The Sacred Hour
Uninterrupted
Skin-to-Skin Contact
Immediately after Birth

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Acknowledgement
Nils Bergman, MD, PhD
Global Advocate
Single-mindedly raising awareness of the critical importance
of keeping babies together with their mothers
in skin-to-skin contact after birth
www.kangaroomothercare.com

Objectives

- Know 5 benefits of early postpartum skin-to-skin contact:
  1) Improves physiologic stability for mother and baby
  2) Increases maternal attachment behaviors
  3) Protects baby from negative effects of separation
  4) Supports optimal infant brain development
  5) Increases breastfeeding rates and duration

- Know 9 instinctive stages of newborn behavior when skin to skin with mother that lead to breastfeeding:
  1) birth cry, 2) relaxation, 3) awakening, 4) activity,
  5) resting, 6) crawling, 7) familiarization, 8) suckling, 9) sleep

- Know 4 practical ways to change the culture of early
  skin-to-skin contact to increase breastfeeding rates:
  1) Educate staff
  2) Change protocols
  3) Engage mothers, partners, and families
  4) Benchmark success

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The womb is the natural habitat for all unborn mammals - where development begins.

- The uterus, placenta, and umbilical cord provide:
  - Warmth
  - Protection
  - Nutrition
  - Oxygenation

The mother’s body is the natural habitat for all newborn mammals - where development continues.

- The mother’s chest and mother’s milk provide:
  - Warmth
  - Protection
  - Nutrition
  - Support for optimal oxygenation
  - Much, much more...

Natural Habitat for All Newborns

Skin-to-Skin Contact with Mother Provides Physiologic Stability

- Stabilizes respiration and oxygenation
- Maintains glucose levels (reduces hypoglycemia)
- Stabilizes blood pressure
- Reduces stress hormones
- Reduces crying (increases quiet alert state)
- Increases early breastfeeding initiation
- Maintains temperature - reduces hypothermia

Martinez, NeoReviews, 2007; Moore, Cochrane Database, 2007
Temperature Stability

Prof Peter Hartmann, UWA

Temperature of mother’s chest will
- Increase by 2 degrees Celsius if baby is too cool
- Decrease by 1 degree Celsius if baby is too hot

Individualized Thermal Synchrony
Each breast independently regulates baby’s temperature

Dads Can Give Skin-to-Skin Care
- Babies delivered by cesarean section
- Placed in an cot or skin to skin with father
- If skin to skin with father
  - Increased glucose level
  - Increased temperature
  - Decreased crying

Christenson, Acta Paediatr, 1996

Thermal Synchrony Challenge

Even Future Dad’s Can Help
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  3. Awakening
  4. Activity
  5. Resting
  6. Crawling
  7. Familiarization
  8. Suckling
  9. Sleep

**Attachment Hormones**

- **Attachment is biologically primed**
- **Biochemical activators** in our brain’s reward circuitry
  - Trigger maternal caregiving
  - Increased by skin-to-skin contact
    - Endogenous opioid peptides
    - Estrogen and progesterone
    - Prolactin
    - Vasopressin
    - Dopamine
    - Oxytocin

**Oxytocin – The Love Hormone**

- Contracts uterus (decreases postpartum hemorrhage)
- Releases mother’s milk-colostrum (letdown reflex)
- Increases relaxation (reduces stress)
- Increases maternal caregiving behaviors
- Increases maternal bonding
- Increases facial recognition
- Increases attraction
- Increases monogamy (in rat studies)

**Liquid Trust**

oxytocinnasalsprays.com

“The only Oxytocin Spray in the world designed to increase confidence, trust and attraction”

**Attachment and Bonding**

- **Multiple studies** - mid-1970s through the early 1980s
  - Examined the effect of early postpartum skin to skin
- **Standard practice**:
  - Mothers briefly viewed newborns at birth
  - Babies taken to nursery while mother recovered
  - Brought to mothers every 4 hours for feedings

**Attachment and Bonding**

- **Study interventions**:
  - Skin-to-skin contact after birth for brief periods
  - Ranging from 15-60 minutes

Attachment and Bonding

- Results lasted well beyond the neonatal period
  - At 3 months - more time kissing & looking at baby’s face
  - At 1 year - more holding, touching, positive speaking
  - More follow-up appointments
  - Increased breastfeeding duration

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Mother-Baby Dyad
a
Single Psychobiological Organism

Mother-Baby Separation
- Mother and offspring live in a biological state that has much in common with addiction.
- When they are parted the infant does not just miss its mother.
- It experiences a physical and psychological withdrawal from a host of her sensory stimuli...not unlike the plight of a heroin addict who goes "cold turkey."

Gallagher, Motherless Child, 1992

From the baby’s perspective
Separation is Life threatening

Baby’s Response to Separation
- Protest - universal infant response to separation
  - Being in the wrong place
  - Outside the newborn’s natural habitat
- Loud cries and intense activity
  - Purpose: attract mother’s attention
  - Instinctive need to be rescued

Protest - frantic crying
- Impairs lung functioning
- Increases intra-cranial pressure
- Jeopardizes the closure of the foramen ovale
- Initiates a cascade of stress reactions


Baby’s Response to Separation

Skin-to-Skin Care vs. Separation

<table>
<thead>
<tr>
<th></th>
<th>STS babies</th>
<th>Cot babies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cries</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>Seconds cried</td>
<td>70</td>
<td>2839</td>
</tr>
</tbody>
</table>

Christensson, Acta Paediatrica, 1992
**Despair Response to Separation**

- **Despair - universal response to prolonged separation**
  - Baby gives up - cries eventually stop
  - Intense movement ceases - infant becomes still
  - Instinctive adaptation to avoid attracting attention

- **All systems slow down for prolonged survival**
  - Temperature drops (hypothermia)
  - Heart rate decreases (bradycardia)
  - Metabolism slows (hypoglycemia)

**Protest-Despair Responses**

- Protest is **NOT** harmful to the developing brain unless it is prolonged and repetitive

  "Despair “ does harm!

**Non-human primates separated from mothers**

- **Protest-despair response leads to dysregulation**

  The welfare of non-human primates used in research
  Adopted on 17 December 2002

1. **Mandate**

   The EU Commission has asked the Scientific Committee on Animal Health and Animal Welfare to prepare a report on the welfare of non-human primates used for experiments. The Scientific Committee, taking into account the most recent scientific information, should propose how the welfare of these animals can be improved, and identify the most important issues within the EU.

**Recommendation for research primates:**

- **No separation from mothers for 6 -18 months**
- Otherwise primates become unfit for research

According to the guidelines of the IACUC (1993 a,b), young individuals should not be separated from their mothers at an early age (i.e. less than 6 months). They should remain in contact for one year to 18 months in monkeys like macaques, baboons and capuchins. The guidelines of the Primate Vaccine Evaluation Network also state that infants should not be weaned before 6 months and recommended separation at 12 months old (Poole and Thomas, 1995).

**Separation of Piglets from Mothers**

- **Days 3 to 11:** Piglets separated from mother for only 2 hours then returned to mother each day
- **Days 12 and 56:** Results measured
  - Weight
  - Behavior
  - Immune parameters
  - Hormonal parameters
  - Brain parameters measured
Mare-Foul Attachment


- Horses as a model of maternal-infant attachment
  - Single offspring
  - Early preferential bonding/attachment behaviors
  - Faster development
    - Easier to study long-term effects
    - Birth to adolescence in 12 months

Immediate Results

- Struggled at first (protest)
  - Trembled, increased respirations
  - Then became motionless (freeze/despair)
    - With high tone
- After release
  - Delayed first standing and first suckling
  - Inappropriate suckling patterns
    - Chewed on teet
    - Made sucking motions in air or towards handler

Kanitz, Brain, Behavior, and Immunity, 2004

Results

- Decreased weight gain (218 vs. 244 g/d)
- Decreased activity levels
- Increased CRH activation in hypothalamus
- Higher plasma basal ACTH and cortisol levels
- Increased glucocorticoid receptors
- Suppression of immune function
- Higher interleukin concentrations in limbic area

Separation of Rodents from Mothers

- Days 8 to 10: Separated from mother for only 10 minutes twice daily then returned to mother.

- Results: Changes in brain function
  - Altered aminergic function in hippocampus and amygdala
  - Modulated by hearing mother’s voice

Horses as a model of maternal-infant attachment

- Single offspring
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Control animals

- Left undisturbed with mother after birth until first suckling

Experimental animals

- Handled by human in mother’s presence for 1 hour before being allowed to suckle

N Bergman

N Bergman

Intermediate Results

- All foals kept with their mother in same pasture
- Experimental foals showed signs of insecure attachment
  - Stayed closer to their mothers
  - Played less with their peers
  - Less likely to be explore novel objects
  - More aggressive towards their peers

Animal and Human Studies

- “It is a serious mistake to assume that the principles derived from careful animal studies do not apply to human infants.
  The risk of suppression or disruption of needed neural processes...is very significant and potentially lasts a life time.”

Graven, Clinics in Perinatology, 2004

Long-term Results

- All foals weaned at 7 months (temporary separation)
- Experimental foals
  - Less adaptable to change
  - Longer duration of stress vocalizations
  - 4 days vs. 2 days
- All foals separated from mothers permanently at 1 year
- Experimental foals
  - Kept more distant from mothers
  - Showed more aggressive behavior toward peers

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Touch and Brain Development

- In early postnatal life, maintenance of critical levels of tactile input...is important for normal brain maturation.

Schore, Infant Mental Health Journal, 2001

Newborn Brain Development

- Areas of the amygdala...are in a critical period of maturation...in the first two months after birth

- Amygdala - Limbic System
  - Emotional learning
  - Memory modulation
  - Activation of sympathetic nervous system

- Skin-to-skin contact activates the amygdala via the prefronto-orbital pathway

Schore, Infant Mental Health Journal, 2001
Drs. William Mason and Gershon Berkson studied the effects of touch and movement. They compared baby monkeys raised with touch but no opportunities for regular movement, touch and movement, or both touch and movement required for normal brain and social development. Lack of touch and movement led to pathological violence.

James Prescott from NICHD & NIH 1960-1980s found that the most important senses for normal brain development are touch and movement (vestibular). He protected against symptoms of SSADS, SomatoSensory Affectional Deprivation Syndrome.

"SSAD is the process of impaired or failed mother-infant bonding that results from a deficiency in the infant’s sensory stimulation via touch, body movement, smell, taste and breastfeeding. Virtually all infant mammals are vulnerable to the emotional-behavioral disorders that are induced by this somatosensory deprivation. The specific emotional-behavioral disorders that result vary by species and have their influence throughout the lifespan of the individual."

James W. Prescott, 1996
Infant carrying and direct body contact is essential for an infant’s development. 

Attachment and Regulation

- Attachment relationships are formative because they facilitate development of the newborn brain’s self-regulatory mechanism.

Attachment and Regulation

- The regulatory function of the newborn-mother interaction is an essential promoter of
  - Synaptic connections
  - Functional brain circuits
- Mechanism for learning self-regulation

Bonding Shapes Culture

- In 49 primitive cultures: Byrne's (1966) work showed that the carrying of babies during the first year was a key factor in predicting peaceful cultures.
- In 26 primitive cultures: breastfeeding babies over 2.5 years predicted low or absent suicide.
- Sensitive period for brain development: pleasurable touch and movement protect against depression and violence. 

Mother is Baby’s Regulator

- “The dyadic interaction between the newborn and the mother constantly controls and modulates the newborn’s exposure to environmental stimuli and thereby serves as a regulator of the developing individual’s internal homeostasis.”

Skin to Skin and Self-Regulation

- Infants who spend the first 1-2 hours skin to skin have better self-regulation one year later.

Attachment and Regulation

- Synaptic connections
- Functional brain circuits
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Skin to Skin and Self-Regulation

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Attachment and Brain Structure

- "Early interpersonal events positively and negatively impact the structural organization of the brain."
- "The brain is designed to be sculpted into its final configuration by the effects of early experiences."
- "These experiences are embedded in the attachment relationship."

Schore, Infant Mental Health Journal, 2001

Attachment as Brain Organizer

“If the attachment relationship is indeed a major organizer of brain development …

... then the determinants of attachment relationships are important far beyond the provision of a fundamental sense of safety or security.”

Fonagy, Attachment and Human Development, 2005

The Bottom Line

Whatever supports mother-infant attachment, supports infant brain development.

Skin to Skin Supports attachment -> Brain development

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Breastfeeding Behaviors

- All mammals have a set sequence of behaviors at birth - all with a single purpose - to BREASTFEED!
In all mammals, the newborn is responsible for initiating breastfeeding, not the mother!

Being warm, fed and protected are intricately and inseparably linked to being in the right place.

Alberts, Acta Paediatrica, 1994

When skin to skin, the newborn displays an impressive and purposeful motor activity which, without maternal assistance, brings the baby to the nipple.

Alberts, 1994

Newborn Breastfeeding

Habitat Determines Behavior

The “Right Place” is Here

Images courtesy of Prof Peter Hartmann, UWA

N Bergman

N Bergman
PLACE-DEPENDENT COMPETENCE
Requires Skin-to-Skin Contact

All newborn mammals
know how to breastfeed

Babies Initiate Breastfeeding!

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Changing The Practice Of Skin-to-skin Contact In The First Hour After Birth To Increase Breastfeeding Rates

A Quality Improvement Project
Loma Linda University Medical Center
Loma Linda, CA, USA

The Problem
- Rates of exclusive breastfeeding at time of discharge initially increased after being designated a Baby Friendly Hospital
- Rates steadily decline to a low of 28% after grant runs out

Rates of exclusive breastfeeding at time of discharge

2008 2009 2010 2011 2012
46% 51% 49% 28%

Joint Commission Perinatal Care Core Performance Measures
- PC1 Elective Delivery before 39 Weeks Gestation
- PC2 Cesarean Delivery
- PC3 Antenatal Steroids
- PC4 Health-care Associated Blood Stream Infection in Newborns
- PC5 Exclusive Breast Milk Feeding

Baby Friendly Hospital Initiative
- The Ten Steps to Successful Breastfeeding
  1. Have a written breastfeeding policy...
  2. Train all health care staff in skills necessary...
  3. Inform all pregnant women about benefits...of breastfeeding...
  4. Help mothers initiate breastfeeding within one hour of birth
  5. Show mothers how to breastfeed...
  6. Give newborn infants no food or drink other than breastmilk, unless...
  7. Practice “rooming in”...24 hours a day
  8. Encourage breastfeeding on demand
  9. Give no pacifiers or artificial nipples to breastfeeding infants
  10. Foster the establishment of breastfeeding support groups...

Baby Friendly Hospital
- Term babies are usually placed skin to skin with mother sometime during the first hour after birth
- However most babies were left there only a brief time

Skin-to-skin contact was often interrupted before the first breastfeeding