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## **Liberty Bottle or Liability Bottle?**

### **A Formula for Failure**

#### **SUMMARY**

The number of mothers initiating breastfeeding has increased dramatically over the last decade but the percentage of mothers who terminate breastfeeding prematurely has remained constant. When mothers experience difficulty with breastfeeding, many physicians fail to diagnose and manage the problem effectively. Some physicians assume that mothers dislike breastfeeding and, in a misguided attempt to help, recommend the introduction of a bottle to solve the problem. They do not explain to the mother how the delicate symbiotic relationship of the nursing dyad may be upset by bottle feeding, and how a downward cascade to premature weaning may begin. Bottle feeding is a specific therapy for breastfeeding difficulties. If, after careful consideration, it is the therapy of choice, then the physician must give full and accurate information to the mother about the possible health hazards and consequences of introducing bottle feeds. Then the mother can make an informed decision about when to introduce a bottle, what to put in it, which nipple to use, and what the outcome might be. The physician should support the mother in whatever informed decision she makes. The author of this article reviews the issues of introducing bottle feeding and informed consent. (*Can Fam Physician* 1988; 34:1143—1146.)

#### **RÉSUMÉ**

Depuis 10 ans, on constate une augmentation marquée du nombre des mères qui s'initient à l'allaitement au sein, alors que le pourcentage des mères qui cessent prématurément d'allaiter demeure constant. Lorsque les mères éprouvent des difficultés à allaiter, nombreux sont les médecins qui ne peuvent diagnostiquer et traiter le problème efficacement. Certains médecins présument que les mères n'aiment pas allaiter et, dans une tentative erronée de leur venir en aide, recommandent l'introduction du biberon pour solutionner le problème. Ils n'expliquent pas à la mère jusqu'à quel point la délicate relation symbiotique de la dyade impliquée dans l'allaitement peut être affectée par l'introduction du biberon et comment ce processus peut déclencher un sevrage prématuré. Lorsque la mère éprouve des difficultés à allaiter, le biberon peut constituer un traitement spécifique. Si, après sérieuse considération, celui-ci devient le traitement de choix, il est du devoir du médecin de fournir à la mère des informations précises et complètes sur les risques potentiels et les conséquences d'introduire le biberon. Il appartient alors à la mère de prendre une décision éclairée quant au moment propice d'introduire le biberon, de décider du contenu et du type de suce et d'en prévoir les résultats. Le médecin se doit d'endosser le choix de la mère, quel qu'il soit. L'auteur du présent article passe en revue les questions entourant l'introduction du biberon et le consentement éclairé.

**Key words:** breastfeeding, bottle feeding, informed consent

DURING THE FIRST year of life, infants undergo a rapid rate of growth and development that is unsurpassed at any other period in their lives. In order for an infant to grow optimally, adequate nutrition is essential. The Canadian Pediatric Society has endorsed the recommendations of the World Health Organization (WHO) and states that in healthy young infants, breast milk alone is the ideal form of nutrition, and that breastfed infants have a definite advantage over those who are formula fed.<sup>1</sup>

In the last 15 years, there has been a dramatic increase in the number of mothers initiating breastfeeding. Canadian surveys show that over 80% of mothers breastfeed their babies from birth, but at six months of age two-thirds of all infants are formula fed.<sup>2</sup> A number of factors have been found to be predictors of breastfeeding success including birth weight of infant, number of hours after birth to first breastfeeding experience, parity, maternal age, marital status, previous breastfeeding experience, supportive family, ethnic origin, smoking behaviour, and predetermined plans for duration of breastfeeding.<sup>3-10</sup>

When looking at reasons for termination of breastfeeding, a highly consistent pattern emerges. A large proportion of mothers stop breastfeeding early, primarily because of technical difficulties associated with the initiation and maintenance of breastfeeding.<sup>2</sup> Breastfeeding problems present as a mother's sense of insufficient milk; perceived infant hunger; failure to gain weight according to standard growth charts; and breast problems such as nipple pain, sore and cracked nipples, and breast infections.<sup>3-6,9</sup> The etiology of many of these problems is often poor maternal technique or poor infant feeding technique, and both are easily remedied. Later weaning is predominately the result of other factors such as the mother's return to work, her convenience, and a belief that breast milk is no longer necessary to the infant's diet.<sup>10</sup>

## **The Supplemental Bottle**

Many of the mothers who present at the Breastfeeding Clinic state that they have been counselled by their physicians to introduce their infants to a supplemental bottle at an early age. As a result, the delicate symbiotic relationship of the nursing dyad may be upset, and a downward cascade towards premature weaning may begin. The reasons given for introducing this bottle are varied; the most common reason is that a mother has encountered difficulties with breastfeeding. There still exists a belief in the medical profession that bottle feeding is an acceptable alternative to breastfeeding and that there is no justifiable reason to dissuade a mother from her decision to terminate breastfeeding prematurely. Instead of diagnosing the cause of the problem and managing it appropriately, some physicians assume that breastfeeding is proving unsuccessful and, in a misguided attempt to help, suggest that bottle feeding would meet the nutritional needs of the infant and put an end to the problems.

Some mothers have stated that they introduced the supplemental bottle when their physician recommended that they use a "liberty" or "relief" bottle once a day as an alternative to breastfeeding. It is tempting to ask "Liberty or relief for whom?" What exactly is the purpose of this bottle? Is it to provide a time for Father to free Mother from the "chore" of feeding and to participate in the nutritive, as well as the nurturative, aspects of child rearing, or is it the introduction of menace?

The physician must consider many factors before recommending the use of a supplemental bottle. These factors include what to put in the bottle, at what age to start giving this bottle, which type of bottle and nipple to use, what the consequences might be of introducing a bottle, who should give it, how the mother interprets the physician's recommendation, and the cause of breastfeeding termination.

## **Effects of a Supplemental Bottle on Milk Production**

Breastfeeding is not strictly instinctual, but is a learned art. Infants appear to take control of milk intake during the first month of life, and it takes several weeks before breastfeeding is properly established. The introduction of a bottle during this early learning time can significantly contribute to premature termination of breastfeeding by upsetting the delicate balance of milk production in the mother and by causing nipple confusion in the infant.<sup>3</sup>

In the early weeks of life, the infant's daily milk requirement increases quickly. In order for the maternal milk supply to meet this demand, the infant must nurse frequently; the breasts must be emptied regularly. If formula is substituted for a feed of breast milk, the decreased nipple stimulation and the incomplete emptying of the breasts contribute to failure to increase the milk production and can lead to an insufficient milk syndrome.<sup>11</sup> This can result in reinforcing a new mother's doubt of her own ability to produce enough milk to meet the demands of her rapidly growing infant and in her resort to giving the infant a bottle more often. The problem snowballs, and the attempt breastfeed ends in failure.

## **Effects of the Supplemental Bottle on Infants' Feeding Techniques**

It has been clearly documented that the infant's sucking action at the breast is very different from the sucking action on a rubber nipple. The position of the infant at the breast and the precise sucking action on the nipple alters its shape during feeds so that the human nipple conforms to the infant's mouth; by contrast, the infant's mouth must conform to a rubber nipple. To suck successfully at the breast, the infant draws the nipple and areola tissue to the junction of the hard and soft palate to form a teat. The jaw is raised, and the gums compress the lactiferous sinuses under the areolar; the tongue is positioned over the lower gums and, in using an undulating motion, helps massage the milk forward; the jaw lowers and the soft palate elevates to close the nasopharynx, and the milk is swallowed as a result of these co-ordinated actions. Bottle feeding requires a different technique: the tongue is frequently positioned at the tip of the nipple in order to slow the flow of milk, and the jaws do not compress the nipple.<sup>12</sup>

An infant who has learned to suck on a rubber nipple may become confused at the breast. He fails to open his mouth widely, cannot draw the areolar into his mouth, tends to suck on the nipple, does not position his tongue correctly, and fails to compress the areolar sufficiently to initiate a good let-down reflex. Inevitably, this leads to frustration, sore nipples, and, ultimately, the infant's refusal of the breast in favour of the rubber nipple. Studies have shown that the mean latency time for release of milk is 2.2 minutes after the infant begins to suckle at the breast. There is no latent period for bottle-fed infants. Some infants become accustomed to the immediate rewards of a bottle and turn away from the breast.

There are many orthodontic teats on the market. The manufacturers claim that these teats simulate a mother's nipple, but the basis for these claims is unclear. It seems likely that all rubber nipples present the same potential problem and can cause nipple confusion. Concern has been expressed about the level of nitrosamines in bottle teats. In 1984, the U.S. Food and Drug Administration urged parents to boil bottle teats repeatedly before using them and to discard the water each time, in order to lower the nitrosamine level. West German regulations limit nitrosamine levels to three parts per billion (ppb); in the United States, however, levels of up to 100ppb are considered acceptable in domestic rubber products.<sup>13</sup>

## **Health Hazards of Infant Formula**

The composition of commercially prepared infant formulas is based on highly inexact scientific data. By the early 1980s, the only requirements for the manufacturing of infant formula were that the formula must be made under sanitary conditions and the ingredients must be listed on the label.<sup>14</sup> There were no specific requirements for the composition of the formula, nor was quality control required.

The health hazards of formula feeds are well documented.<sup>15</sup> There have been several problems and legal suits associated with these formulas. In 1979, two soybean formulas (Neo-Mull-soy and Cho-free) were recalled because they lacked the required amount of fluoride and essential nutrients. Before these products were recalled, however, approximately 20 000 infants were affected with physical symptoms including diarrhea, lethargy, and failure to gain weight, and were admitted to hospital.<sup>14</sup> The long-term effects of the nutritional deficits in the early weeks of life of these infants has yet to be fully determined.

In recent years, a number of formulas have been found lacking in vitamin B6, vitamin C, folic acid or the essential amino acid, taurine. The most popular formulas contain 20% - 50% of their fat in the form of coconut oil, although coconut oil is actually toxic and has been demonstrated to cause serious problems in laboratory animals and in normal human adults.<sup>16</sup>

Infant formulas must be prepared and stored correctly or they will cause potentially life-threatening illnesses in babies. In the Los Angeles area, infant health problems caused by misuse of formula have reportedly reached near epidemic proportions. The problem is widespread in any low socio-economic group including the Native populations in North America.<sup>16</sup>

It is possible that the introduction of even one bottle of formula can adversely affect the homeostasis of an infant's gut. Solely breastfed infants rely on the presence of lactoferrin, an iron-binding protein in the gut, to help inhibit the growth of *Escherichia coli*, the major cause of bowel infection in infants. When supplements containing iron are introduced, the effectiveness of the lactoferrin is significantly reduced.<sup>17</sup>

The infant's age at the introduction of formula feeds depends, to some extent, on the allergenic background of the infant. Cow's milk and cow's-milk-based formulas may cause allergic reactions, and the infant's age at the time of exposure to cow's-milk protein may correlate well with the subsequent problems; the younger the child, the greater the risk. It is advisable to delay the introduction of these substances until the infant is at least six months old or even older if the history suggests it.<sup>18</sup>

## **Informed Consent**

Carol Taylor was referred to the Breastfeeding Clinic because her six-week-old son was refusing to nurse. Two weeks earlier she had been too busy to express her milk, and so she opened the gift pack of formula that had been given to her in the hospital. Her physician had told her that breastfeeding was tiring, and that she would need her rest. He emphasized that she must not feel guilty if she did not manage to breastfeed all the time, and that formula was almost as good as breast milk. He suggested that it was a good idea to introduce the bottle at an early date and to let the father feed the baby sometimes. Personally, Mrs. Taylor found it very enjoyable and restful to sit quietly and feed her baby.

Unfortunately, the physician did not specify what to put in the baby's bottle, or which type of nipple to use, nor did he teach Mrs. Taylor how to express and store milk. She had tried to express her milk manually, following instructions in a prenatal manual, but had been unsuccessful.

The baby had refused the bottle initially, and this concerned the parents. Mrs. Taylor was planning to return to work, and the baby would be bottle fed during her absence. The parents began to offer the bottle routinely, and soon the baby became accustomed to the easy flow of milk. Shortly afterward, the baby began to struggle at the breast, turned away repeatedly, and was only pacified by the bottle. The parents became convinced that there was something wrong with the breast milk, and they decided to stop breastfeeding prematurely. On examination, it was determined that the baby was nipple confused and was unable to suckle correctly at the breast. Mrs. Taylor was upset that she had not been informed about the drawbacks of introducing a bottle early in the baby's life.

When any patient presents with a problem, the physician must take a complete history and perform an examination in order to make a correct diagnosis. The physician should discuss possible management with the patient and should provide information about the benefits and adverse effects of the therapies. This approach will enable the patient to give informed consent about a specific method of management. Bottle feeding is a specific therapy for breastfeeding difficulties; if it is the therapy chosen, full and accurate information must be given to the mother about the possible consequences, including health hazards, of introducing bottle feeds.

Before bottle feeding is suggested, physicians should carefully assess the reasons for making this recommendation and should explore possible alternatives. Mothers should be counselled about the potentially harmful effects of introducing rubber nipples and should be informed that the safety and long-term effects of formula have yet to be realized. With this knowledge, mothers will be able to make an informed decision about when and if to introduce the first bottle, what to put in it, and which nipple to use.

The safety and long-term effects of formula have yet to be assessed and, until such time as this occurs, it is prudent to think of infant formula as a drug and to give parents as much information as possible about any adverse effects that may occur.

## **Recommendations**

In 1981, the WHO published its *Code of Marketing of Breast Milk Substitutes*.<sup>19</sup> It recommended that health-care workers, including physicians, follow the code by not promoting milk substitutes, bottles,

and nipples, and by stopping the distribution of free formula samples. There are many hidden implications in giving an inexperienced mother a sample of formula. The mere fact that the physician has given her the sample implies that it is all right to use it, and mother may assume that the particular brand given is to be considered the best. Studies have shown that the distribution of gift packs containing infant formula may have a significant effect on early introduction of bottle feeds.<sup>20,21</sup>

It is still common practice for some hospitals to recommend complementary or supplementary bottle feeds during the early postpartum period. The reasons for this include assessment of the infant's swallow before breastmilk is ingested, prevention of weight loss until the milk "comes in", routine feeding schedules at night, prevention of hypoglycemia, and prevention of hyperbilirubinemia. No studies have documented that exclusively breastfed neonates routinely require additional fluids. Clinical data suggest that jaundice may be minimized by early and frequent breastfeeding because of the increased peristalsis in the gut and the rapid transit of meconium.<sup>22</sup> When there is a risk of hypoglycemia, the higher protein level in colostrum has a more stabilizing effect on blood sugar than does glucose water, and therefore frequent breastfeeding may be more efficacious than bottle feeding.

Nipple confusion can be minimized by avoiding exposure of the infant to bottle nipples and pacifiers unless specific indications for supplementation exist. While the baby is in hospital, it may be necessary to write an order for "No supplementation nor pacifiers to be given to the infant without physician's consent". Some hospitals have designed a form to be signed by the mother, in order to verify that her informed consent for supplements has been obtained.

A bottle is not the only alternative means of giving fluids; very young infants can learn to drink from a small cup or spoon, and a supplemental nursing system may be used in conjunction with breastfeeding as a method of giving extra milk while suckling.<sup>23</sup>

Once breastfeeding is well established, the use of a substitute bottle should be discussed. A mother must be counselled appropriately about her free time, and she should be encouraged to leave the baby occasionally with a child minder and resume her personal pursuits. She must be taught how to express her milk either manually or with the help of a breast pump, and she must be told clearly how to store the milk for later use. Expressing milk is time consuming, and it may take 20 to 30 minutes to collect four ounces. The mother should be encouraged to breastfeed whenever she is with her young infant rather than to delegate the feeding to someone else. Her partner can do myriad other things to help.<sup>24</sup>

It is unnecessary to introduce the bottle at an early date in preparation for some future need such as the mother's return to work, since more problems are caused than are solved by this approach. It is more appropriate to wait until the need for supplementary feeding arises.

## Conclusions

The introduction of a bottle should be avoided in the early months of life, as it can inadvertently act as a catalyst that causes a downward cascade towards breastfeeding failure. It is prudent to think of formula as a drug that may have adverse side-effects.

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