### Skin-to-Skin, Kangarooing & Early Contact

**Definitions**

- **Skin-to-Skin:** Placing the undressed infant (diaper may remain) on to a bare chest. Can be done in a chair, bed or bath.
- **Kangarooing:** Babies are placed skin-to-skin and tucked in with a cloth. "Kangarooing" is more likely used for infants, especially preemies, hospitalized in the neonatal intensive care unit.
- **Early Contact:** There are 3 Types
  - Birth—Occurring immediately postpartum ideally for a full hour or more and until the first successful breastfeeding is completed.
  - Very Early—within 30-40 min
  - Early—1-24 hours

### Gold Standard

Early contact or Skin-to-Skin that occurs at birth for a full hour or more and until the first successful breastfeeding is completed.

### Agenda

- Define Skin-to-Skin, Early Contact and Kangarooing
- List Several Risks to the Mother and Infant when Skin-to-Skin Contact does NOT occur.
- Review Several Studies that Support the Risks
- Present a Comprehensive Flow Chart about the Numerous Effects of Skin-to-Skin Care
Risks of Separation for Child

Infants Can Experience:
1. Difficulty Establishing Breastfeeding
2. Shorter Durations of:
   • Any Breastfeeding
   • Exclusive Breastfeeding
3. Increased Crying/Startling
4. Sucking Dysfunction
5. Hypothermia
6. Hypoglycemia
7. Lower Weight Gain
8. Higher Rates of Jaundice
9. Suboptimal Maternal-Infant Bonding
10. Fewer Expressions of Positive Feelings

Risks for Mothers

1. Risks Related to Shorter durations of breastfeeding
   - Chronic Diseases
   - Breast and Ovarian Cancer
   - Post Partum Depression
   - Loss of Contraception
2. Risks Related to Inadequate Suckling
   - Engorgement
   - Infections
   - Nipple Trauma
3. Increased Blood Loss/Anemia/Hemorrhage
4. Slower Involution

Review of Studies That Found Lower Breastfeeding Outcomes

1. Historical Early Studies 1970’s and the Most Current-2012
2. Various Types: Cochrane Review, RCT, cohorts, convenience samples etc.
A Study of factors Promoting and Inhibiting Lactation* (Cochrane RTC)
de Chateau et al., Develop. Med Child Neurol. 1977, 19, 575-584

Early Contact-15 min skin-to-skin at birth with suckling
Control-Baby wrapped after 30 min and placed in bed or by mother in cot

Both then separated for 3 days between every 4 hour feeds; increased contact after the 3rd day

The Importance of Immediate Postnatal Contact: Its Effect on Breastfeeding (Cochrane RTC)

- N=30
  - Early Contact 15-20 min
  - Control 5 min
  - Both:
    - Formula fed at HS (usually x 2)
    - Modified Rooming-in on the Second Day
    - Scheduled feeds every 4 hours followed by offering Supplementation with Glucose solution

Results

1. Breastfeeding Duration at 3 mo 58% vs 26%
2. 30% (6/20) mothers in the control found night feeds problematic vs. 0.05% (1/21) in the Early Contact

*Of the 8 Mothers in this study that did not have a happy maternal reaction all 8 had Weaned by 2 months.
The Importance of Immediate Postnatal Contact: Its Effect on Breastfeeding

Can Fam Physician Vol 25:11/79

Effects of Contact and Medications on Sucking at Birth and 2 hours Later N=78


Establishment of Breastfeeding

Crowell M et al Relationship between obstetrical anesthesia and time of effective BF. J Nurs Mid 30:150-55;1994

Sucking Technique and Its effect on Success of Breastfeeding

Incorrect Sucking vs. Correct Sucking and Breastfeeding Problems


88% vs. 57% (>31%)
*Milk insufficiency
*Sore Nipples
*Engorgement

Frequency of Breastfeeding and Hyperbilirubinemia

Yamuachi, Y. & Yamanouchi, Pediatrics, 1990. 86 p. 171-175.

RCT of early skin-to-skin contact

Gabriel Marin MA. Acta Paediatrica 2010 (99) pp 1630-1634

- 2 hours of Skin-to-skin immediately after birth
- Not Included Cochrane D/T Randomization of MD’s NOT Moms

<table>
<thead>
<tr>
<th></th>
<th>Control n=137</th>
<th>Treatment n=137</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive BF at D/C</td>
<td>84.7%</td>
<td>70%</td>
<td>0.01</td>
</tr>
<tr>
<td>Placental Expulsion</td>
<td>475.2 +/- 275.6 sec</td>
<td>408.7 +/- 244.8</td>
<td>0.05</td>
</tr>
</tbody>
</table>
OR’s for Exclusive BF During Hospitalization in Relation to Minutes of Skin-to-Skin Cohort study

Analysis adjusted for maternal infant-feeding intention at entry to maternity stay, mode of delivery (vaginal or cesarean), age, race/ethnicity, primary language, education, smoking status, maternal intrapartum analgesia/anesthesia, and hospital of birth. Mothers experiencing no skin-to-skin mother–infant contact were the reference group. (Bramson. J Hum Lact 2010 26: 130)

n = 21,842

Cochrane Review 2012

• Only RCT
• Looked at a wide variety of outcomes
• Early contact varied between studies
• Separation in control groups varied
• Did Sensitivity Analysis

### Cochrane Review Outcomes

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Study</th>
<th>N=</th>
<th>Statistical Analysis</th>
<th>Results 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast engorgement (pain, tension, hardness 3 d PP)</td>
<td>2</td>
<td>131</td>
<td>Std. Mean Difference (IV, Fixed)</td>
<td>-0.41 [-0.76, -0.06]</td>
</tr>
<tr>
<td>Exclusive Breastfeeding 3-6 months</td>
<td>3</td>
<td>149</td>
<td>Risk Ratio (M-H, Fixed)</td>
<td>1.97 [1.37, 2.83]</td>
</tr>
<tr>
<td>Breastfeeding 1-4 months</td>
<td>13</td>
<td>702</td>
<td>Risk Ratio (M-H, Random)</td>
<td>1.27 [1.06, 1.53]</td>
</tr>
<tr>
<td>Breastfeeding 1-4 months Sensitivity Analysis</td>
<td>12</td>
<td>642</td>
<td>Risk Ratio (M-H Random)</td>
<td>1.31 [1.16, 1.48]</td>
</tr>
<tr>
<td>Breastfeeding Duration in days: Sensitivity Analysis</td>
<td>6</td>
<td>264</td>
<td>Mean Difference (IV, Random)</td>
<td>63.73 [37.98, 89.50]</td>
</tr>
</tbody>
</table>

### Effects on Maternal Bonding

**RISK #3**

Effects on Maternal Bonding
Maternal Attachment

Participants
N=28

Extra Contact

<table>
<thead>
<tr>
<th>Methods</th>
<th>Interviews</th>
<th>Exam and Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st hr of Birth</td>
<td>At 20-30 Days PP</td>
<td>Scores Were Blinded</td>
</tr>
<tr>
<td>6 hrs more day X 3 Subsequent Days</td>
<td>1. Interviews</td>
<td>Exam: Detached During Exam vs. Standing and Hovering</td>
</tr>
<tr>
<td></td>
<td>2. Medical Exam of Baby</td>
<td>Film: Looked for Bonding, En face Activities, Maternal-Infant Bodily Contact</td>
</tr>
<tr>
<td></td>
<td>3. Filmed Bottle-feeding Observations</td>
<td></td>
</tr>
</tbody>
</table>


Long-term Effect on Mother-Infant Behaviour of Extra Contact During the First Hour Post Partum.
N=62

<table>
<thead>
<tr>
<th>Observation</th>
<th>Contact Primps</th>
<th>Routine Primps</th>
<th>Routine Multips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands Infant</td>
<td>10.9</td>
<td>2.9</td>
<td>11.7</td>
</tr>
<tr>
<td>Encompassing</td>
<td>9.3</td>
<td>5.3</td>
<td>10.9</td>
</tr>
<tr>
<td>Infant Crying</td>
<td>3.0</td>
<td>2.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>


### Three months observations

<table>
<thead>
<tr>
<th></th>
<th>Contact Primps</th>
<th>Routine Primps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klasse</td>
<td>1.1</td>
<td>.8</td>
</tr>
<tr>
<td>Ein Faco</td>
<td>3.1</td>
<td>.8</td>
</tr>
<tr>
<td>Infant Crying</td>
<td>.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Infant Smiling and/or Laughing</td>
<td>3.0</td>
<td>3.3</td>
</tr>
</tbody>
</table>

### Same Study at 3 Years

<table>
<thead>
<tr>
<th></th>
<th>Breastfeeding</th>
<th>Child Rearing Practices</th>
<th>Behavior Differences</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 Months Longer</td>
<td>Different up to 12 Months</td>
<td>More Laughing and Smiling of Dyads</td>
<td>More Conflicts But More Were Solved</td>
<td>NS for Girls</td>
</tr>
<tr>
<td>Control n=18 and Extra Contact n=20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Early Contact, Social Support, and Mother-Infant Bonding

Pediatric 1983 Jul; 72 (1): 79-83

N=59

<table>
<thead>
<tr>
<th></th>
<th>Extra Contact</th>
<th>Routine Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Social Support</td>
<td>30.2 +/- 9.7</td>
<td>29.4 +/- 7.3</td>
</tr>
<tr>
<td>Lower Social Support</td>
<td>34.2 +/- 10.1</td>
<td>23.0 +/- 6.9</td>
</tr>
</tbody>
</table>
Similar in Response Despite Parity

Affectionate Contact Scores of Women with Lower or Higher Social Support

<table>
<thead>
<tr>
<th>Parity</th>
<th>Extra Contact</th>
<th>Routine Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primipous</td>
<td>33.1 +/- 9.6</td>
<td>23.7 +/- 6.3</td>
</tr>
<tr>
<td>Multiparous</td>
<td>32.4 +/- 10.6</td>
<td>26.6 +/- 8.4</td>
</tr>
</tbody>
</table>

Short-term effects of early suckling and touch of the nipple on maternal behavior.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Control</th>
<th>Early Contact</th>
<th>P &lt; value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talked to Infants</td>
<td>18/25 (72%)</td>
<td>31/31 (100%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Mean Time in Nursery</td>
<td>1212 minutes</td>
<td>990 minutes</td>
<td>0.01</td>
</tr>
<tr>
<td>Range of Time in Nursery</td>
<td>580-2070 minutes</td>
<td>370-1350 minutes</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Baby Friendly Initiative Study

- USSR study
- (12 year study 6 years before BFI and 6 years after)
- Decreased Infant Abandonment

Abandonment Rates Before During and at Completion

Conclusion:

+ Early mother-infant contact with suckling/rooming-in may provide a simple, low cost method for reducing infant abandonment.
Cochrane Review Outcomes
Maternal Affect/Bonding

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Study</th>
<th>N</th>
<th>Statistical Analysis</th>
<th>Results</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal positive affective involvement and responsiveness 12 mo PP</td>
<td>1</td>
<td>61</td>
<td>Mean Difference IV, Fixed</td>
<td>1.90 [1.14, 4.94]</td>
<td></td>
</tr>
</tbody>
</table>

Only 1 RCT Study Evaluated

OTHER RISKS/BENEFITS

Long-term Effect on Mother-Infant Behaviour of Extra Contact During the First Hour Post Partum.
N=62

<table>
<thead>
<tr>
<th>Time</th>
<th>Observation</th>
<th>Infant Crying</th>
<th>Infant Smiling or Laughing</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Infant Crying</td>
<td>1.0</td>
<td>N/A</td>
</tr>
<tr>
<td>First</td>
<td>Infant Smiling or Laughing</td>
<td>0.2</td>
<td>N/A</td>
</tr>
<tr>
<td>3 Month</td>
<td>Infant Crying</td>
<td>3.0</td>
<td>N/A</td>
</tr>
<tr>
<td>3 Month</td>
<td>Infant Smiling or Laughing</td>
<td>3.0</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Birth-related Fatigue in 34-36 week preterm neonates: Rapid recovery with very early kangaroo (skin-to-skin) care.
• Convenience sample w/ 5 min apgars ≥ 6
• 2 were included with grunting respirations

EGA 34-36 wk and Skin-to-Skin for the 1st 6 hrs After Birth
N=6
<table>
<thead>
<tr>
<th>Temperature</th>
<th>Respirations</th>
<th>Heart Rate</th>
<th>Discharge</th>
<th>Breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose Rapidly to WNL</td>
<td>O₂ Saturation WNL*</td>
<td>WNL</td>
<td>All within 48 hours</td>
<td>ALL at Discharge</td>
</tr>
</tbody>
</table>

*With Few Insignificant Exceptions

Thermoregulation
Initial and 2 Hour Values
N=50 BF within 30 minutes and with a LATCH score of 5 or higher.

Skin-to-Skin Contact and Newborn Temperature
• For about 20 min babies were separated and even bathed
• Then were skin-to-skin for 2 hours
• Rated one of the Better studies by Cochrane Review

RCT of early skin-to-skin contact
Gabriel MA. Acta Paediatrica 2010 (99) pp 1630-1634
• 2 hours of Skin-to-skin immediately after birth
• Excluded from Cochrane Review Because MD’s NOT Moms were Randomized

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<th>Control n=137</th>
<th>Treatment n=137</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Stability at w/ in 5 min</td>
<td>0.22 ±0.52°C</td>
<td>0.07 ±0.58°C</td>
<td>0.001</td>
</tr>
</tbody>
</table>

n=44 Skin-to-skin
n=44 Mother’s arms
n=88 Nursery
Cochrane 2012 Review Outcomes For Temperature

<table>
<thead>
<tr>
<th>Study</th>
<th>Mean Comparison of Glucose Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
</tr>
<tr>
<td>Initial Glucose mg/dl</td>
<td>68.68</td>
</tr>
<tr>
<td>2 Hour Glucose mg/dl</td>
<td>71.84*</td>
</tr>
</tbody>
</table>

*Infant’s fed 15 cc formula and 15 cc 5% glucose water

Christensson Studies Rated Slightly Less Biased Than the Villalon Study

<table>
<thead>
<tr>
<th>Cochrane Hypoglycemia Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
</tr>
<tr>
<td>Not crying for &gt;1 minute</td>
</tr>
<tr>
<td>Lower Heart rate 75-120 min Post birth: Sensitivity analysis</td>
</tr>
<tr>
<td>Lower Respiratory rate 75-120 min Post birth: Sensitivity analysis</td>
</tr>
</tbody>
</table>
Summary

Mom & Baby: Enhanced Maternal Attachment and Bonding

Infant Benefits

- Happier
- Less likely:
  - Startle
  - Cry
- Decreased Risk:
  - Hypoglycemia
  - Hypothermia
  - Jaundice
- Increased likelihood:
  - Correct and Effective Sucking

Correct Sucking Prevents:

1. Nipple Trauma
   - Maternal pain
   - Engorgement
   - Subsequent infections
     > Thrush (nipple and ductal)
     > Mastitis
     > Abscess
2. Delayed lactogenesis and insufficient milk supply
3. Poor milk transfer and subsequent poor weight gain
   - Insufficient breastmilk jaundice
   - Hypoglycemia
4. Infant supplementation
5. Premature weaning/Lowered durations of breastfeeding
### Duration Benefits

**Infant**
- Lower Risks
  - Hospitalization
  - Acute/Chronic illnesses
  - SIDS
- Lower rates
  - Obesity
  - Overweight

**Mother**
- Increased Weight Loss
- Decreased Risk:
  - Diabetes
  - Heart Disease
  - Hypertension
  - HTN
  - Breast & Ovarian Cancer
  - PPD
  - Rheumatoid Arthritis

AAP policy statement: www.pediatrics.org/cgi/doi/10.1542/peds.2011-3552

### Relative Risk of Formula Feeding v.s. Breastfeeding
(Adapted from Am Fam Physician 2006;64:2095-100,2103-4.)

<table>
<thead>
<tr>
<th>Illness</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies, eczema</td>
<td>2 to 7 times¹</td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>2.6 to 5.5 times⁶</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>1.5 to 1.9 times⁷</td>
</tr>
<tr>
<td>Diabetes, type 1</td>
<td>2.4 times²</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>3 times¹</td>
</tr>
<tr>
<td>Hodgkin’s lymphoma</td>
<td>1.8 to 6.7 times⁹</td>
</tr>
<tr>
<td>Otitis media</td>
<td>2.4 times¹</td>
</tr>
</tbody>
</table>

Better cognitive development in children¹³

### The Decision to BF in the US: Does Race Matter?

*Pediatrics* Vol. 108 No. 210/01, pp.291-296

- **N** = 24,566 all single live-births from 1988 &1995
- Analysis of *infant mortality* indicated that breastfeeding accounts for the race difference in infant mortality in the US at least as well as LBW.
- Infants that are *ever* breastfed are 80% less likely to die before age 1 than are *never* breastfed infants.

Slide by Christine Betzold NP MSN
Skin to Skin and Rooming-In

Earlier Breastfeeding Establishes Labio-Colonic Reflex Passage of Meconium Decreased Circulation of Bilirubin Lowered Risk of Jaundice Increased Digestive Enzymes Improved Digestion Decreased Risk of Hypoglycemia Improved Weight Gain Decreased Crying, Sweating, Startling Increased Sleeping and Cardiovascular Stability Decreased Energy Usage Lower Risk of Hypothermia

Questions?