Helping Mothers Who Exclusively Pump

Nancy Mohrbacher, IBCLC, FILCA

Disclosure: I earn royalties from book sales

Exclusively pumping mothers may have:
- Babies in special care
- Full-term, healthy babies

4-5% exclusively pump (EP)


Healthiest to least healthy infant feeding choices (WHO):
1. Breastfeeding
2. Mother’s own expressed milk
3. Donor human milk
4. Non-human milks

Seeing an expression epidemic
- 85% express in 1st 4.5 mo
- Rise in preterm births
- Product vs. process

Recommendations for Healthy Term Infants:
1. Exclusive breastfeeding for about 6 mo
   - Breastfeeding preferred, alternatively expressed mother’s milk, or donor milk


Reasons for Pumping
Baby fussed, refused (4)
- 1 temporary weaning
Baby “rough”
Infant health (2)
Sore nipples
Better lifestyle fit
Mother uneasy

Points to Make
1. I can help you
2. Pumping is more time & work
3. Nearly all problems are fixable
4. Can transition to breast any time

Degree of Breast Fullness
Daly. Exp Physiol 1996; 81:861-875
- Drained breasts make milk faster
- Full breasts make milk slower (FIL + pressure)
Helping Mothers Who Exclusively Pump

For every 100 mL more available milk, mothers pump 14% less

Same dynamic during breastfeeding

Breast Storage Capacity
Daly, S. Exp Physiol 1993; 78: 209-20

Large capacity Takes more milk & time to fill
Small capacity Takes less milk & time to fill

Affects # of pumpings needed/day to establish & maintain milk production

The closer to childbirth, the easier it is to boost milk production

More Milk at First Means More Milk Later
Prolactin receptor theory
Receptor activation key during first 2 weeks

Starting milk expression ≤ 1 hr of birth associated with earlier milk increase & more milk at 7 days & 3 wk

Getting Started with Pumping
Establish with a rental-grade double pump
Most can maintain with personal pump
Helping Mothers Who Exclusively Pump

**Pump Fit**

28% of UK NICU mothers needed larger nipple tunnel


In US study
- 51% went larger at first
- 77% later in lactation

Set pump at highest comfortable suction: no higher & no lower


- To get there, turn up vacuum until slightly uncomfortable, then turn down a bit
- If she’s gritting her teeth or is sore after, it’s too high!

**Stage 1: Birth to Milk Increase**

Breast massage before pump

Jones. Arch Dis Child Fetal Neonatal Ed 2001; 86:F91-95

Pump 8-10x/24 hr
- Focus on daily total
- “Putting in your order”
- Expect small amounts

Longest stretch: ≤ 6 hr

Double pump till flow stops

After, hand express >5x/day


**Hand Expression After Pumping**

http://newborns.stanford.edu/Breastfeeding/HandExpression.html

**Stage 2: Milk Increase to Full Production**

Longest stretch: ≤ 6 hr

Use hands-on pumping so “drained breasts make milk faster”

**Full Milk Production Defined**

<table>
<thead>
<tr>
<th>Level</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideal</td>
<td>≥ 750 mL (25 oz.)</td>
</tr>
<tr>
<td>Borderline</td>
<td>350-500 mL (12-17 oz.)</td>
</tr>
<tr>
<td>Low</td>
<td>≤ 350 mL (12 oz.)</td>
</tr>
</tbody>
</table>

Hurst & Meier, Breastfeeding and Human Lactation, 2010, p. 434

Goal: ≥ 750 mL/day/baby by Day 7-10
Warming Breastshields

- Tested breastshields at 25°C and 39°C
- 39°C removed ↑ available milk @ 5 min
- No difference @ 15 min
- Warming may help speed milk removal

Hands-On Pumping (HOP)
http://newborns.stanford.edu/Breastfeeding/MaxProduction.html

Steps for Hands-On Pumping

1. Massage both breasts
2. Double pump
3. Stop pumping & repeat massage
4. Single pump or hand express
5. Alternate right to left to right, etc. until milk flow slows

Increase in Milk Yield of >48%

Milk-fat content nearly double the average

©2012 Nancy Mohrbacher, IBCLC, FILCA
Pumping Effectiveness

Triggering milk ejection reflexes (MERs) is key.

During pumping, MERs range: 2-14; Average: 5
More MERs = more milk expressed = breasts more fully drained = faster milk production

“...milk ejection is, at least in part, a conditioned response.”

Fastest milk flow occurred at either the 1st or 2nd milk ejection 94% of the time

Using MER triggers
- Mind
- Senses
- Vary pump cycles (fast cycles trigger MER, slow cycles drain)

Law of Diminishing Returns

<table>
<thead>
<tr>
<th>Milk Ejection</th>
<th>Average Volume of Milk Expessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>54 mL (1.8 oz)</td>
</tr>
<tr>
<td>2nd</td>
<td>37 mL (1.3 oz)</td>
</tr>
<tr>
<td>3rd</td>
<td>16 mL (0.5 oz)</td>
</tr>
<tr>
<td>4th</td>
<td>13 mL (0.4 oz)</td>
</tr>
<tr>
<td>5th</td>
<td>7 mL (0.2 oz)</td>
</tr>
<tr>
<td>6th</td>
<td>7 mL (0.2 oz)</td>
</tr>
<tr>
<td>7th</td>
<td>2 mL (0.1 oz)</td>
</tr>
</tbody>
</table>

How Many Minutes Should She Pump?


Individualize pumping instructions

To find a mom’s best pumping length, pump a few times & observe milk flow

Research Findings

- Preterm mothers ~3x greater risk of inadequate milk at Week 6 (<500mL/day)
- Day 4 output predicted Week 6 output

Early Breast Stimulation


Preterm: 6 pumps/day
Term: 8-9 breast/day

- Early breast stimulation predicted 49% of variation in Week 6 milk output
- Gestation in weeks predicted 11%

At Breast vs Pumping Only


In breastfeeding mothers
• Milk increased through Week 5
• Slight decline in Week 6

In pumping mothers
• Milk increased until Week 3
• By Week 4, milk declined

Adding Hands to Pump


Adding Hands to Pump

Adding Hands to Pump

More milk using hands + pump
Hand expression + pump
Pump and hands
Pump only

If <500 mL/day on Day 10
- Check flange fit
- Hands-on pumping
- Increase # pumps/day
- Skin-to-skin contact
- Pump at baby’s bedside
- Galactagogues

Galactagogues
If not a licensed prescriber, provide information to health-care provider

“As new evidence has emerged regarding various interventions to increase milk secretion in lactating women, the case for using pharmaceutical galactagogues has grown weaker.”

“There remain selected indications for which some of these agents may be useful, but the data are insufficient to make definitive recommendations.”

Maintaining Milk Production
Impact of Individual Differences

One of these is the use of domperidone in mothers of babies < 31 weeks gestation in the NICU
**Stage 3: Full Production**
- Decrease to 15-20 min
- Most maintain milk production with 5-7 pumps/day
- Sleep through the night
- Record 24-hr yield 1x/wk

**In Stage 3 Does Degree of Breast Fullness Trump Frequency?**
- Pumping >7/day important to milk volumes in 1st 2 wk but not at 8 wk
- With HOP, some pumped less but volumes kept increasing

**Increasing Volume Over Time**

**Power Pumping?**
- Keep pump in common area, pump a few min when passed
- Spend an hour pumping 10 min on, 10 min off

**Impact of the Longest Stretch**
- Always ask its length
- “Full breasts make milk slower”
- Usually occurs at night
  - May be ≥12 hr
  - 8 hr works for most

**The Magic Number**
- Total # of pumps/day needed to maintain production long term
  - Major factor: Breast storage capacity
  - Clue to capacity: Yield at first am pump

©2012 Nancy Mohrbacher, IBCLC, FILCA
### Spectrum of Normal

<table>
<thead>
<tr>
<th># Pumps/day to increase milk</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td>6-8</td>
<td>8-10</td>
<td>10-11</td>
<td>≥12</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Pumps/day to maintain milk</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Pumps/day to decrease milk</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>4-5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

### Spectrum of Normal

<table>
<thead>
<tr>
<th>Maximum longest stretch</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-12 hr</td>
<td>8-10 hr</td>
<td>8 hr</td>
<td>6-7 hr</td>
<td>4-5 hr</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yield at first am pump</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 oz</td>
<td>10-14 oz</td>
<td>8-9 oz</td>
<td>6-7 oz</td>
<td>4-5 oz</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of pump</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other factors</th>
<th>Largest Capacity</th>
<th>Large Capacity</th>
<th>Average Capacity</th>
<th>Small Capacity</th>
<th>Smallest Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Responses to Pumps Vary


Milk ejection occurred with all 7 patterns for half

For the other half, milk ejection occurred with 1 to 6 patterns

### Effectiveness Ratio

For 1/3 of mothers less of the available milk was removed during pumping than during an average breastfeeding


Why?
- Breast anatomy
- Conditioning
- Inhibition of MER

Chatterton, et al. J Clin Endocrinol Metab 2000; 85(10), 3661-68

### Breast Storage Capacity


Only ¼ of moms pump the same volume from left & right breasts

Wherever on the spectrum a mother falls, if # pumps per day drops below her Magic Number, milk production slows
Key Milk Production Facts

A breastfed baby’s milk intake:

- Increases from Birth to Week 5
- Plateaus until 6 mo
- Decreases when other foods started

Peak milk intake averages
~ 25-35 oz/day

Over time, baby’s rate of growth slows

Between 1 & 6 mo, breastfed baby needs ~ same volume of milk/day


On average, formula-fed babies consume much more milk:

- 15% @3 mo
- 23% @6 mo
- 20% @9 mo
- 18% @12 mo


How often a baby bottle-feeds has no relation to breastfeeding frequency

Ask Pumping Mothers

- Pump used (best varies)
- # pumps/day (NOT “how often”—count)
- Length of pumps
- Daily yield—full production?
- Longest stretch
- Yield at first am pump, other pumps (Clue to storage capacity)
- Long-term goals

Case Report: Survey Mother #5
Reason for EP: Mother Uneasy

- Double rental pump
- 4xs/day for 40 min each (160 min total)
- Started Day 1, always pumped 4x/day
- Daily yield: 32 oz
- 1st am pump: 12-14 oz

What conclusions can we reach? What recommendations should we give?
Case Report: Survey Mother #10  
**Reason for EP: Baby w/Cleft palate**  
- Double rental pump  
- Started Day 2  
- First pumped 8x/day  
- 6xs/day for 20 min (120 min total)  
- Daily yield: 21 oz  
- 1st am pump: 3.75 oz  

What conclusions can we reach?  
What recommendations should we give?

Case Report: Survey Mother #3  
**Reason for EP: Preemie w/Down**  
- Double rental pump  
- Started >24 hr  
- First pumped 6-8x/day  
- Then 7xs/day for 8-10 min (63 min total)  
- Daily yield: 96 oz  
- 1st am pump: 15 oz  

What conclusions can we reach?  
What recommendations should we give?

"When my baby wouldn’t latch on at the hospital, the LCs there tried to talk me out of pumping and bottle-feeding.  
“It wasn’t until an LC in private practice told me it was OK that I was finally able to relax and feel good about it.”

“I felt it was important for my baby to have the milk.  It didn’t matter how it got into her.”

“It was tough at first—it’s like doing ‘double-time’—but you feel better afterwards.  It doesn’t last forever, and it’s the best thing you can do.”
"I would recommend it. Some people said, ‘How can you do that?!’ Others called me ‘a saint.’"

"Every mother has her own way, which needs to be respected."

"This route is better than putting the baby on formula. My baby never had an earache."

- Pump choice (quality/fit)
- Pumping strategies
  - Early and often
  - #/length pumps/day to establish/maintain
  - Longest stretch
  - Role of milk ejection
- Individual differences
- How to adjust supply
- How to transition to breast or safely wean

Questions?
E-mail: nancymohrbacher@gmail.com
Reporting at:
www.NancyMohrbacher.com
www.BreastfeedingMadeSimple.com
Like me on Facebook!

Thank you!

©2012 Nancy Mohrbacher, IBCLC, FILCA