Step 2 Establishment and maintenance of milk supply

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What we already know are...
Hormone level during and after pregnancy
How to establish and maintain milk supply

• Ideally, an infant should be breastfed within the first 2 hours after birth.
• Pump within 1st few hours after birth
• 8 to 12 times per 24 hours.
• The degree of breast emptying is a crucial
• More than 8 breastfeeding sessions in a 24-hour period prevents the decline of prolactin before the next feeding

Spatz DL. J Perinat Neonatal Nurs. 2004
Pump early!

- Mothers who pumped within 1 hour had significantly more milk during the first 7 days.
- Significantly more milk at week 3.
- Significantly earlier lactogenesis stage II.

**Table 1: Milk volume (ml)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Volume of milk</th>
<th>Early initiation (n = 10)</th>
<th>Late initiation (n = 10)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>M</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Initial expression session</td>
<td>4.19</td>
<td>0.1</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Day 1</td>
<td>19.2</td>
<td>0.7</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td>76.7</td>
<td>2.2</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td>142.3</td>
<td>45.4</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Day 4</td>
<td>185.7</td>
<td>69.9</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>Day 5</td>
<td>282.0</td>
<td>85.8</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Day 6</td>
<td>322.0</td>
<td>191.9</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Day 7</td>
<td>355.0</td>
<td>188.8</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Total at 1 week*a</td>
<td>1374.7</td>
<td>608.1</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>3 weeks*b</td>
<td>613.0</td>
<td>267.2</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>6 weeks*c</td>
<td>451.0</td>
<td>209.95</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

*aSum of all milk volume for days 1–7.
*b24 h milk volume at 3 weeks.
*c24 h milk volume at 6 weeks.

Electric breast pump VS Hand expression

# Higher Fat Content in Breastmilk Expressed Manually: A Randomized Trial

<table>
<thead>
<tr>
<th></th>
<th>Manual expression</th>
<th>Pump expression</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean fat (g/100 ml)</td>
<td>2.3 + 1.27</td>
<td>1.84 + 1.36</td>
<td>0.024</td>
</tr>
<tr>
<td>Mean protein (g/100 ml)</td>
<td>2.06 + 0.98</td>
<td>2.03 + 0.89</td>
<td>NS</td>
</tr>
<tr>
<td>Mean CHO (g/100 ml)</td>
<td>5.39 + 0.92</td>
<td>5.39 + 0.78</td>
<td>NS</td>
</tr>
<tr>
<td>Mean energy (kcal/100 ml)</td>
<td>53.47 + 13.66</td>
<td>48.9 + 14.8</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Predictors of expressed breast milk volume

- 62 mothers, GA <34 weeks
- Participate in RCT trials of double VS single pump
- 47 provides data on milk expression until hospital discharge
Milk pumping records can improve breast milk feeding rates.
Improvement of Expressed Breast Milk in Mothers of Preterm Infants by Recording Breast Milk Pumping Diaries in a Neonatal Center in China

The cross coordinate represents the month and the vertical coordinate represents the constituent ratio of the feeding pattern. Blue bar is BMF (breast milk feeding), red bar is MF (mixed feeding), green bar is FF (formula feeding).

Galactagogues

- Dopamine antagonist
- Increase prolactin secretion
- Ex. Domperidone, metoclopramide, risperidone, phenothiazine, neuroleptics
# Domperidone study

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Dose</th>
<th>Result</th>
</tr>
</thead>
</table>
| Da Silva et al 2001    | Preterm (Mean GA 29 weeks) | 10 mg three times daily total 7 days | Milk volume increase 44.5% VS 16.6% (p<0.05)  
PL increase 89% VS 13.8% (p=0.008) 
No adverse events |
| Campbell-Yeo et al 2010| Preterm GA<31 wks    | 10 mg three times daily total 14 days          | Milk volume increase 267% VS 18.5% (p=0.005)  
PL increase 97% VS 17% (p=0.07)  
No adverse events |
| Knoppert et al 2013    | Preterm GA<33 wks    | 10 mg or 20 mg three times daily total 4 weeks | Increase in daily milk volumes within each group (p<0.01)  
Dose of domperidone 20 mg, 3 times daily was associated with clinical, but not statistically significant |
# EMPOWER Trial

**Table 2.** Outcomes on Days 14 and 28.

<table>
<thead>
<tr>
<th>Outcome Description</th>
<th>Group A</th>
<th>Group B</th>
<th>OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%) of mothers who achieved a 50% increase in milk volume on Day 14</td>
<td>35 (77.8%)</td>
<td>26 (57.8%)</td>
<td>2.56 [1.02, 6.25]</td>
<td>.04a</td>
</tr>
<tr>
<td>Missing Day 14 volumes</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. (%) of mothers who achieved 50% increase in milk volume on Day 28</td>
<td>31 (68.9%)</td>
<td>28 (62.2%)</td>
<td>1.35 [0.56, 3.22]</td>
<td>.51</td>
</tr>
<tr>
<td>Missing Day 28 volumes</td>
<td>4</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. CI = confidence interval; OR = odds ratio. Group A: 4 weeks of domperidone (*N* = 45). Group B: 2 weeks of placebo + 2 weeks of domperidone (*N* = 45).*

*aThis favors Group A over Group B.*

Asztalos EV. Journal of Hum Lact. 2017
# EMPOWER Trial

**Table 4.** Mean Percentage Volume Change on Days 14 and 28.

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (range) % volume change Day 0 to Day 14</td>
<td>254 (−100 to 2,129)</td>
<td>175 (−100 to 923)</td>
<td>.19(^a)</td>
</tr>
<tr>
<td>Mean (range) % volume change Day 15 to Day 28</td>
<td>22 (−68 to 200)</td>
<td>49 (−100 to 254)</td>
<td>.05(^a)</td>
</tr>
</tbody>
</table>

*Note.* Group A: 4 weeks of domperidone (\(N = 45\)). Group B: 2 weeks of placebo + 2 weeks of domperidone (\(N = 45\)).

\(^a\)Wilcoxon rank sum test was used.

Asztalos EV. Journal of Hum Lact. 2017
Key factors for success

- Time to initiate milk expression
- Methods of milk expression
- Milk volume during first 2 weeks
- Milk record chart
- Feeding at the breast
- NICU nursing lactation team
Lessons learned: Challenges

• Unable to initiate early milk expression
  • Not fully recovered from anesthesia
  • Maternal complications eg. hypertension, postpartum hemorrhage

• Maternal mental and physical stress

• Inadequate equipment
  • Hospital
  • Household

• No on-site lactation team
Lessons learned:

- Geographic disparity in mother vs baby treatment location
- Short maternity leave
Clinical practice guidelines

• Establishment
  • Written hospital policy
  • Give information regarding breast milk benefits and how to succeed in breastfeeding these vulnerable infants
  • Set goals with mother
  • Encourage mother to express milk regularly
  • Give clear instructions for milk expression and collection
  • Prepare proper equipment for milk expression
  • Establish hospital connections for milk transfer
Clinical practice guidelines

• Maintenance
  • Maternal support
  • Create relaxing atmosphere to express milk
  • Encourage mother to express and record milk volume regularly
  • Positive reinforcement from healthcare personnel
  • Set up on-site lactation team
  • Use indicator tools for early detection of milk inadequacy
Controversial issues
Methods of expression

**Hand expression**
- **Strength**
  - Low cost, no equipment need
  - Gentle
  - Might get more fat content
- **Weakness**
  - Maternal exhaustion
  - Lower volume
  - Technique dependent

**Electrical breast pump**
- **Strength**
  - Higher milk volume
  - Easy to use
- **Weakness**
  - Quality of pump matter
  - Sophisticate equipment
  - High cost
Geographic problems
Thank you