In mammalian physiology, lactation follows pregnancy and disruption of this physiology is associated with adverse health outcomes for mother and child. Although lactation is the physiologic norm, cultural norms for infant feeding have changed dramatically over the past century. Breastfeeding initiation fell from 70% in the early 1900s to 22% in 1972. In the past 40 years, rates have risen substantially, to 77% in 2010. Although more mothers are initiating breastfeeding, many report that they do not continue as long as they desire. As reproductive health care experts, obstetricians are uniquely positioned to assist women to make an informed feeding decision, offer anticipatory guidance, support normal lactation physiology, and evaluate and treat breastfeeding complications. Integration of care among the obstetrician, pediatric provider, and lactation consultant may enable more women to achieve their breastfeeding goals, thereby improving health outcomes across two generations.

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In mammalian physiology, lactation follows pregnancy. Human milk provides nutrition and immunologic protection for the infant, and lactation mobilizes maternal fat stores accumulated during gestation, resetting maternal physiology.

Disruption of this physiology is associated with adverse health outcomes for both mother and child. For mothers, not breastfeeding is associated with increased risks of breast cancer, ovarian cancer, diabetes, hypertension, and myocardial infarction. A recent cost analysis modeled the lifetime effects of breastfeeding in a cohort of women born in a single year in the United States. If relationships between improved health outcomes and breastfeeding are causal, the authors estimated that, compared with outcomes if 90% of mothers breastfed each infant for 1 year, current (lower) breastfeeding rates are associated with 4,981 excess cases of breast cancer, 53,847 excess cases of hypertension, and 13,946 excess cases of myocardial infarction, incurring $733.7 million in excess direct medical costs. For infants, not being breastfed is associated with increased risks of infectious morbidity, childhood obesity, sudden infant death syndrome, and childhood leukemia. Compared with health outcomes if 90% of infants were exclusively breastfed for 6 months, current breastfeeding rates are associated with $2.2 billion per year in excess medical costs and 911 excess infant deaths, again assuming that the relationship between breastfeeding and adverse healthy outcomes is causal.

All major medical organizations therefore recommend 6 months of exclusive breastfeeding. The American Academy of Pediatrics recommends continuation of breastfeeding for 1 year or longer as mutually desired by mother and child.

Although lactation is the physiologic norm, cultural norms for infant feeding have changed dramatically in the United States with breastfeeding initiation falling from 70% in the early 1900s to 22% by 1972. In the past 40 years, breastfeeding initiation has increased dramatically: in 2010, 77% of mothers initiated breastfeeding and 27% continued through...
This generational transformation affects the cultural context in which mothers breastfeed. Grandmothers who formula-fed their children may struggle with how to support breastfeeding, and clinicians who trained when formula feeding was the norm may struggle to advise breastfeeding mothers. These cultural forces explain, in part, why mothers face considerable challenges in meeting their personal breastfeeding goals. In a recent study, 60% of women reported that they stopped breastfeeding earlier than they desired. Given the differences in health outcomes associated with breastfeeding, enabling women to meet their breastfeeding goals is a major public health priority, and obstetricians should therefore approach infant feeding as a modifiable health behavior rather than a lifestyle choice. As reproductive health care experts, obstetricians are obligated to assist women to make an informed feeding decision, offer anticipatory guidance, support normal lactation physiology, and evaluate and treat breastfeeding complications.

**PHYSIOLOGY OF LACTATION**

Lactation physiology begins during puberty, when estrogen stimulates breast duct growth and progesterone stimulates alveolar development. This process accelerates in pregnancy with secretory differentiation, as lactocytes develop the capacity to produce milk. After birth, progesterone withdrawal triggers secretory activation. This transition from colostrum to mature milk occurs at 30–40 hours after birth, allowing time for secretory immunoglobulin (IgA), lactoferrin, and other protective proteins concentrated in colostrum to coat the neonate’s gastrointestinal and respiratory epithelium. Infant suckling at the breast triggers prolactin and oxytocin release, which regulate milk synthesis and milk secretion. Cortisol, thyroid hormone, insulin, and growth hormone further support milk synthesis. Illustration: © The American College of Obstetricians and Gynecologists.

the nipple–areolar complex. Letdown is triggered by the sound, sight, or smell of the infant, and it is inhibited by pain and stress. This phenomenon can be observed when a worried mother engages in conversation, smiles, or laughs, and her child begins gulping the milk that is now available at the breast.

A good latch is the second key component of breastfeeding. To achieve sufficient suction, the infant takes most of the nipple and areolar complex into his mouth, forming a teat that reaches almost to the junction of the hard and soft palate.10 A well-latched infant’s lips flange out, and after feeding, the nipple should be round. A creased, “lipstick”-shaped nipple indicates compression that both reduces milk transfer and traumatizes the nipple. Finally, moving milk sustains milk production. When alveoli are full, the whey protein Feedback Inhibitor of Lactation downregulates milk synthesis,11 and prolactin uptake is reduced. To sustain lactation, mothers must therefore empty the breast every few hours, whether by feeding the infant, hand expression, or mechanical pumping.

Prenatal Care and Anticipatory Guidance

Most women decide how to feed their infants early in pregnancy, and obstetric provider advice is an important determinant of feeding decisions.12 Women bring a wide range of perspectives and experience to their feeding intentions, and a three-step counseling approach is useful to begin a patient-centered conversation. Begin with an open-ended question such as “What have you heard about breastfeeding?” Then, summarize the patient’s concerns in your own words, showing that you have understood the patient’s point of view. In the third step, tailor counseling to the patient’s understanding and concerns.

Infant formula marketing complicates issues of autonomy and informed consent in infant-feeding decisions. In a recent study, Parry et al.13 found that advertisements about additives in formula led mothers to worry their milk was deficient. “It still makes me wonder, then, is my breast milk doing all those things too?” one mother said. Formula manufacturers have historically enlisted health care providers in their marketing efforts. An Abbott Laboratories training manual states, “Never underestimate the importance of nurses. If they are sold and serviced properly, they can be strong allies. A nurse who supports Ross is like an extra salesperson.” Such marketing affects feeding outcomes. In a clinical trial, women randomized to commercial formula marketing materials in prenatal care stopped breastfeeding earlier than women who received non-commercial information. This effect was particularly pronounced among mothers who were uncertain about their feeding preferences.15 Given the adverse outcomes associated with not breastfeeding, formula marketing should not occur in health care settings, and obstetricians are obligated to provide balanced, noncommercial information about infant feeding risks and benefits.

Obstetric providers can assess risk factors for breastfeeding difficulties as part of the prenatal history and physical. As part of the obstetric history, obstetric providers should ask parous women about their prior infant feeding experience, including mastitis, pain, and problems with latch or milk supply. On physical examination, widely spaced, tubular breasts may indicate insufficient glandular tissue.16 Both macromastia and history of breast reduction are associated with breastfeeding difficulties17 as is breast augmentation.18 Mothers with risk factors may benefit from antenatal lactation consultation to establish a feeding plan and support system. The obstetric provider should share any concerns with both the mother and the pediatric provider to assure extra support until the milk supply is established.

Intrapartum Care and the Baby-Friendly Hospital Initiative

Intrapartum care affects breastfeeding outcomes. In the Promotion of Breastfeeding Intervention Trial,19 mothers who birthed at Baby-Friendly hospitals were more likely to breastfeed exclusively at 3 months (43.3% compared with 6.4%) and to continue to breastfeed through 12 months (19.7% compared with 11.4%).

The Baby-Friendly Hospital Initiative is based on the “Ten Steps to Successful Breastfeeding”,20 a set of practices that support lactation physiology (Box 1). In observational studies, implementation of some or all of the Ten Steps enables mothers to achieve their own breastfeeding goals. In a national sample of U.S. mothers, 96.8% of those who experienced all six steps assessed in the study met their personal goal to breastfeed for at least 6 weeks, whereas among women who experienced none of the steps, only 70% met their personal goals.21 The Ten Steps may be especially important for primiparous women.22

Skin-to-skin care at birth is a key component of the Ten Steps. Skin-to-skin infants progress through nine behavioral phases, culminating with infant-led latch, suckling, and postfeed sleep.23 Routine separation of mother and infant disrupts neonatal physiology. In a Cochrane meta-analysis, routine separation of mother and infant both lowered infant glucose (mean difference 10.56 mg/dL, 95% confidence interval [CI] 8.40–12.72) and decreased breastfeeding at 1–4 months postpartum compared with uninterrupted skin-to-skin contact.24 Skin-to-skin contact is feasible after cesarean deliveries and is associated with reduced need for formula supplementation in the early neonatal period.25
milk in the days to come. Obstetricians can counsel
provides a concentrated dose of antibodies and immune
trum are physiologic in the first days of life.26 Colostrum
stomach holds 20 cc, and frequent, brief feeds of colos-
milk expression to all mothers. At birth, the neonate
Milk by keeping mothers and infants together, feeding
‡The American Academy of Pediatrics endorsed the UNICEF-WHO
Reprinted from Breastfeeding in underserved women: increasing
Box 1. Ten Hospital Practices to Encourage and
Support Breastfeeding*

1. Maintain a (supportive) written breastfeeding pol-
   icy that is communicated to all health care staff.
2. Train all pertinent health care staff in the skills
   necessary to implement this policy.
3. Inform all pregnant women about the benefits of
   breastfeeding.
4. Offer all mothers the opportunity to initiate breast-
   feeding within 1 hour of giving birth.
5. Show breastfeeding mothers how to breastfeed
   and how to maintain lactation, even if they are
   separated from their newborns.
6. Give breastfeeding newborns only breast milk,
   unless medically indicated.
7. Facilitate rooming-in and encourage all mothers
   and newborns to remain together during their hos-
   pital stay.
8. Encourage unrestricted breastfeeding when the
   newborn exhibits hunger cues or signals or on
   request of the mother.
9. Encourage exclusive suckling at the breast by pro-
   viding no pacifiers or artificial nipples.†
10. Refer mothers to established breastfeeding support
    groups and services and foster the establishment of
    these services when they are not available.

Steps 5–9 support Let Down, Latch and Moving
Milk by keeping mothers and infants together, feeding
on demand, avoiding bottles and pacifiers, and teaching
milk expression to all mothers. At birth, the neonate
stomach holds 20 cc, and frequent, brief feeds of colos-
trum are physiologic in the first days of life.26 Colostrum
provides a concentrated dose of antibodies and immune
factors, priming the neonate’s gut for larger volumes of
milk in the days to come. Obstetricians can counsel
mothers to expect frequent feedings and teach how to
recognize feeding cues. Hungry infants typically flex
their fingers and arms, sucking on their hands and root-
ing, whereas satisfied infants relax their extremities and
close their eyes. Counseling, “Your baby has a fuel
gauge,” contrasting arm postures for “empty” and “full,”
can enable parents to interpret the infant’s needs.

Timing of Cord Clamping
Early cord clamping reduces infant iron stores in the
first 6 months of life, and these differences are more
pronounced among exclusively breastfed infants.27
Early cord clamping also reduces rates of neonatal pho-
totherapy in some studies. The World Health Organi-
zation recommends cord clamping at 1–3 minutes of
life “unless the neonate is asphyxiated and needs to be
moved immediately for resuscitation.”28 In a recent
Committee Opinion, the American College of Obste-
tricians and Gynecologists concluded, “insufficient evi-
dence exists to support or refute the benefits from
delayed umbilical cord clamping for term infants that
are born in settings with rich resources.”29

Intrapartum Risk Factors for
Breastfeeding Difficulties
Several prospective studies have quantified associations
between intrapartum risk factors and delayed onset of
lactogenesis, defined as milk coming in after 72 hours
postpartum. Data suggest that unmedicated, spontane-
ous vaginal birth is associated with improved breast-
feeding outcomes. In multivariate analyses, a second
stage of labor longer than 1 hour, cesarean delivery,
a maternal body mass index higher than 27 kg/m², flat
or inverted nipples, primiparity, and infant birth weight
3,600 g or greater were independently associated with
delayed onset of lactogenesis.30 Data are mixed regard-
ing epidural anesthesia.31 In a double-blind, random-
ized controlled trial, women receiving higher doses
of epidural fentanyl had lower breastfeeding rates at
6 weeks postpartum, suggesting that epidural narcotics
may affect breastfeeding.32 Parenteral narcotics are
associated with depression of neonatal feeding behav-
ior, and short-acting agents are preferred.31 Both late
preterm and early term birth are also associated with
breastfeeding difficulties, likely reflecting differences in
oromotor and neurologic maturity.33

Medications and Lactation
Health care providers commonly assume that informa-
tion about medication safety in pregnancy can be
extrapolated to lactation. However, the placenta and
the breast are different organs, and the fetus and
neonate have different physiologies. Clinicians can
access continuously updated information through The National Library of Medicine’s LactMed database, available on the web and through apps for iOS and Android devices. Most medications are safe in breastfeeding, and, when there are concerns, an alternative medication with a better safety profile can often be identified. Counseling should weigh the risk of medication exposure through breast milk compared with the risks of formula feeding and should include the infant’s health care provider. For mothers with chronic health conditions, counseling about medication safety in lactation should be part of routine prenatal care.

Contraception

Lactation suppresses fertility. Women who are fully or nearly fully breastfeeding, are within 6 months of delivery, and have not yet resumed menses have a 2% risk of pregnancy. Falling progesterone after delivery of the placenta triggers onset of lactogenesis, so exogenous progesterone could prevent onset of milk production. For women who have resumed menses or are not fully breastfeeding, nonhormonal methods are therefore preferred because they pose no risk of disrupting lactation or exposing the infant to exogenous hormones. For women who are neither exclusively breastfeeding nor candidates for a copper intrauterine device, and who state that they will not be able to use barrier methods consistently, patients and health care providers should weigh the risk of unplanned pregnancy compared with the potential effect of hormonal contraception on breastfeeding.

World Health Organization and Centers for Disease Control and Prevention guidelines differ regarding hormonal contraception during breastfeeding. World Health Organization guidelines suggest more caution with use of hormonal contraception in the early postpartum period, whereas the Centers for Disease Control and Prevention guidelines are more liberal. The World Health Organization discourages progesterone-only contraception before 6 weeks and combined hormonal contraception before 6 months, whereas the Centers for Disease Control and Prevention states that the advantages outweigh the theoretical or proven risks for progesterone-only methods immediately after birth and for combined methods at 1 month postpartum. Two recent randomized controlled trials have quantified the effect of early postpartum etonogestrel contraceptive implant placement at 1–3 days compared with 4–8 weeks postpartum, the authors found no difference in onset of lactogenesis or rates of any or full breastfeeding in follow-up. Approximately half of study participants in both groups were no longer fully breastfeeding at 2 weeks postpartum, limiting the study’s ability to detect effects on milk supply. There have been no published randomized controlled trials of early depot medroxyprogesterone acetate and breastfeeding outcomes. Given biologic plausibility and the absence of evidence of safety, authors of a recent systematic review concluded that the potential adverse effects on milk supply associated with early (less than 6 weeks) postpartum depot medroxyprogesterone acetate use should be disclosed to allow for a fully informed consent process.

Given the paucity of high-quality evidence regarding hormonal contraception in breastfeeding and the low risk of pregnancy in exclusively breastfeeding women, it may be prudent to delay introduction of hormonal contraception, particularly among mothers with risk factors for breastfeeding difficulties.

Postpartum Follow-Up

Epidemiology of Early Weaning

In a recent study of mothers who initiated breastfeeding, 60% of women weaned earlier than they desired, and milk supply, latch problems, and pain were commonly cited reasons for weaning. As reproductive health experts, obstetricians can play a central role in the management of these lactation concerns so that more mothers can achieve their feeding goals.

Evaluation of the Breastfeeding Mother–Infant Dyad

Lactation is a two-person organ system. Just as evaluation of infertility requires assessment of both the woman and her partner, evaluation of breastfeeding problems requires consideration of both mother and infant. For mothers who are expressing milk, evaluation should also include mechanical pump use, because misuse can affect milk production and cause tissue trauma.

Beginning the breastfeeding history with an opened-ended question such as “How is breastfeeding going?” encourages patients to share any concerns. For mothers experiencing difficulty, a careful history includes review of intrapartum events such as postpartum hemorrhage or possible retained placenta, early breastfeeding, nipple trauma, and mastitis. A breastfeeding review of systems (Box 2) can identify...
disruption of normal physiology. For women with low milk supply, pertinent history includes breast growth during pregnancy, breast surgery, radiation to the chest, and endocrine disorders such as diabetes, thyroid disease, and polycystic ovarian syndrome. For women with pain, pertinent history includes Raynaud’s syndrome and pain disorders such as migraine, irritable bowel syndrome, dysmenorrhea, and dyspareunia.

On physical examination of mothers experiencing breastfeeding difficulties, the clinician should assess for physiologic changes of lactation. In the normal lactating breast, increased vascular flow produces visible veins on the breast and upper chest. Glandular tissue is palpable from the axillae to the areola and feels distinctly firmer than the adipose tissue of the nonlactating breast. Nipple cracks, fissures, and exudates may suggest dermatitis or superinfection. Palpation of the breast can identify masses, fluctuance, and areas of tenderness.

To assess infant latch and oromotor function, it may be helpful to collaborate with a pediatric provider or an International Board Certified Lactation Consultant (IBCLC). Such certification is the gold standard for lactation training, and obstetricians should identify certified individuals in their community to whom they can refer their patients. Ideally, the obstetrician, pediatric provider, and IBCLC collaborate to address breastfeeding concerns so that women can achieve their feeding goals. For infants with disorganized suck or abnormal oral anatomy, an occupational therapist or speech therapist with lactation expertise may also be helpful.

**Box 2. Breastfeeding Review of Systems**

**Letdown**

Do you feel a tingling sensation when the infant is nursing? Do your breasts feel more full? If you pump, does production increase after the first few minutes?

**Latch**

Is it comfortable when the infant nurses? Are the infant’s lips flanged out? Can you hear the infant swallow?

**Moving Milk**

Are you feeding at least 8 to 12 times a day, until the infant is satisfied? Do your breasts feel softer after a feed? Are you away from your infant? Are you supplementing? Are you using pacifiers?

**BREASTFEEDING COMPLICATIONS**

**Early Postpartum Discomfort**

In the early postpartum period, nipple sensitivity is markedly increased, and many mothers experience discomfort in the initial 20–30 seconds of neonatal latch. It may be helpful to counsel that continued discomfort is a signal for the mother to adjust the infant’s position, sometimes simply by shifting his body so that he is not sliding off of the breast. A variety of ointments and dressings have been studied to reduce early breastfeeding-associated pain, and no one treatment has proven to be superior. At our center, we treat early discomfort with careful evaluation by an IBCLC to prevent recurrent trauma coupled with barrier ointment such as petrolatum.

**Postpartum Depression**

In the early postpartum period, women with breastfeeding difficulties are more likely to experience symptoms of postpartum depression, and women with anxiety symptoms have shorter breastfeeding durations. These differences may reflect neuroendocrine pathways implicated in both breastfeeding and postpartum mood disorders, and it is unclear whether breastfeeding problems trigger mood symptoms or mood symptoms interfere with breastfeeding. Nevertheless, obstetricians should screen women with breastfeeding difficulties for clinically significant depression and anxiety and be prepared to provide treatment, referral, or both as needed.

The selective serotonin reuptake inhibitor, sertraline, has minimal secretion into human milk and is used as first-line therapy for postpartum depression at our institution. Some psychotropic medications are present at higher concentrations in milk. The American Association of Pediatrics’ committee on drugs states that “Mothers who desire to breastfeed their infant(s) while taking these agents should be counseled about the benefits of breastfeeding as well as the potential risk that the infant may be exposed to clinically significant levels and that the long-term effects of this exposure are unknown. Consideration should be given to monitoring growth and neurodevelopment of the infant.”

**Mastitis**

Mastitis is a clinical diagnosis characterized by fever, breast inflammation, and systemic symptoms. Mastitis affects from 3% to 20% of lactating women and often occurs in the setting of prolonged milk stasis or nipple trauma, both of which should be evaluated to avoid recurrent infection. Causative bacteria are generally flora colonizing the infant’s mouth and nose, so
continued breastfeeding does not pose a risk to the infant, and emptying the breast is essential for maternal recovery. Women with mastitis should therefore continue to breastfeed. Additional treatment includes nonsteroidal antiinflammatory drugs, rest, and antibiotics that cover Gram-positive organisms. Dicloxacillin is typically used as first-line therapy, 500 mg four times a day for 10–14 days.48

Lack of response or worsening of symptoms may indicate methicillin-resistant Staphylococcus aureus infection or breast abscess. For suspected resistant organisms, collection of midstream breast milk for aerobic culture and sensitivities can guide therapy.48 Breast ultrasonography is the diagnostic modality of choice for abscess, and ultrasound-guided drainage is highly effective. In a series of 89 patients with puerperal breast abscesses, 97% resolved with ultrasound-guided drainage.49

Low Milk Supply
Perceived low milk supply is a common cause of formula supplementation and premature weaning. Identifying underlying concerns and assessing the infant’s weight trajectory can help to differentiate low supply from unrealistic expectations of infant feeding. For example, engorgement normally subsides after secretory activation, but mothers may perceive resolution of engorgement as milk “drying up.” Families may perceive the infant’s desire to breastfeed on demand every few hours as evidence of insufficient supply, although feeding every 1–2 hours is physiologic.26 Furthermore, increases in feeding frequency during growth spurts may be perceived as low supply.

When there is objective evidence of poor milk transfer, the differential diagnosis includes disrupted physiology and both endocrine and anatomic causes. The most common cause is insufficient milk removal, and treatment begins with restoring normal physiology with frequent, on-demand feeding, ideally working in conjunction with an IBCLC, or a pediatric or family medicine provider with lactation expertise. Sleep and serotonin trigger prolactin release, and working with the patient to identify social support can improve milk production.

Maternal obesity and insulin resistance are associated with delayed onset of lactation,51 and disrupted insulin signaling may be associated with milk production difficulties.52 Other endocrine causes include retained placenta,53,54 thyroid disorders, and Sheehan’s syndrome. In the setting of postpartum hemorrhage, laboratory evaluation of prolactin can detect Sheehan’s syndrome with full assessment of pituitary function if prolactin levels are low. Discontinuation of hormonal contraceptives may also be helpful. Pregnancy can also abruptly reduce milk supply and should be excluded.

Women with insufficient glandular tissue16 may have tubular, widely spaced breasts and disproportionately large areolae. In other cases, the breast contour appears normal, but palpation of the breast demonstrates mostly adipose tissue with only a small amount of glandular tissue. A history of breast surgery or radiation to the chest may also reduce milk production.

Evidence to support galactagogues is limited.55 Dopamine suppresses prolactin release, and dopamine antagonists therefore increase prolactin levels. In some studies, metoclopramide increases milk production, but it can also precipitate anxiety, depression, and extrapyramidal symptoms. Domperidone can improve milk production with fewer central nervous system side effects, but this drug has also been associated with an increased risk of sudden cardiac death. The U.S. Food and Drug Administration recommends that breastfeeding women not use domperidone to increase milk production. There is limited evidence for herbal supplements, including Moringa oleifera,56 fenugreek, goat’s rue, and milk thistle.57 In a recent statement, the American Academy of Pediatrics concluded, “galactagogues have a limited role in facilitating lactation and have not been subject to full assessments of safety for the nursing infant.”

Even with support from obstetric providers and qualified lactation professionals, some women will not be able to establish a full milk supply. Women who are not able to achieve their breastfeeding intentions report considerable distress,48 and the obstetrician can validate a woman’s efforts and experience. Regardless of milk production, a mother can nurture her infant at the breast. The obstetrician can also address widely held assertions that “every mother can breastfeed.” As Marianne Neifert has written,58 “The bold claims made about the infallibility of lactation are not cited about any other physiologic processes. A health care professional would never tell a diabetic woman that ‘every pancreas can make insulin’ or insist to a devastated infertility patient that ‘every woman can get pregnant.’ The fact is that lactation, like all physiologic functions, sometimes fails because of various medical causes.”

Pain
Most breastfeeding-associated pain begins with trauma at the interface between the infant’s mouth and nipple–areolar complex. Tongue tie, or ankyloglossia, is associated with both pain and poor milk transfer, and in a randomized single-blind trial, frenotomy reduced
maternal breastfeeding-associated pain. Obstetric providers should collaborate with a pediatric provider, an IBCLC, or both, to assess infant anatomy and latch dynamics. Among mothers who pump, excessive suction or inappropriately fitted flanges can cause trauma, and pump use and fit should be assessed.

The differential diagnosis for traumatized nipples includes irritant dermatitis, impetigo, and Candida infection. Barrier ointment such as petrolatum or zinc oxide can aid healing of irritant dermatitis. Contact dermatitis, from topical breast ointments, breast pads, or allergens in the infant’s mouth, can be treated with removal of the allergen and topical steroids. Staphylococcus superinfection is common in women with sore nipples. For moderate-to-severe pain and trauma, oral antibiotics are superior to topical preparations or advice on positioning alone. Although breastfeeding pain has been attributed to Candida infection, a recent study found more evidence of Candida species among asymptomatic controls than among cases. Topical mupirocin and clotrimazole demonstrate both anti-Staphylococcus and anti-Candida activity, so treatment with either of these agents treats both bacterial and fungal superinfection.

Vasospasm is a common cause of breastfeeding-associated pain and often is misdiagnosed as Candida infection. Women with past or current nipple trauma may experience blanching or purple discoloration of the nipple after feeding and shooting, burning pain. A history of Raynaud’s symptoms may or may not be present. Patients may describe onset of pain on getting out of a warm shower or entering the frozen food section of the grocery store. A heating pad or warm gel pack applied to the breast after feedings can relieve symptoms. In women with partial relief with heat, extended-release nifedipine can markedly improve symptoms.

Severe, shooting, burning pain unresponsive to heat or nifedipine may present as part of a functional pain syndrome. Patients with this condition may report a history of other pain disorders such as migraines, irritable bowel syndrome, dysmenorrhea, or dyspareunia. We evaluate for allodynia using a cotton-tipped swab to test light and sharp touch, starting at the lateral aspect of each breast at 2 and 10 o’clock and moving toward the nipple. Women with allodynia report increased sensitivity lateral to the areola, and inspection of the skin may reveal engorged capillaries in the sensitive region, suggesting vascular dysregulation. Onset of pain may coincide with visible changes in skin color, suggestive of a “mammary migraine.” We have found that such symptoms respond to central pain pathway modulators such as propranolol, tricyclic antidepressants, and serotonin-norepinephrine reuptake inhibitor antidepressants. Collaboration with a pain specialist may be helpful.

Breastfeeding and the Preterm Neonate
For preterm neonates, mother’s milk is medicine. Human milk contains immune modulators and antibodies that reduce risk of necrotizing enterocolitis, and human milk is associated with reduced risk of other infectious morbidity. Sharing this information with mothers who intend to formula-feed increases breastfeeding initiation and does not increase maternal anxiety. Initiating milk expression within 6 hours of birth and hand expression in conjunction with pumping are associated with greater milk production among mothers of preterm neonates. In a recent randomized trial, initiation of pumping within 1 hour of birth increased milk volume compared with initiation between 1 and 6 hours postpartum. Stress reduction also supports lactation. The obstetrician can support mothers to establish a full supply for their preterm neonate(s) by providing anticipatory guidance when preterm birth is imminent and working with hospital staff to facilitate early milk expression.

OTHER SPECIAL SITUATIONS
The Academy of Breastfeeding Medicine has developed evidence-based protocols for management of multiple special situations, including breastfeeding infants with complications such as hypotonia, orofacial clefts, and allergic proctocolitis as well as maternal issues such as breastfeeding and drug-dependent women.

CONCLUSION
After the umbilical cord is clamped, lactation forms a sustained, dynamic connection between the physiology of the mother and infant. As experts in reproductive health care, obstetricians can play a central role in supporting this physiology and treating complications that arise. Optimal management includes collaboration with pediatric providers and International Board Certified Lactation Consultants. By enabling more women to achieve their infant feeding goals, obstetricians can improve health across two generations.

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