The Magic Number and Long-Term Milk Production

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Worry about milk production is the most common reason women wean earlier than planned. In many cases this worry is due to confusion about how milk production works. This article describes a teaching concept, termed the Magic Number. Clinicians can use this concept to provide mothers who are not exclusively breastfeeding on cue a clear, evidence-based understanding of how to keep their milk production stable over the long term.

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With unrestricted access to the breast, most babies can easily adjust their mother's milk production by simply changing their breastfeeding length and frequency. However, many mothers with milk-production issues are not exclusively breastfeeding. Employed mothers, exclusively pumping mothers, and mothers using feeding schedules often seek help from clinicians when their milk production slows. Or they may ask for help in preventing milk production from slowing over the long term.

When milk production is not regulated solely by the baby, one teaching concept used successfully is the Magic Number (Mohrbacher, 2010). This term refers to the number of times each day a mother needs to remove milk from her breasts to maintain her milk production. If her number of daily milk removals stays at or above this threshold, her milk production stays steady or may even increase. If it falls below this threshold, her milk production slows.

Two Major Dynamics Determine a Mother's Magic Number

- **Breast fullness**
- **Breast storage capacity**

This specific threshold varies among mothers. Two primary dynamics determine an individual mother's Magic Number: degree of breast fullness and breast storage capacity. The purpose of this teaching concept is to give mothers a clear understanding of these dynamics and take the mystery and anxiety out of milk production. This knowledge, when provided with several other key facts, enhances mothers' confidence in breastfeeding and empowers them to adjust their daily routine as needed to meet their long-term goals.

Degree of Breast Fullness

Mothers are sometimes told to wait until their breasts feel full before expressing or breastfeeding. This advice reflects a basic misunderstanding of how milk production works. Research has found that the fuller breasts become, the more milk production slows (Kent, 2007). One simple way to explain this mechanism to mothers is: full breasts make milk slower (Mohrbacher & Kendall-Tackett, 2010).

The opposite is also true. Milk production speeds when a mother's breasts are drained more fully. This is how a baby adjusts his mother's milk production as needed. If a baby wants more milk, he breastfeeds more often and/or longer. Taking a larger percentage of the available milk speeds the rate of milk production. In other words, drained breasts make milk faster.

Within a day, and even from feeding to feeding, rate of milk production can change dramatically. In one study, for example, after 6 hours without milk removal, one mother's rate of milk production per breast was 22 mL (about 2/3 oz.) per hour (Daly, Kent, Owens, & Hartmann, 1996). By breastfeeding from that breast every 90 minutes and removing milk from her breasts

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more completely, her rate of production per breast increased quickly within the same day to 56 mL (nearly 2 oz.) per hour—more than double the previous rate.

Breast Storage Capacity

A mother's breast storage capacity refers to the maximum volume of milk available to her baby when her breast is at its fullest. Unrelated to breast size, breast storage capacity is determined by the amount of room in her milk-making glandular tissue. Breast size is determined primarily by the amount of fatty tissue (Geddes, 2007).

The maximum volume of milk in the breasts each day can vary greatly among mothers. Two studies found a breast storage capacity range among its mothers of 74 to 606 g (2.6 to 20.5 oz.) per breast (Daly, Owens, & Hartmann, 1993; Kent et al., 2006). The mother with the largest breast storage capacity accumulated up to 90% of her baby's daily milk intake in both breasts, while the one with the smallest storage capacity accumulated in both breasts only 20% of her baby's daily milk intake.

Breast storage capacity affects how long it takes for mother's breast to become full. For example, a woman with a small storage capacity may become so full with 2.5 ounces (75 mL) of milk in her breasts that her rate of milk production slows. However, in a woman with a larger breast storage capacity this same 2.5 ounces (75 mL) would not cause milk production to slow. This larger-capacity mother could, therefore, go for longer periods between feedings without her rate of milk production slowing.

It's vital to note that although breast storage capacity can affect feeding patterns, it does not affect a mother's overall ability to produce ample milk for her baby. One study found that all of its babies whose mothers had a small storage capacity had healthy weight gains (Kent et al., 2006). To consume the same amount of milk as other babies, however, on average these babies breastfed more times each day.

Depending on her breast storage capacity, a mother's Magic Number (number of daily milk removals needed to keep milk production stable) may be as few as 3, 4 or 5 or as many as 10, 11, or 12. But when a mother's total number of milk removals (breastfeedings plus milk expressions) dips below her Magic Number, her rate of milk production slows.

Facts and Focus

In addition to understanding degree of breast fullness and breast storage capacity, there is one key fact that is helpful for these mothers to know. Most employed and exclusively pumping mothers think that as their baby grows bigger and heavier they will need to increase their milk production. They assume that—like babies fed formula—their breastfed babies will need more and more milk as they grow. These mothers are usually tremendously relieved to learn that the amount of milk breastfed babies consume daily between 1 and 6 months of age stays remarkably stable, on average between 25 and 30 oz. (750-900 mL), with an average increase during this time of only about 4 ounces (120 mL) or so (Butte, Lopez-Alarcon, & Garza, 2002). This means that when breastfeeding is going normally, after 1 month milk production doesn't need to increase by much. After reaching this level, a mother can focus primarily on maintenance until 6 months, when her baby's milk intake will decrease with the introduction of solid foods (Islam, Peerson, Ahmed, Dewey, & Brown, 2006).

To give mothers a clearer sense of how their daily choices affect their rate of milk production, it can be helpful to suggest employed mothers keep their focus on the 24-hour-day as a whole. By considering their baby's overall daily milk needs, it quickly becomes obvious that the more times each day the baby breastfeeds directly, the less expressed milk he will need while they're separated. In other words, every missed breastfeeding at home equals an average of 3 to 4 ounces (90-120 mL) more milk the baby needs while the mother is at work. Many mothers lose sight of the fact that encouraging babies to sleep more at night adds to the volume of expressed milk they need to leave during the day. Taking a broader view of their daily routine often provides the answers mothers need to maintain milk production over the long term.

As babies begin sleeping longer at night, number of milk removals can decrease. Also Western mothers are often encouraged to follow bottle-feeding norms by trying to convince their babies to take larger and less frequent feedings. This pattern, however, is not consistent with breastfeeding norms, as number of feedings per day have not been found to decrease between 1 and 6 months (Kent et al., 2006).

To stay aware of this dynamic, when an employed mother returns to work after maternity leave, at least once per week suggest she make note of how many times per day she removes milk from her breasts, adding

breastfeedings and milk expressions. At least once per week, suggest exclusively pumping mothers total their daily milk yield. Milk production is easier to boost if it hasn't been reduced for longer than a couple of weeks. When a mother focuses weekly on either daily milk removals (employed mothers) or daily milk yield (exclusively pumping mothers), she will know when adjustments in routine are needed while it is still easy for her milk production to rebound.

Determining a Mother's Magic Number

An exclusively pumping mother will get an idea of her magic number quickly as she sees what level of daily milk expression maintains her milk production and when it starts to dip. Another clue to a mother's breast storage capacity, a major influencer of her Magic Number, is her milk yield at her first-morning expression. In a 1996 survey of 10 exclusively pumping mothers, mothers who expressed 10 ounces (300 mL) of milk or more at the first-morning pumping were able to maintain their milk production long-term with as few as 5 milk expressions per day (Mohrbacher, 1996). Mothers who expressed 5 ounces (150 mL) or less at their first-morning pumping required more daily milk expressions to maintain milk production.

To get an idea of an employed mother's Magic Number (assuming she is exclusively breastfeeding a thriving baby), suggest she think back to her maternity leave. On average, how many times every 24 hours did her baby breastfeed? Because this daily number of feedings at the breast was working well for her baby, most likely this same number will keep her milk production stable. So start with this daily total as an estimate of her Magic Number. For example, if her answer is 8 (which seems to be average), she can assume that to keep her milk production steady long term she will need to continue removing milk from her breasts at least 8 times each day. If she's expressing milk 3 times during her work day, this means she would need to breastfeed 5 times when she and her baby are together.

Many employed mothers are diligent about maintaining their number of milk expressions at work. But often, as their baby gets older, they breastfeed less and less at home. This change in routine can bring them below their Magic Number, slowing milk production. That's why it is important for a clinician not to limit her questions to the number of milk expressions at work. Since milk production is determined by 24-hour milk-removal patterns, it is just as important to know about the breastfeeding routine at home. Another key piece of information is their longest stretch between milk removals (usually at night), which some mothers report may be as long as 12 hours.

Troubleshooting Using the Magic Number

One mother's experience provides a good example of how the Magic Number concept can be used. This mother called for help because she was expressing at work only about half of the milk her baby consumed at day care and her goal was to breastfeed for at least a year. She was concerned that her milk was disappearing and that breastfeeding was at risk.

Her baby boy was 6 months old and she had returned to work 4 months earlier. She was away from her baby 5 days a week for 8 hours per day, including travel time. At work she expressed a total of 6 ounces (180 mL) of milk while her baby consumed 12 ounces (360 mL), which was near the average milk intake expected. When her volume of milk expressed at work began to decrease, this mother started taking galactogogues to increase her rate of milk production. While this would not be effective for every mother, it worked for her. However, every time she stopped taking the galactogogues, her milk production slowed again. She said that during her maternity leave, her baby had breastfed 9 times per day.

Now, though, her routine was very different:

- One breastfeeding at home before work
- Two milk expressions at work
- Two breastfeedings at home in the evening
- Baby was sleeping 10 to 12 hours at night as the longest stretch

Her total number of daily milk removals had dropped from 9 to 5 (3 breastfeedings at home plus 2 milk expressions at work).

The clinician gave this mother an explanation of how degree of breast fullness and breast storage capacity affects the Magic Number. The clinician concluded from the mother's description that the combination of her baby's 10- to 12-hour sleep stretch at night (full breasts make milk slower) and the drop in her total number of milk removals from 9 to 5 most likely explained her difficulty in maintaining her milk production.

When her baby started sleeping so long, at first the mother got up once during the night to express her milk,

which allowed her to store enough milk for her workday. However, as her baby got older she stopped expressing at night and began breastfeeding fewer times at home, because her friends told her that older babies need fewer feedings.

After a better understanding of the dynamics affecting milk production, this mother realized that she her breast storage capacity was most likely near the small end of the spectrum. Now her experience made sense to her. Her goal was to breastfeed her baby for at least his first year, so she changed her daily routine. She started breastfeeding more often at home. She also decided that rather than waking her baby at night—which she most definitely did not want to do—she got up once during the night to express her milk. Armed with a clear understanding of how milk production worked, she knew how to adjust her daily routine so that she could meet her long-term breastfeeding goals. As a result, this mother had no more issues with her milk production and went on to meet her target goals.

The Magic Number is a teaching concept that focuses on the basics. Of course, in some cases a mother may have low milk-production for less common reasons, such as hypothyroidism, polycystic ovary syndrome (PCOS), the use of hormonal contraceptives, etc. Even so, it always makes sense to start with the fundamentals. Because milk production tends to be a very robust process, going back to basics is likely to address most mothers' milk production issues. Over the millennia, the very survival of the human race has relied upon women's ability to produce milk. However, for an individual mother to meet her breastfeeding goals, first she needs to understand how this works.

Additional resources available online:

For employed mothers:
http://www.nancymohrbacher.com/blog/tag/for-employed-nursing-mothers

http://www.breastfeedingmadesimple.com/

http://www.ameda.com/sites/default/files/26401032_1010%20Working%20EN_4c.pdf

For exclusively pumping mothers:
http://www.ameda.com/sites/default/files/26401014_1010%20FullProd%20EN_4c.pdf

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