

## Management of Common Breast-feeding Problems

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The benefits of breast-feeding have been well documented in the literature: it reduces morbidity from many illnesses and is considered the ideal nutrition for the newborn infant. This paper reviews common breast-feeding problems that family physicians may be called upon to manage: maternal problems, infant problems, and problems related to the need for maternal medication.

Ensuring proper position of the infant at the breast and attention to the let-down reflex is the recommended method for prevention and treatment of nipple soreness. Prompt identification and treatment of blocked ducts, mastitis, and monilial infection of the nipple can prevent complications and allow uninterrupted nursing.

Breast-feeding, which is recognized as the ideal nutrition for newborn infants,<sup>1-3</sup> has been proven effective in reducing morbidity from lower respiratory infections, gastrointestinal disease, and otitis media for infants in developed countries.<sup>4-6</sup> Although *Healthy People 2000* set a goal of 75% of women breast-feeding at hospital discharge,<sup>7</sup> the percentage of women in the United States breast-feeding at discharge actually declined from 60% in 1984 to 52% in 1989.<sup>8</sup>

Many women leave the hospital planning to breast-feed but discontinue in the first few weeks because of problems that arise after discharge. Some women discontinue breast-feeding on the advice of their physicians, even though their problems may have been successfully managed while they continued to breast-feed.<sup>9</sup> General textbooks of family medicine, obstetrics, and pediatrics

Poor weight gain in the infant is managed by more frequent nursing. Neonatal jaundice or infant gastroenteritis rarely requires discontinuation of breast-feeding.

Although physicians frequently recommend that women discontinue breast-feeding because of the administration of some maternal medications, maternal illness can often be managed with medications that do not interfere with nursing.

Given proper advice and support, many mothers continue to breast-feed even after returning to work.

*Key words.* Breast-feeding; hyperbilirubinemia; mastitis; abscess, review literature.

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offer little guidance to physicians regarding the management of patients with breast-feeding problems. A study of family practice residents in the southeastern United States showed that many physicians-in-training lack adequate knowledge or training about breast-feeding.<sup>10</sup> In addition, a recent editorial called attention to the need for improved education for physicians and physicians-in-training regarding breast-feeding.<sup>11</sup>

This paper reviews common breast-feeding problems that family physicians may be called upon to manage in the process of caring for mothers and newborns. Maternal problems, infant problems, and problems related to the need for maternal medication are covered in sequence.

Articles on specific breast-feeding problems were identified by MEDLINE searches from 1966 through 1992. Additional articles were identified through article references, reference texts, and knowledgeable individuals. When available, evidence from randomized clinical trials is cited. However, few trials have been conducted that address the many questions related to breast-feeding. In light of their limited power, randomized trials with a small sample size that showed no effect of an intervention

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were interpreted cautiously. Nonrandomized trials, case series, and expert recommendations in published review articles and textbooks are included as well. The type of evidence used to derive recommendations is specified in each section.

## Problems and Recommendations

### Maternal Problems

#### SORE NIPPLES

Sore nipples, a common reason reported by women for early discontinuation of breast-feeding,<sup>12-14</sup> are characterized by pain that continues throughout feeding sessions. Often the nipples are cracked, bruised, or bleeding.<sup>15</sup> Sore nipples must be distinguished from the pain that, during latch-on, commonly occurs in the first few postpartum weeks and is felt during the first seconds that the infant closes his or her jaws on the breast.

Prenatal preparation of the breasts by nipple rolling, rubbing with a towel, applying cream or antiseptic spray, or expressing colostrum has been advocated to reduce nipple soreness associated with breast-feeding. Women can perform nipple rolling by grasping the areola behind the nipple, pulling gently but firmly outward, and rolling the nipple between the thumb and finger. The thumb and finger are then moved to another location at the base of the nipple and the exercise is repeated.<sup>16,17</sup> Nipple rolling has been evaluated in two small studies, in which each subject served as her own control, preparing one breast but not the other.<sup>18,19</sup> In one study, nipple rolling was combined with rubbing with a towel.<sup>19</sup> In both studies, a statistically significant decrease in reported nipple tenderness was noted. Application of creams, including commercial preparations,<sup>18</sup> A and D Ointment (Schering-Plough HealthCare, Kenilworth, NJ), and lanolin<sup>20,21</sup> has been ineffective in studies on preventing nipple soreness. Lanolin may also contain pesticide residues.<sup>22,23</sup> Applications of alcohol or soap solutions to the nipple have been shown to increase soreness.<sup>20</sup> One study claimed that a commercial antiseptic spray was beneficial in preventing nipple trauma and soreness,<sup>24</sup> but a reanalysis of the data<sup>25</sup> casts doubt on that conclusion. Expression of colostrum before giving birth has not been shown to have any benefit.<sup>19</sup> Breast shells (worn over the nipples when not nursing) did not reduce nipple pain in a small trial in which each of 20 subjects used the shell on only one breast.<sup>26</sup>

Limiting the length of breast-feeding sessions in the early postpartum period has been frequently recommended for the prevention of nipple soreness. One large

trial compared the effects of limited nursing time with that of unrestricted nursing time.<sup>27</sup> No difference in nipple soreness between groups was found, but women in the unrestricted group were more likely to still be breast-feeding at 6 weeks postpartum. Two smaller observational studies also found no relationship between early restriction of nursing time and nipple soreness.<sup>28,29</sup> Frequency of breast-feeding (demand vs scheduled intervals) does not appear to affect nipple soreness.<sup>30</sup>

Current recommendations based on the published clinical impressions of experts focus on the importance of proper positioning of the infant's mouth on the nipple to prevent and treat nipple soreness.<sup>31-33</sup> Alternating nursing positions (cradle hold, football hold, lying down) with each feeding changes the location of maximum friction exerted by the infant's mouth during nursing (Figure 1). Prolonged non-nutritive sucking, which may occur when the baby is satiated and drowsy, leads to prolonged negative pressure and may also contribute to nipple trauma.<sup>15,33</sup>

Although there is some evidence that prenatal preparation by nipple rolling may be helpful,<sup>18,19</sup> it is not recommended by most experts.<sup>31,32</sup> Nipple rolling should not be initiated before 35 to 36 weeks' gestation because of the possibility of stimulating uterine contractions. Proper positioning of the infant's mouth on the nipple to avoid trauma has been described in detail elsewhere.<sup>31,33,34</sup> Engorgement and monilial infections of the nipple may also contribute to nipple soreness.

#### INHIBITED LET-DOWN

Difficulty with the let-down reflex in the early days of nursing may compound the problem of sore nipples. Without significant let-down, the infant must nurse longer and more vigorously to obtain the same amount of milk. The let-down reflex results from the release of oxytocin by the posterior pituitary and is stimulated primarily by nursing. The let-down reflex may be identified as a tingling accompanied by an increased sensation of fullness in the breasts. In some women, milk may leak from the breast not being nursed.

To evaluate a patient's let-down reflex, providers may ask, "After the baby nurses for a minute or two, does milk drip or squirt from both breasts? Do you feel a tingling sensation in the breasts or uterine cramping? Does the baby seem to be swallowing a lot more milk after the first couple of minutes?" Affirmative answers to any of these questions indicate an adequate let-down reflex. Leaking of milk from the opposite breast, an infant's increased swallowing rate, or both, may be directly observed by providers during an office visit. Attention must be paid to the provision of adequate privacy during nurs-



Figure. Positions for breast-feeding: cradle hold (top left), football hold (top right), side lying (bottom).

ing, comfort and rest for the mother, and proper positioning and latch-on. Pain, anxiety, and cold are some of the factors shown to inhibit let-down.<sup>35</sup>

Local application of heat to the breasts or a warm bath or shower before nursing may improve let-down. Oxytocin in nasal-spray form (Syntocinon, Sandoz Pharmaceuticals, East Hanover, NJ), which is available by prescription, also can be used to enhance the let-down reflex. This medication is contraindicated in pregnancy because it may cause uterine contractions. Although the side effects of this product are minimal, as with physiological let-down, it may cause uterine cramping. Some women have associated the development of headache with repeated use.<sup>16(p138)</sup> Within a few days, a comfortable pattern is usually established between mother and infant, and nasal oxytocin can be discontinued.

#### ENGORGEMENT

Severe engorgement generally occurs after hospital discharge on the third or fourth postpartum day. Engorgement makes the breast become very hard, which complicates proper positioning and latch-on of the infant. Management includes hand expression or pumping before nursing to soften the breast and to enhance maternal comfort. Results of a small observational study suggest that while frequent nursing may be associated with greater engorgement, longer duration of nursing in the early postpartum period is associated with less severe engorgement.<sup>36</sup>

#### BLOCKED DUCTS

A blocked milk duct, identified as a persistent smooth, tender lump in the breast that does not change in size with nursing, may result from an overly copious milk supply, a tight bra, incomplete emptying of the breast, or failure to vary position of the infant on the breast. Management is based on expert opinion.<sup>17(pp114-115)</sup> Blocked ducts should be treated aggressively, with application of local heat and massage toward the nipple, combined with frequent nursing in a variety of positions. A persistently blocked duct may develop into a breast abscess if mastitis supervenes. No published studies on blocked ducts were located.

#### MASTITIS

Puerperal mastitis is an infection of the lactating breast most commonly caused by *Staphylococcus aureus*, although *Escherichia coli* or *Streptococcus* species may also be involved.<sup>37</sup> Symptoms may be nonfocal, consisting of chills, fever, fatigue, and diffuse myalgias. Examination of the breast generally reveals a tender erythematous wedge-shaped area. Mastitis most often occurs during the first 2 months postpartum, but may occur at any point during nursing.<sup>38</sup> A recent cohort study of breast-feeding women found a 2.9% incidence of mastitis in the first 7 weeks. Mastitis was strongly associated with professional and managerial occupations in both parents, and also with having given birth in the delivery room rather than the

labor room.<sup>39</sup> Missed feedings, cracked nipples, and fatigue have also been associated with mastitis.<sup>30(p208)</sup> Milk from breasts affected by mastitis contained  $>10^6$  white blood cells and  $>10^3$  bacterial colonies per mL in one study.<sup>40</sup>

In practice, treatment is usually empiric, consisting of frequent nursing, bedrest, fluids, acetaminophen for pain and fever, and at least a 10-day course of antibiotics (dicloxacillin, cephalexin) for penicillinase-producing *Staphylococcus aureus*.<sup>41</sup> Nursing on the unaffected side until let-down occurs may be less painful. In general, the organisms causing sporadic mastitis are part of the mouth flora of the nursing infant and, therefore, continued nursing does not transmit infection to the infant.<sup>42</sup> In several cases, bilateral mastitis has been reported to be caused by group B streptococcus and associated with disease in the infant.<sup>41</sup>

#### BREAST ABSCESS

Breast abscess may occur with untreated mastitis or mastitis complicating a blocked duct. It occurs in 5% to 10% of cases of mastitis.<sup>43</sup> Clinical findings consist of a tender, hard breast mass with erythema of the overlying skin. Needle aspiration will yield pus, cultures of which will yield organisms similar to those seen in mastitis. Treatment consists of incision and drainage, antibiotic therapy, analgesia, and continued emptying of the affected breast. This is best accomplished by gentle mechanical pumping during the first few days, while continuing to feed the baby from the opposite breast. Bilateral nursing can usually be resumed by the third or fourth day following incision and drainage, as the wound begins to heal and pain diminishes. A single large case series suggests that "stripping the pus" by firm massage of mastitic breasts can reduce the incidence of breast abscess.<sup>44</sup>

Although mastitis and breast abscess are painful and unpleasant, it is important to encourage the mother not to stop emptying the breasts while in either circumstance, as milk drainage is essential to successful resolution. A case series has been reported advocating incision and drainage of breast abscesses followed by primary closure and drain placement, accompanied by pharmacologic suppression of lactation and antibiotic therapy. This represents an alternative approach for women who insist on stopping breast-feeding.<sup>45</sup>

#### MONILIAL INFECTIONS

Monilial infection of the nipple has been associated with nipple damage, antibiotic therapy, history of monilial vaginitis in the mother during pregnancy, and thrush in the infant.<sup>46</sup> One published case report was located in the literature,<sup>47</sup> but there are no published studies on preva-

lence. It has been described as causing intense, burning nipple pain with nursing. The nipple may appear normal or have the typical erythematous rash with papular satellite lesions. The infant may have signs of thrush or monilial diaper dermatitis. This problem is best treated by topical nystatin to the nipple and oral nystatin to the infant, even if thrush is not apparent.<sup>47</sup>

#### RETURN TO WORK

Physicians and nurses cite the mother's return to work as a primary reason for discontinuation of breast-feeding,<sup>9</sup> yet many women successfully breast-feed after returning to work full or part-time. Since 53% of mothers between the ages of 18 and 44 return to work within the first year after giving birth,<sup>48</sup> it is imperative that family physicians be able to counsel breast-feeding mothers about how to continue nursing. The nature and hours of the mother's job and the distance from the workplace to the infant's caregiver will help determine the most practical alternatives. On-site infant day care allows women to nurse during the workday, but this convenience is rarely available. Some women may arrange for their infant to be brought to the workplace during lunch hours and breaks, or they may visit the nearby day-care site at those times.

If several feedings are missed each day, pumping or hand-expressing milk helps to maintain the milk supply and the mother's comfort. Expressed milk is usually collected to be bottle-fed to the infant by the caretaker, though many mothers find that, when they return to work, supplementary formula feedings are necessary or more convenient. Reverse-cycle feeding, in which the infant nurses more frequently in the early morning and evening hours and less often while the mother is at work, can help to maximize milk production. Some women supplement with formula during the day and maintain morning and evening breast-feeding over a prolonged period without pumping during the day.<sup>49</sup> Strategies for the working mother who continues to nurse her baby are available.<sup>50,51</sup>

A variety of breast pumps can be either purchased or rented. Manual breast pumps are the least expensive, but they are somewhat arduous to use. Electric breast pumps are comfortable and extremely efficient. Newer models are less bulky and lighter-weight but are expensive to purchase. Short- and long-term rentals are available. Small, portable, battery-operated or electric pumps, which can be purchased for \$50 to \$75, are less fatiguing than manual pumps to operate, but are less efficient than large electric pumps. Breast milk can be refrigerated for up to 48 hours<sup>52</sup> or frozen for up to 6 months in a standard deep freezer.<sup>50</sup>

## Infant Problems

### POOR INFANT WEIGHT GAIN

Supplementation with formula should not be the first step recommended in the management of poor infant weight gain. Because milk production is stimulated by the frequency of suckling and the emptying of the breast,<sup>53</sup> formula supplementation often further decreases the supply of breast milk. Early formula supplementation, as well as delayed initiation of breast-feeding (more than 6 hours after birth) are associated with decreased likelihood of successful breast-feeding.<sup>13,54-56</sup>

A normal newborn may lose up to 10% of body weight in the first few days of life but should regain to birthweight by 10 days and follow a growth curve thereafter.<sup>57</sup> If an infant is not gaining weight adequately when checked at 10 to 14 days of age or has fewer than six wet diapers per day, the cause of inadequate intake should be evaluated. If the infant is otherwise well, simple interventions may solve the problem while promoting breast-feeding success.<sup>58</sup>

Newborns should nurse every 2 to 3 hours for the first few weeks, with no more than a 5- to 6-hour interval between feedings at night.<sup>34,59</sup> Some infants may have to be awakened to nurse this frequently during the newborn period. Suckling technique should be observed directly at an office or home visit. Let-down of milk should be observed or convincingly described by the mother. Mothers should be asked if they use nipple shields, which interfere with nipple stimulation during nursing. Babies who fall asleep after too short a nursing interval may respond to changing position to the other breast earlier in the feeding period. Sleepy babies or frantic, uncoordinated babies may respond well to being undressed for feedings, since skin-to-skin contact is both soothing and stimulating.

The baby should be followed closely. If these interventions are successful, the baby will show a gain of 2 ounces or more in 2 days, and growth will catch up thereafter. If weight gain remains inadequate, or if at any time the infant appears to be dehydrated, breast-feeding must be supplemented with an appropriate formula. If available, a lactation consultant (who may be affiliated with a local hospital or clinic) should be involved.

There is no consensus about and no published controlled study addressing the best way to supplement. Offering a bottle after breast-feeding maintains some nipple stimulation, but doing so may result in nipple confusion. Because the mouth movements required for breast-feeding and bottle-feeding are completely different, the infant may have problems with one method or the other. Cup or eyedropper feedings are sometimes suggested to avoid nipple confusion, but this method has been criticized for being time-consuming for parents and energy-consuming



Figure 2. Supplemental lactation device. (Courtesy of Lact-Aid International, Inc, Athens, Tenn. Reproduced with permission.)

for the already compromised infant. Breast-pumping between infant feedings is suggested to increase milk supply. Prompt initiation of a supplemental nursing system (Lact-Aid, Lact-Aid International, Inc, Athens, Tenn, or Medela SNS, Medela, Inc, Chicago, Ill) maintains nipple stimulation to the mother while supplementing; allows the baby to control milk flow as natural breast-feeding does; and may help babies acquire the necessary sucking and swallowing skills for successful breast-feeding.<sup>58</sup> A supplemental nursing system is a small bag that contains formula and is suspended from the mother's neck. A small, soft plastic tube leads from the bag and may be taped to or held next to the nipple. As the baby suckles, he or she receives both breast milk and supplemental formula (Figure 2).

Prompt weight gain in response to supplementation reassures parents and health care providers that the baby is essentially healthy and buys time for further development of maternal breast-feeding skills. If weight gain remains inadequate with supplements, however, underlying

chronic illness or other causes of failure to thrive should be considered.

Lactation failure for physiologic or anatomic causes certainly occurs in some women, but its frequency and clinical significance in a primary care population is not known.<sup>59</sup>

#### INFANT JAUNDICE

There is often confusion among clinicians about the contribution of breast-feeding to jaundice in the newborn. The confusion may be compounded by recent changes in the recommended management of neonatal jaundice.<sup>60-62</sup> There is clearly an association between breast-feeding and high levels of serum bilirubin in the first few days of life.<sup>63</sup> However, in full-term infants and in the absence of hemolytic disease, it appears that hyperbilirubinemia has little clinical significance.<sup>62,64,65</sup> There is no evidence that breast milk itself causes early jaundice; rather, caloric deprivation and delayed stooling have been implicated. In a small prospective study, infants who nursed more than eight times per day had a significantly lower mean bilirubin level than did the group that nursed less frequently.<sup>66</sup> Increased frequency of nursing (every 2 to 3 hours around the clock), with attention to the effectiveness of the infant's sucking, is the most appropriate management.<sup>65</sup> Ordering supplemental water, a common intervention, is not likely to be useful, since unconjugated bilirubin is not water-soluble and is not excreted in the urine.<sup>67</sup>

If bilirubin is approaching a level of concern ( $>15$  to  $17$  mg/dL [ $256.5$  to  $290.7$   $\mu\text{mol/L}$ ])<sup>62</sup> or if maternal milk production is delayed, judicious supplementation with formula, not water, is recommended to provide calories and stimulate stooling. The use of a device such as the Lact-Aid supplementer, with which the infant gets extra formula while actually suckling at the breast, can maximize the stimulus to milk production and minimize the risk of nipple confusion until the milk supply is established.<sup>65</sup> Temporary discontinuation of breast-feeding will lower bilirubin levels, but resuming breast-feeding may be difficult. (Health care providers should stress the importance of mechanical pumping to maintain milk production while infant is not nursing.) The outcome measures of studies comparing formula supplementation with breast-feeding cessation in the management of jaundice ideally should include overall breast-feeding success as well as resolution of jaundice.

The syndrome of "breast milk jaundice," as described in textbooks and older literature, has its onset after the 3rd day of life, peaks at 5 to 15 days, and seems to be caused by substances in the milk itself which have not yet been identified with certainty.<sup>68</sup> Typically, serum

bilirubin drops quickly when breast-feeding is interrupted for 18 to 24 hours and does not return to previous levels when breast-feeding is resumed, though some jaundice may persist for weeks. Supplementation with formula while continuing to breast-feed has been effective in this setting as well, as it lowers bilirubin levels while preserving the chance of breast-feeding success.<sup>65</sup> There is considerable overlap between early- and late-onset jaundice syndromes.<sup>63</sup>

#### INFANT GASTROENTERITIS

Infant gastroenteritis is not a reason to discontinue breast-feeding. A randomized, controlled trial demonstrated that children hospitalized for gastroenteritis improved more rapidly if they continued to breast-feed in addition to receiving oral rehydration solution.<sup>69</sup>

#### *Medications During Lactation*

When the need for maternal medication arises, physicians often advise women to discontinue breast-feeding. This advice may be misplaced, as many medications are compatible with breast-feeding. The concentration of a medication in breast milk is determined by several factors, including its pKa, molecular weight, protein binding, active transport, dosing, and maternal metabolism. Other factors include whether the drug is absorbed from the infant's gastrointestinal tract, the infant's metabolism of a drug, and the risks of the drug to the nursing infant. Several useful resources are available to the clinician prescribing for the nursing mother.<sup>30,70,71</sup>

Few medications are considered absolutely contraindicated in breast-feeding. Often, if one drug in a particular class has been noted to have significant effects in the nursing infant or poses a theoretical risk, a substitute drug, which is effective for the mother and safer for her baby, may be prescribed. The contrast between indomethacin and ibuprofen, both of which are nonsteroidal anti-inflammatory drugs, is a good example. Indomethacin can be detected in significant quantities in breast milk (milk:plasma ratio  $>1$ ), and there is a case report of seizures in a breast-feeding infant whose mother took this medication. On the other hand, ibuprofen is detected at extremely low levels in human milk (milk:plasma ratio =  $0.01$ ).<sup>71</sup> Before advising a woman that she must discontinue nursing because of a needed medication, it is important to consult available references and consider alternative medications that would not interrupt breast-feeding. Table 1 lists some commonly prescribed medications considered by the American Academy of Pediatrics to be compatible with breast-feeding.<sup>70</sup>

Questions about contraceptive medication com-

Table 1. Some Commonly Prescribed Drugs Considered Compatible with Breast-feeding

Antibiotics	Antihypertensives
Ampicillin	Methyldopa
Penicillin	Captopril
Cloxacillin	Hydrochlorothiazide
Dicloxacillin	
Erythromycin	Anticonvulsants
Cephalexin	Carbamazepine
Cephadrine	Phenobarbital
Cefaclor	Phenytoin
Clindamycin	
	Other
Analgesics	Digoxin
Acetaminophen	Heparin
Aspirin	Warfarin
Ibuprofen	Magnesium sulfate
Codeine	Rubella vaccine
	RhoGAM

Modified from Committee on Drugs. The transfer of drugs and other chemicals into human breast milk. *Pediatrics* 1994; 93:137-50.

monly arise. Although the average duration of amenorrhea in a nursing mother is 8 months, breast-feeding should not be considered as an effective contraceptive method. Time of first ovulation may vary considerably and is extremely difficult to predict. Barrier methods and intrauterine devices (IUDs) have no effect on breast-feeding. Combination oral contraceptives are considered compatible with breast-feeding by the American Academy of Pediatrics,<sup>70</sup> but they may decrease milk supply in the early weeks of nursing.<sup>72</sup> The progesterone-only pill ("mini-pill") contains a much lower dose of progestin than that found in the combination pills. In lactating women, it is nearly as effective if used correctly and does not affect milk supply.<sup>73</sup>

A similarly minimal effect on breast-milk production could be expected from the levonorgestrel implant (Norplant). A study comparing Norplant users with IUD users in Chile found no clinically significant differences in numbers of women breast-feeding at 1 year or in the growth rates of their infants.<sup>74</sup> Additionally, the bleeding irregularities associated with Norplant use were infrequent among breast-feeding women. It should be noted that no information is available on the effect of Norplant insertion before 6 weeks postpartum in breast-feeding mothers. Injectable depot medroxyprogesterone acetate (Depo-Provera) is another progesterone contraceptive considered safe for lactating women.<sup>73</sup>

The clinician may also be called on to give advice on breast-feeding and self-administered drugs, including alcohol, caffeine, cigarettes, and illicit drugs such as marijuana and cocaine. Ingestion of large quantities of alcohol by the breast-feeding mother has been known for some time to induce lethargy and drowsiness in the infant. A recent prospective study<sup>75</sup> indicated that as little as one

alcoholic drink per day in nursing mothers may affect motor development in the infant to a small but measurable extent. The effects of alcohol intake of less than one drink per day are not known.

All patients should be advised to quit smoking because of the many documented health risks to the smoker and the effects of passive smoking on other family members, especially infants and children. Women who are unable to quit smoking should not smoke in the same room with their infants. While nicotine is excreted into breast milk, passive exposure to smoke in bottle-fed infants also results in nicotine absorption.<sup>30(p580)</sup> Smoking also has been associated with poor milk supply.<sup>76</sup> Women should be advised to quit smoking and continue nursing, not vice versa.

Caffeine has been detected in the milk of breast-feeding women and is reported to have a milk-to-plasma ratio ranging from 0.51 to 0.71. One study estimated an infant dose of 0.6 to 0.8 mg/kg/day from a maternal intake of 750 mg (six to eight cups of coffee) per day. In comparison, therapeutic dosing of caffeine for treatment of infant apnea is 5 mg/kg/day. A study of two mothers found no effect on infant heart rate or sleep time resulting from maternal ingestion of 500 mg per day.<sup>77</sup> Caffeine may accumulate in the infant over time, however, and symptoms of caffeine-related stimulation have been reported in nursing infants whose mothers drank more than six to eight cups of coffee per day.<sup>30(p272)</sup> Moderation and the use of decaffeinated beverages can prevent the development of such symptoms.

Illicit drug use of any type should be avoided during pregnancy and breast-feeding.

## Summary of Recommendations

Nipple soreness is most effectively prevented by ensuring proper positioning and latch-on and by alternating nursing positions. Prenatal nipple rolling may also help prevent soreness. Creams, ointments, and sprays have not been proven effective in the prevention or treatment of nipple soreness. Inhibited let-down can be managed by ensuring the comfort, privacy, and relaxation of the mother, and by the use of nasal oxytocin. Engorgement is managed by frequent nursing and manual expression or pumping, if needed. Blocked ducts are managed by frequent nursing and massage. Mastitis is treated with rest, oral antibiotics, and frequent nursing; breast abscess requires incision and drainage. Monilia infection is treated with topical nystatin to the nipple and nystatin suspension to the infant's mouth.

With the use of a breast pump, reverse-cycle nursing,

or minimal breast-feeding, many women continue to breast-feed after returning to work.

Poor infant weight gain is managed initially with frequent nursing and close observation of nursing technique. If this is unsuccessful, involvement of a lactation consultant, use of a supplemental nursing system, or supplementation with formula after breast-feeding may be required. Jaundice is also managed by more frequent nursing; if bilirubin levels reach 15 to 17 mg/dL (256.5 to 290.7  $\mu\text{mol/L}$ ), formula supplementation may be helpful. Breast-feeding should not be interrupted because of infant gastroenteritis.

Many medications can be safely prescribed for breast-feeding mothers. The use of available references can guide the clinician in the choice of appropriate medications.

## Conclusions

Informed physicians can contribute to breast-feeding success by responding appropriately to commonly encountered difficulties. Families need to know that the first few weeks with a new infant may involve difficult adjustments. Nursing becomes easier and more fun as infancy progresses: problems tend to decrease, intervals between feedings get longer, and babies interact more during feeding. Family physicians can support breast-feeding mothers and infants and prevent some problems by providing correct information. When problems arise, they can recommend

appropriate management. Table 2 lists patient education resources the authors have found to be helpful.

While research has clearly established the benefits of breast-feeding for infants, additional research on the management of breast-feeding problems is needed. Few randomized trials have been conducted, and many have sample sizes too small to inspire confidence in their conclusions. Expert opinion and common wisdom need to be verified in controlled studies, so that clinicians can provide useful advice and effective medical interventions to their breast-feeding patients.

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## References

1. Nutrition Committee of the Canadian Paediatric Society and the Committee on Nutrition of the American Academy of Pediatrics. Breast-feeding. *Pediatrics* 1978; 62:591-600.
2. American Academy of Pediatrics. The promotion of breast-feeding. *Pediatrics* 1982; 69:654-61.
3. American Public Health Association. Infant feeding in the United States. *Am J Public Health* 1981; 71:207-11.
4. Wright AL, Holberg CJ, Martinez FD, Morgan WJ, Taussig LM. Breast-feeding and lower respiratory tract illness in the first year of life. *BMJ* 1989; 299:946-9.
5. Howie PW, Forsyth JS, Ogston SA, Clark A, Florey CD. Protective effect of breast feeding against infection. *BMJ* 1990; 300:11-6.
6. Cunningham AS, Jelliffe DB, Jelliffe EFP. Breast-feeding and health in the 1980s: a global epidemiologic review. *J Pediatr* 1991; 118: 659-66.
7. US Department of Health and Human Services. Public Health Service. Healthy People 2000. Washington, DC: US Government Printing Office. DHHS publication No. (PHS) 91-50212, 1990: 379.
8. Ryan AS, Rush D, Krieger FW, Lewandowski GE. Recent declines in breast feeding in the United States, 1984 through 1989. *Pediatrics* 1991; 4:719-27.
9. Lawrence RA. Practices and attitudes toward breast feeding among medical professionals. *Pediatrics* 1982; 70:912-20.
10. Goldstein AO, Freed GL. Breast-feeding counseling practices of family practice residents. *Fam Med* 1993; 25:524-9.
11. Freed GL. Breast-feeding: time to teach what we preach. *JAMA* 1993; 269:243-5.
12. West CP. Factors influencing the duration of breast-feeding. *J Biosoc Sci* 1980; 12:325-31.
13. Loughlin HH, Clapp-Channing NE, Gehlbach SH, et al. Early termination of breast-feeding: identifying those at risk. *Pediatrics* 1985; 75:508-13.
14. Yeung DL, Pennell MD, Leung M, et al. Breastfeeding: prevalence and influencing factors. *Can J Public Health* 1981; 72:323-30.
15. Walker M, Driscoll JW. Sore nipples: the new mother's nemesis. *MCN* 1989; 14:260-5.
16. Goldfarb J, Tibbetts E. Breast feeding handbook. Hillside, NJ: Enslow Publishers, 1980:78-138.
17. Gaskin IM. Babies, breastfeeding and bonding. South Hadley, Mass: Bergin & Garvey Publishers; 1987:34-115.
18. Brown MS, Hurlock JT. Preparation of the breast for breastfeeding. *Nurs Res* 1975; 24:448-51.
19. Storr GB. Prevention of nipple tenderness and breast engorgement

Table 2. Resources for Patient Education on Breast-feeding

### Pamphlets

- Childbirth Graphics, Ltd, PO Box 20540, Rochester, NY 14602.  
 Danner SC, Cerrutti E. *Nursing Your Baby for the First Time*.  
 Danner SC, Cerrutti E. *Nursing Your Baby Beyond the First Days*.  
 Danner SC, Cerrutti E. *Expressing Breastmilk*.

### Books

- Dana N, Price A. *Successful breastfeeding: a practical guide for nursing mothers*. New York: Meadowbrook Press, 1989.  
 Gaskin IM. *Babies, breastfeeding, and bonding*. South Hadley, Mass: Bergin & Garvey Publishers, Inc, 1987.  
 Huggins K. *The nursing mother's companion*. Harvard, Mass: Harvard Common Press, 1990.  
 Mason D, Ingersoll D. *Breastfeeding and the working mother*. New York: St Martin's Press, 1986.  
 Reukauf DM, Trause MA. *Commonsense breastfeeding: a practical guide to the pleasures, problems, and solutions*. New York: Atheneum, 1988.  
 Worth C. *Breastfeeding basics: easy-to-read, easy-to-use directions for the breastfeeding mother*. New York: McGraw-Hill Book Co, 1983.

### Videos

- A Healthier Baby by Breastfeeding*. Smith L. Television Innovation Company, 8349-N Arrowridge Blvd, Charlotte, NC 28273.  
*Breastfeeding: A Special Relationship*. Tully MR, Overfield ML. Eagle Video Productions, 2201 Woodnell Drive, Raleigh, NC 27603-5240.



- in the postpartal period. *J Obstet Gynecol Neonatal Nurs* 1988; 17:203-9.
20. Newton N. Nipple pain and nipple damage. Problems in the management of breast feeding. *J Pediatr* 1952; 41:411-23.
  21. Hewat RJ, Ellis DJ. A comparison of the effectiveness of two methods of nipple care. *Birth* 1987; 14(1):41-5.
  22. Copeland CA, Wagner SL. Pesticide residue in lanolin. *JAMA* 1989; 261:242.
  23. Cade PA. Pesticide in lanolin. *JAMA* 1989; 262:613.
  24. Herd B, Geeney JG. Two aerosol sprays in nipple trauma. *Practitioner* 1986; 230:31-8.
  25. Inch S. Antiseptic sprays and nipple trauma. *Practitioner* 1986; 230:1037-8.
  26. Gosha JL, Tichy AM. Effect of a breast shell on postpartum nipple pain: an exploratory study. *J Nurse Midwifery* 1988; 33:74-7.
  27. Slaven S, Harvey D. Unlimited suckling time improves breast feeding. *Lancet* 1981; 1:392-3.
  28. L'Esperance C, Frantz K. Time limitation for early breastfeeding. *J Obstet Gynecol Neonatal Nurs* 1985; 14:114-8.
  29. Whitley N. Preparation for breastfeeding. A one-year followup of 34 nursing mothers. *J Obstet Gynecol Neonatal Nurs* 1978; 7:44-8.
  30. De Carvalho N, Robertson S, Klaus MH. Does the duration and frequency of early breastfeeding affect nipple pain? *Birth* 1984; 11(2):81-580.
  31. Woolridge MW. Aetiology of sore nipples. *Midwifery* 1986; 2:172-6.
  32. Lawrence RA. Breast feeding: a guide for the medical profession. 3rd ed. St Louis, Mo: CV Mosby, 1989:194-5.
  33. Gunther M. Sore nipples. Causes and prevention. *Lancet* 1945; 2:590-3.
  34. Bedinghaus J, Melnikow J. Promoting successful breastfeeding skills. *Am Fam Physician* 1992; 45:1309-18.
  35. Newton M, Newton NR. The let-down reflex in human lactation. *J Pediatr* 1948; 33:698-704.
  36. Moon JL, Humenick SS. Breast engorgement: contributing variables and variables amenable to nursing intervention. *J Obstet Gynecol Neonatal Nurs* 1989; 18:309-15.
  37. Olsen CG, Gorden RE Jr. Breast disorders in nursing mothers. *Am Fam Physician* 1990; 41:1509-16.
  38. Marshall BR, Hepper JK, Zirbel CC. Sporadic puerperal mastitis. *JAMA* 1975; 233:1377-9.
  39. Kaufman R, Foxman B. Mastitis among lactating women: occurrence and risk factors. *Soc Sci Med* 1991; 33:701-5.
  40. Thomsen AC, Hansen KB, Moller BR. Leukocyte counts and microbiologic cultivation in the diagnosis of puerperal mastitis. *Am J Obstet Gynecol* 1983; 146:938-41.
  41. Lawrence RA. The puerperium, breastfeeding, and breast milk. *Curr Opin Obstet Gynecol* 1990; 2:23-30.
  42. Niebyl JR, Spence MR, Parnley TH. Sporadic (non-epidemic) puerperal mastitis. *J Reprod Med* 1978; 20:97-100.
  43. Ogle KS, Davis S. Mastitis in lactating women. *J Fam Pract* 1988; 26:139-44.
  44. Bertrand H, Rosenblood LK. Stripping out pus in lactational mastitis: a means of preventing breast abscess. *Can Med Assoc J* 1991; 145:299-306.
  45. Khanna YK, Khanna A, Arora YK, et al. Primary closure of lactational breast abscess. *J Indian Med Assoc* 1989; 87(5):118-20.
  46. Amir LH. Candida and the lactating breast: predisposing factors. *J Hum Lact* 1991; 7:177-81.
  47. Johnstone HA, Marcinak JF. Candidiasis in the breastfeeding mother and infant. *J Obstet Gynecol Neonatal Nurs* 1990; 19:171-3.
  48. United States Bureau of the Census. Statistical Abstract of the United States, 1992. 12th ed. Washington, DC: US Government Printing Office, 1992. Table 93.
  49. Morse JM, Harrison MJ, Prowse M. Minimal breastfeeding. *J Obstet Gynecol Neonatal Nurs* 1986; 15:333-8.
  50. Auerbach KG. Assisting the employed breastfeeding mother. *J Nurse Midwifery* 1990; 35(1):26-34.
  51. Mason D, Ingersol D. Breast feeding and the working mother. New York: St Martins Press, 1986.
  52. Larson E, Zuill R, Zier V, Berg B. Storage of human breast milk. *Infect Control* 1984; 5:127-30.
  53. Klaus MH. The frequency of suckling. A neglected but essential ingredient of breast-feeding. *Obstet Gynecol Clin North Am* 1987; 14:624-33.
  54. Kurinij N, Shiono PH. Early formula supplementation of breastfeeding. *Pediatrics* 1991; 88:745-50.
  55. Bergevin Y, Dougherty C, Kramer MS. Do infant formula samples shorten the duration of breast-feeding? *Lancet* 1983; 1:1148-51.
  56. Neikoff B, Laukaran V, Myers D, et al. Dynamics of infant feedings: mothers, professionals, and the institutional context in a large urban hospital. *Pediatrics* 1986; 77:357-65.
  57. Kempe HC, Silver HK, O'Brien D, Fulginetti VA, eds. Current pediatric diagnosis and treatment. Los Altos, Calif: Appleton & Lange, 1987:12.
  58. Frantz KB. The slow-gaining breastfeeding infant. *NAACOG's Clin Issues Perinatol Womens Health Nurs* 1992; 3:647-55.
  59. Neifert MR, Seacat JM. Lactation insufficiency: a rational approach. *Birth* 1987; 14:182-8.
  60. Maisels MJ, et al. Jaundice in the healthy newborn: a new approach to an old problem. *Pediatrics* 1988; 81:505-11.
  61. Watchko JF, Oski FA. Bilirubin 20mg/dl = vigintiphobia. *Pediatrics* 1983; 71:660-3.
  62. Newman TB, Maisels MJ. Evaluation and treatment of jaundice in the term newborn: a kinder, gentler approach. *Pediatrics* 1992; 89:809-18.
  63. Schneider AP. Breast milk jaundice in the healthy newborn: a real entity. *JAMA* 1986; 255:3270-4.
  64. Lascari AD. "Early" breastfeeding jaundice: clinical significance. *J Pediatr* 1986; 108:156-8.
  65. Gartner LM, Auerbach KG. Breast milk and breastfeeding jaundice. *Adv Pediatr* 1987; 34:249-74.
  66. DeCarvalho, Klaus MH, Merkatz RB. Frequency of breast-feeding and serum bilirubin concentration. *Am J Dis Child* 1982; 136:737-8.
  67. DeCarvalho M, Hall M, Harvey D. Effects of water supplementation on physiologic jaundice in breast-fed babies. *Arch Dis Child* 1981; 56:568-9.
  68. Auerbach KG, Gartner LM. Breast feeding and human milk: their association with jaundice in the neonate. *Clin Perinatol* 1987; 14:89-107.
  69. Khin MU, Nyunt-Nyunt-Wai, Myo-Khin, Mu-Mu-Khin, Tin-U, Thane-Toe. Effect on clinical outcome of breastfeeding during acute diarrhoea. *BMJ* 1985; 290:587-9.
  70. Committee on Drugs. The transfer of drugs and other chemicals into human breast milk. *Pediatrics* 1994; 93:137-50.
  71. Briggs GG, Freeman RK, Yaffe SJ. Drugs in pregnancy and lactation. 3rd ed. Baltimore, Md: Williams & Wilkins, 1990:309, 317.
  72. Nilsson S, Mellbin T, Hofvander Y, et al. Long-term follow-up of children breast-fed by mothers using oral contraceptives. *Contraception* 1986; 34:443-57.
  73. Hatcher RA, Trussell J, Stewart F, et al. Contraceptive technology 1990-1992. 16th rev ed. New York: Irvington Publishers, 1994:442-3.
  74. Diaz S, Peralta O, Juez G, et al. Fertility regulation in nursing women: VII. Influence of Norplant levonorgestrel implants upon lactation and infant growth. *Contraception* 1985; 32:53-74.
  75. Little RE, Anderson KW, Errin CH, Worthington-Roberts V, Claren S. Maternal alcohol use during breast feeding and infant motor development at one year. *N Engl J Med* 1989; 321:425-30.
  76. Matheson I. The effect of smoking on lactation and infantile colic. *JAMA* 1989; 261:41-2.
  77. Fulton B. Recreational drug use in the breast feeding mother, part 2: licit drugs. *J Hum Lact* 1990; 6:15-6.