second infant [38].

Several positions for simultaneous nursing have been recommended. The first position is the football hold previously described (Figure 12a). The infants are placed on pillows at the mother's sides, and their heads are on a third pillow across the mother's lap. A fourth pillow may be placed under the mother's knees to prevent strain.

Another possibility is the crisscross position. Pillows are placed behind the mother's back, under each elbow, and across the lap (Figure 12b). The first infant is held in the Frantz position, described on page 12. The second infant is similarly cradled by the other forearm but placed across the first infant's body. The mother's forearms support the infants. Her hands are clasped at the infants' buttocks to draw the infants closer. Difficult with small

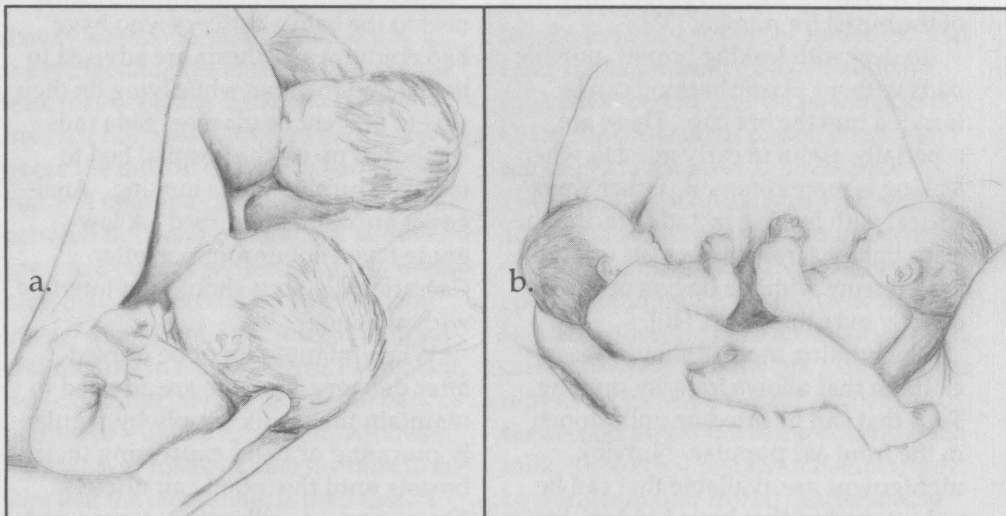


Figure 12. Football and crisscross positions for nursing twins.

infants, this position is recommended for babies over 6 weeks of age.

Another position is the parallel hold (Figure 13a). The twins are positioned in the same direction with their bodies parallel. One infant is in the Frantz position, while the other is placed alongside, with the mother's arm around the infant's body and her hand supporting the head.

The last position is the front V hold (Figure 13b). Pillows are placed behind the mother's back and under each forearm. The mother is lying on her back but raised halfway to a sitting position. The twins are placed at each breast and face each other, their feet extending downward and knees meeting to form a V. The mother's forearms support the infants; her hands hold their buttocks [38, 46].

Cleft Palate and Lip

Traditionally it was thought that infants with a cleft palate or lip could not nurse because of the difficulty of

maintaining the necessary suction. Bottle-feeding is also difficult for such infants. Infants with one or more clefts in the lip but an intact palate can often nurse: they can form a seal between the breast and their mouth and nose. The soft breast molds better to their mouth than the firmer rubber nipple. Some infants, however, may still have difficulty, and corrective surgery may be advised. Mothers of infants with a cleft palate or lip will need to express their milk during this period [33].

Infants with two clefts or one extensive cleft in the palate will have difficulty nursing well, but breastfeeding is possible for infants with a small single cleft in the palate. Mothers are advised to hold the infant in an upright position and direct the nipple toward the part of the palate that is intact. Milk let-down should be initiated before nursing begins. Sometimes mothers may need to hand express the milk directly into the baby's mouth. It may be necessary to hold the nipple in the infant's mouth

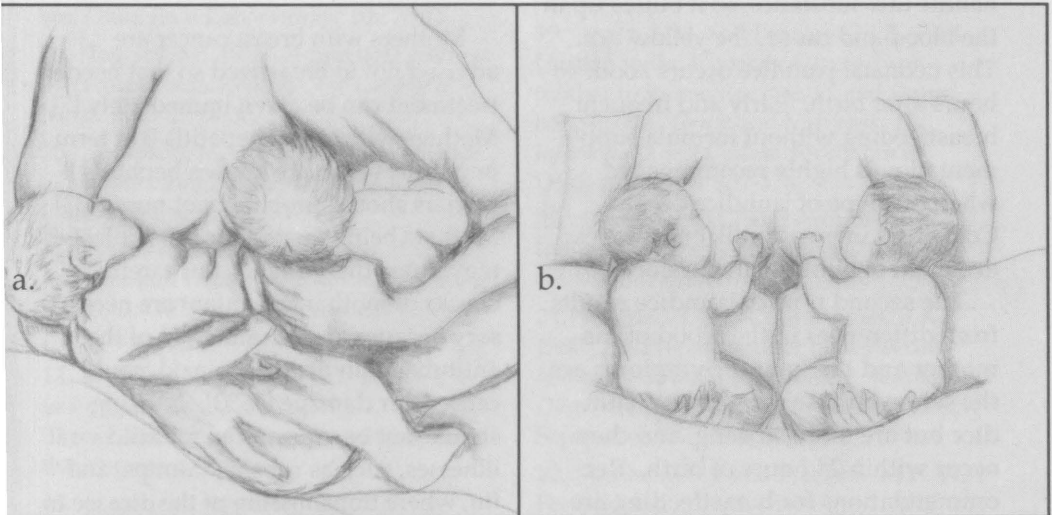


Figure 13. The parallel and V-hold positions for nursing twins.

throughout the feeding. The nipple should be held between the thumb and forefinger or index and middle fingers so that the nipple will protrude [33].

An alternative method for infants with cleft palates is to feed them expressed milk by bottle. A Lact-Aid Nursing Trainer may be useful in some situations. Some mothers have tried using the special duck-bill nipple. The nipple is cut in half and used as a shield to cover the palate. This method has had disappointing results because of the difficulty of effective sealing. Nursing an infant with a cleft lip or palate requires patience, but mothers motivated to nurse can do so [33].

Jaundice

About 50 percent of newborns have jaundice to some extent. Symptoms include yellowing of the skin and eyes, poor suckling, and sleepiness. Red blood cells needed by the infant before birth are destroyed after birth and produce a waste product called bilirubin. The infant's liver cannot at first handle this substance, so it builds up in the blood and causes the yellow tint. This neonatal jaundice occurs about 48 hours after birth. Early and frequent breastfeeding without formula supplementation is highly recommended when this type of jaundice occurs. Colostrum in breast milk encourages excretion of bilirubin in the stool [29].

The second type of jaundice results from differences in the blood of the mother and the infant. Symptoms are the same as those for neonatal jaundice but are more striking, and they occur within 24 hours of birth. Recommendations for breastfeeding are the same [29].

The last type of jaundice is breast milk jaundice. In cases of breast milk jaundice, certain substances in the milk are thought to inhibit the infant's liver from breaking down the bilirubin. The yellow tint is present, but the infant is alert, has a good appetite, and grows well. Breast milk jaundice usually occurs between 1 and 3 weeks after birth. Treatment may vary. Formula may be recommended for every other feeding. Some physicians may advise discontinuation of nursing for 12, 18, or 24 hours. During this time, formula is given, and expressed breast milk is discarded. Rarely is breastfeeding discontinued permanently. Recent evidence indicates that there may be another type of breast milk jaundice that occurs about 3 days after birth. Breastfeeding is continued as for other types of early jaundice [29, 47].

Contraindications to Breastfeeding

Mothers with breast cancer are advised not to breastfeed so that needed treatment can be given immediately [7]. Mothers with active hepatitis B at term or mothers who are known hepatitis B carriers should probably not nurse [33]. Mothers being treated for tuberculosis may nurse their infants, but careful checks of mother and infant are necessary because an accumulation of the antituberculin drug, Isoniazid, could cause liver damage [7, 33]. Nursing should not be interrupted for mild viral illnesses, such as rubella, mumps, and flu, where transmission of the disease to the infant causes less concern [33].

References

1. American Academy of Pediatrics. 1981. Nutrition and lactation. *Pediatrics* 68: 435-441.
2. Picciano, M.F. 1981. The volume and composition of human milk. In: Bond, J.T. et al., eds. *Infant and Child Feeding*. New York: Academic Press, pp. 47-61.
3. Cunningham, A.S. 1979. Morbidity in breastfed and artificially fed infants II. *Journal of Pediatrics* 95: 685-689.
4. Chandra, R.K. 1978. Immunological aspects of human milk. *Nutrition Reviews* 36: 265-272.
5. Chandra, R.K. 1979. Prospective studies of the effect of breastfeeding on incidence of infection and allergy. *Acta Paediatrica Scandinavica* 68: 691-694.
6. Gerrard, J.W. 1974. Breastfeeding: Second thoughts. *Pediatrics* 54: 757.
7. Lawrence, R. 1985. *Breastfeeding: A guide for the medical profession*. St. Louis, Missouri: C.V. Mosby Company, 1985.
8. Kennell, J.H. 1980. Mother-infant interaction enhanced by breastfeeding. In: *Counseling the mother on breastfeeding*. Columbus, Ohio: Ross Laboratories, pp. 70-75.
9. Taggart, M. 1976. A practical guide to successful breastfeeding. *The Canadian Nurse*. March: 26-30.
10. Tompson, M. 1971. The convenience of breastfeeding. *The American Journal of Clinical Nutrition* 24: 991-992.
11. National Research Council. 1980. *Recommended Dietary Allowances*. Washington, D.C.: Office of Publications, National Academy of Sciences.
12. McCann-Rugg, M. 1983. *Breast feeding your baby* (Circular 1217). Urbana, Illinois: College of Agriculture, Cooperative Extension Service.
13. American Academy of Pediatrics. 1984. *A gift of love*. Elk Grove Village, Illinois: American Academy of Pediatrics Publications Department.
14. Goodhart, R.S. and Shils, M.E. 1980. *Modern nutrition in health and disease*. Philadelphia, Pennsylvania: Lea and Febiger, pp. 1308-1310.
15. Manning-Dalton, C. and Allen, L. 1983. The effects of lactation on energy and protein consumption, post-partum weight change and body composition of well-nourished North American women. *Nutrition Research* 3: 293-308.
16. Strode, M.A., Dewey, K.G., and Lonnerdal, B. 1986. Effects of short-term caloric restriction on lactational performance of well-nourished women. *Acta Paediatrica Scandinavica* 75: 222-229.
17. Dusdieker, L.B. and Stumbo, P.J. 1985. Effects of supplemental fluids on human milk production. *The Journal of Pediatrics* 106: 207-211.
18. Morrison, S.D. 1952. *Human milk: Yield, proximate principles and inorganic constituents* (Technical Communication Number 18). Aberdeenshire, Scotland: Commonwealth Agricultural Bureaux.
19. Janas, L.M. and Picciano, M.F. 1984. Human milk: A portal of drugs from mother to infant. In: Roe, D. and Campbell, T., eds. *Drugs and Nutrients: The Interactive Effects*. New York: Marcel Dekker, Inc., pp. 331-373.
20. Postellon, D.C. and Aronow, R. 1982. Iodine in mother's milk. *Journal of American Medical Association* 247: 463.
21. Riordan, J. and Countryman, B.A. 1980. IV. Preparation for breastfeeding and early optimal functioning. *Journal of Obstetric, Gynecologic and Neonatal Nursing* September/October: 277-283.
22. Matheny, R.J. and Picciano, M.F. 1986. Feeding and growth characteristics of human milk-fed infants. *Journal of*

American Dietetic Association 86: 327-331.

23. Esperance, C.L.' and Frantz, K. 1985. Time limitation for early breastfeeding. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* March/April: 114-118.

24. DeCarvalho, M., Klaus, M., and Merkatz, R. 1982. Frequency of breastfeeding and serum bilirubin concentration. *American Journal of Diseases of Children* 136: 737-738.

25. DeCarvalho, M., Hall, M., and Harvey, D. 1981. Effect of water supplementation on physiological jaundice in breastfed babies. *Archives of Disease in Childhood* 56: 568-569.

26. Riordan, J. and Countryman, B.A. 1980. V. Self-care for continued breastfeeding. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* November/December: 357-361.

27. Janas, L.M., Picciano, M.F., and Hatch, T. 1985. Indices of protein metabolism in term infants fed human milk, whey-predominant formula, or cow's milk formula. *Pediatrics* 75: 775-784.

28. American Academy of Pediatrics. 1980. On the feeding of supplemental foods to infants. *Pediatrics* 65: 1178-1181.

29. Walker, M. and Driscoll, J. 1981. *Breastfeeding your baby*. Wayne, New Jersey: Avery Publishing, Inc.

30. American Academy of Pediatrics. 1976. Iron supplementation for infants. *Pediatrics* 58: 765-768.

31. American Academy of Pediatrics. 1979. Flouride supplementation: Revised dosage schedule. *Pediatrics* 63: 150-152.

32. Riordan, J. and Countryman, B.A. 1980. II. The anatomy and psychophysiology of lactation. *Journal of Obstetric, Gynecologic and Neonatal Nursing* July/August: 210-213.

33. Goldfarb J. and Tibbetts, E. 1980. *Breastfeeding handbook*, Hillside, New Jersey: Enslow Publishers.

34. Brown, M.S. and Hurlock, J.T. 1975.

Preparation of the breast for breastfeeding. *Nursing Research* 24: 448-451.

35. *Breastfeeding Your Baby*. 1983. Columbus, Ohio: Ross Laboratories.

36. Schlegel, A.M. 1983. Observations on breastfeeding technique: Facts and fallacies. *Maternal Child Nursing* 8: 204-208.

37. Frantz, K. 1980. Managing nipple problems. Reprinted and revised with permission from *Human milk: Its biological and social value*, Excerpta Medica.

38. Health and Welfare, Canada. *Nursing and special situations: Caesarean birth, premature and twins*.

39. Borovies, D.L. 1984. Assessing and managing pain in breastfeeding mothers. *Maternal Child Nursing* 9: 272-276.

40. Riordan, J. and Countryman, B.A. 1980. VI. Some breastfeeding problems and solutions. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* November/December: 361-366.

41. La Leche League International, Inc. *Working and Breastfeeding*. Publication Number 58. Franklin Park, Illinois.

42. Shepherd, S. and Yarrow, P. 1982. Breastfeeding and the working mother. *Journal of Nurse-Midwifery* 27: 16-20.

43. Johnson, C.A. 1983. An evaluation of breast pumps currently available on the American market. *Clinical Pediatrics* 22: 40-45.

44. Tibbetts, E. and Cadwell, K. 1980. Selecting the right breast pump. *Maternal Child Nursing* 5: 262-263.

45. Personal communication with Sandra Bartholmey, Ph.D. 1986. Gerber Products, Fremont, Michigan.

46. Keith, D.M., McInnes, S., and Keith, L.G. 1982. *Breastfeeding twins, triplets and quadruplets: 195 practical hints for success*. Chicago: The Center for Study of Multiple Births.

47. Lascari, M.D. 1986. "Early" breastfeeding jaundice: Clinical significance. *Journal of Pediatrics* 108: 156-158.

Appendix — Daily Food Guide

Food group	Number of servings per day	Examples of one serving
Milk	3 to 4 (4 to 5 for teens)	1 cup milk (whole, 2 percent, skim, buttermilk, reconstituted nonfat dry milk) 1 1/2 ounces cheese 2 cups cottage cheese 1 cup yogurt, pudding, custard, or kefir 1 cup goat milk or fortified soy milk 4 tablespoons cheese spread 1 1/2 cups ice cream or ice milk 1 1/2 cups cream soup made with milk
Meat	2	2 to 3 ounces cooked lean meat 2 eggs 2 ounces fish or shellfish (unbreaded) 3 to 4 ounces breaded fish or shellfish 2 frankfurters, 4 small sausage links 1/4 cup or 4 tablespoons peanut butter 1 cup cooked dried beans, peas, or lentils 1/2 cup nuts or sunflower seeds 8 ounces tofu
Vitamin C fruits and vegetables	1	1 orange, 1/2 grapefruit, 2 tangerines 1/2 cup citrus fruit juice 3/4 cup strawberries 1/2 guava or papaya, 1 mango 1/2 cup broccoli, cabbage, green or red pepper, or tomatoes 1 medium-sized potato 1 1/2 cups tomato juice 1/4 cup chili pepper
Vitamin A fruits and vegetables	several times a week	1/2 cup carrots, broccoli, brussels sprouts, cabbage, greens, spinach, green peppers, sweet potatoes, or asparagus 1/4 small cantaloupe 2 dried apricot halves
Other fruits and vegetables	2 to 3	1 medium-sized piece of fruit 1/2 cup diced canned fruit 1/2 cup cooked vegetables 1 cup salad greens 1/4 cup dried fruit
Bread and cereals	4 to 6	1 slice whole grain or enriched bread 3/4 cup dry cereal or 1/2 cup cooked cereal 1/2 cup cooked rice, spaghetti, noodles or other pasta, or cooked grain 1 tortilla, dinner roll, or small bagel 1 medium-sized pancake, waffle, muffin, or biscuit

The diet should also include 2 tablespoons of fats or oils as a part of prepared foods or added as margarine or salad dressing.