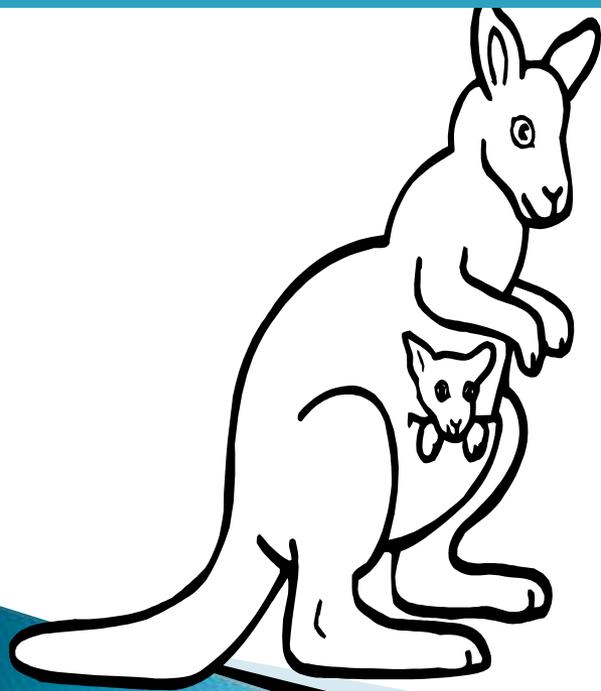


Health Outcomes of Kangaroo Care ☺



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Objectives

- ▶ To gain a ‘snapshot’ understanding of the physiologic, behavioral, and other health outcomes of Kangaroo Care
 - ▶ To provide you with in-depth evidence of 3 public health oriented outcomes of Kangaroo Care: Breastfeeding, mortality, and brain development/disability.
 - ▶ To make recommendations for use of KC
- 

What is the evidence behind KC?



Evidence Behind Kangaroo Care

- ▶ The available evidence; 324 Full TERM articles and 375 manuscripts on KC with preterm infants) clearly show improved health outcomes
- ▶ –for infants, mothers, fathers, families
- ▶ –for extremely preterm, preterm, late preterm infants, and for
- ▶ –full term infants
- ▶ The KC Annotated Bibliography is FREE from United States Institute for Kangaroo Care (USIKC2010@gmail.com)

324 manuscripts on KC with full term infants-
3 Cochrane Meta-Analyses (Anderson et al. 2003;
Moore et al., 2007, 2009); 3 other meta-analyses
(Carfoot et al., 2006; Ludington-Hoe & Dorsey, 1998;
Mori et al., 2011



Kangaroo Care Full term Delivery Room

- ▶ Very early KC kept infants warm, promoted bonding, and initiated breastfeeding and promoted longer duration and exclusivity of breastmilk(Moore & Anderson, 2007; Carfoot et al., 2006)



Full Term /Meta-Analyses

- ▶ FULLTERM infants: effect of early KC on **breastfeeding** outcomes. Early KC infants had...
- ▶ Better BF outcomes up to 3 months postbirth
- ▶ Better BF duration up to 12 months postbirth,
- ▶ Maintained temperature, re-warmed faster
- ▶ Less crying,
- ▶ Higher blood glucose, and
- ▶ Lower RR.
- ▶ Anderson et al., 2003. Early skin-to-skin contact for mothers and their healthy newborn infants. *The Cochrane Library, Issue 2*, 2003, and confirmed in Moore et al., 2007, 2009.

Meta- Analyses... Fullterm

- ▶ **KC within 30** minutes of birth
- ▶ More initiated BF and breastfed longer, stayed warm, cried less
- ▶ More exclusivity of BF
- ▶ *Moore, E.R, Anderson, G.C. & Bergman, N. 2007 . Early skin-to-skin contact for mothers and their healthy newborn infants. The Cochrane Database of Systematic Reviews, 2007, Issue 3*



Birth Kangaroo Care



- ▶ JCAHO reviews are now measuring exclusivity of BM feedings by discharge and will begin monitoring how soon after birth Kangaroo Care begins. (by 2012) (should be less than 1 minute)



Kangaroo Care with Fullterm Infants

- ▶ Bonding and interactions improve for 1 year and up to 16 years (Bystrova, et al., 2010; Gordon et al,2010)
- ▶ Infant physiology
 - Thermoregulation
 - Cardiorespiratory stability
 - Metabolism & hormones better
 - Less Pain
 - Neurobehavioral development
- ▶ Heart repairs occur sooner & better Recovery (Harrison, 2010; Torowiz, 2010)



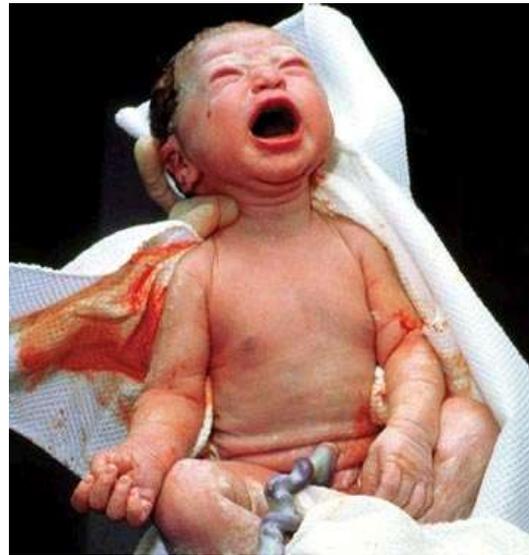
Impact of Paternal KC...

- ▶ –Fathers attach better
- ▶ –Fathers feel more responsible for infant
- ▶ –Infant's have better depth of respiration with Paternal KC than when in crib/incubator
- ▶ –Interactions with father are better after KC has occurred
 - (Christiansson et al. 1995; Erlandsson, et al. 2006, 2008;
 - Ludington-Hoe et al., 1992)



Stress and crying

- ▶ For the fullterm infant separated from his mother over the first two days of life, he will have pathogenic levels of salivary cortisol
- ▶ (McDermott, 2003—available from Gene Anderson 216-368-3343).



KC environment alters effects of stress

- ▶ Stress rewires the brain so there are multiple levels of disruption and disorganization in infants' physical systems.
- ▶ (Calkins & Hill 2007 pg 240)



Kangaroo Care



Pleasant touch causes release of neuropeptides, especially opioids (Weller & Feldman, 2003). Opioids reduce cortisol release. KC is a source of pleasant touch; pleasant touch directly stimulates limbic area of brain (Olausson et al., 2002) causing decrease in stress hormones

Health Outcomes

- ▶ Maternal Physiologic Outcomes
 - ▶ –Less episiotomy repair pain(Marin–Gabriel et al., 2009; Walters et al., 2007 [suggested it])
 - ▶ –faster delivery of placenta with concomitantly less blood loss
 - ▶ –less postpartum anemia
 - ▶ –faster maternal involution and less lochia (Dordevic et al., 2008)
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Behavioral Health Outcomes

- ▶ **Less crying and colic** (Moore et al., 2007; Okan et al., 2010; Saeidi et al., 2010)
- ▶ **Less pain** with heel sticks, shots, venipunctures (Cong et al., 2009; 2011; Chermont et al., 2009; Kashaninia et al., 2008).
- ▶ Better **breastfeeding** outcomes (Moore et al., 2007) and **BETTER MILK PRODUCTION** (Durand)
- ▶ Better **interactions** with parents (Neu et al. Bystrova et al., 2009; Moore et al., 2007; Neu & Robinson, 2010; Velandia, Matthiesen, Uvnas-Moberg, & Nissen, 2010)

The KC Microenvironment

- ▶ Continuous,
- ▶ Non-phasic,
- ▶ Gentle human touch that is not noxious, not medically oriented and is pleasing to the infant (Olausson et al., 2002) and to the parents (Affonso et al. 1989. 1993).
- ▶ Maternal scent, voice, HR
- ▶ Containment, warmth



Benefits of KC for Preterm Infants

- **Regulates infant temp , prevents hypothermia, warmer than in any incubator or anywhere else (Ludington–Hoe et al. 2000; Moore et al., 2007)**
- **Cardiorespiratory stabilization** Fohe et al., 2000),
- **75% fewer apnea spells and**
- **less disturbed breathing**
- **(Ludington–Hoe & Dorsey, 1999)**
- **enhanced weight gain by 1.6 g**
- **/day (Conde–Agudelo 2011),**



Health Outcomes for Preterms

▶ Infant Physiologic Outcomes:

-
- **Less stress** Hypothalamic–Pituitary–Adrenal activation (cortisol, pro-inflammatory cytokine activation) (Neu et al. 2010; Cong et al. 2009, Morelius et al., 2005; Takahashi, Tamakoshi, Matsushima, & Kawabe, 2011; Collados–Gomez, Aragonés–Corral, Contreras–Olivares, García–Feced, & Vila–Piqueras, 2011)
- **Better autonomic nervous system control** (Cong et al., 2009; 2010, 2011, in press),
- **Fewer infections** (Conde–Agudelo et al., 2011) and **better immune function** (Abouelfetoh et al., 2011)
- **Better gastric hormone regulation** (gastrin, somatostatin) (Ludington–Hoe et al., 2008, Ludington–Hoe, 2010)
- **Fewer transfusions** (Ludington–Hoe et al., 2008; Ludington–Hoe, 2010)

Benefits of KC for Preterm Infants

- Improved brain maturation (3 hours in KC = 2 weeks in incubator) (Ludington-Hoe et al., 2008)
- Promotes self-regulation (Feldman et al., 2003; Neu et al., 2010)
 - Better emotional and cognitive regulatory abilities and more efficient arousal at 3 & 6 months (Feldman et al., 2002)
 - Improved attachment (Tessier et al., 1998)
- Decreases infant's length of stay in the NICU by 2.4 days in US, by 10-14 days in Europe (Conde-Agudelo et al., 2011)

Benefits of KC for Mothers of Preterm Infants

- ▶ Sleep better
- ▶ Have a deeper sense of well-being because they are doing something for their premature infant
- ▶ Increased BM production
- ▶ Decrease fear and anxiety



Public Health

- ▶ Kangaroo Care reduces **mortality** (Conde–Agudelo et al, 2011; Lawn et al. 2010)
 - ▶ So well, that KC is one of the 5 essential elements of newborn care for ALL infants (WHO, Darmstadt et al., 2008)
 - ▶ European Hospitals are measuring their OB/Newborn care by its inclusion, starting in Belgium and Spain – routine in Scandinavia
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Public Health: Development

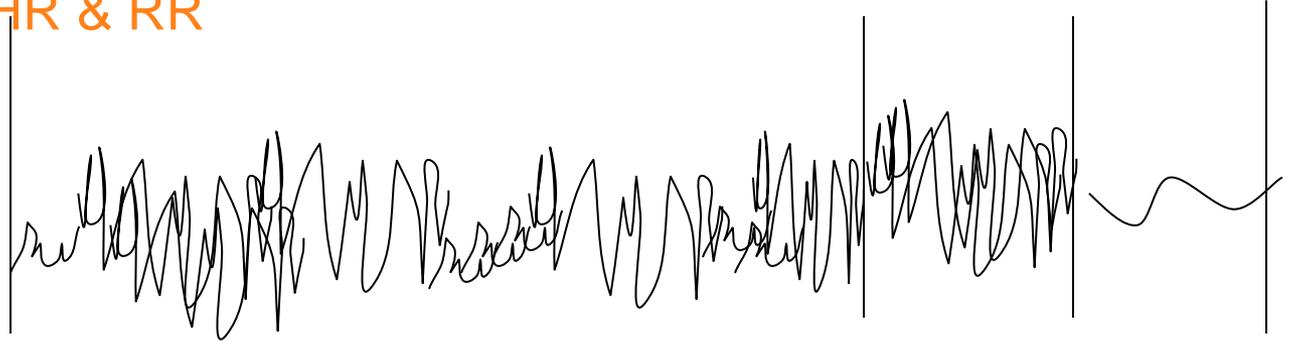
- ▶ **KC improves mental development** (Charpak et al., 2001; Feldman et al., 2002; Kirsten et al., 2001; Neu et al., 2010; Ogi et al., 2001; Ohgi et al., 2002, Conde-Agudelo et al. 2011)
- ▶ **KC increases brain oxygenation** (Martin & Ludington-Hoe, 2010)
- ▶ **KC decreases brain activation from stress, letting cerebral blood flow be stable** (Martin & Ludington-Hoe, 2010)
- ▶ **KC increases brain's maturation by weeks and in 5 specific sensory areas** (Scher et al., 2009; in press) **and Complexity** (Kaffashi et al., in press)





In the NICU, infants demonstrate a very chaotic version of this cycling pattern. Cycling is needed for normal development. Quiet Sleep is needed to produce Active Sleep.

chaotic pattern of activity,
quiet HR & RR



Pre-KC:

- ▶ Same as baseline pattern

In KC:

- ▶ Normal cycling & less magnitude in 2nd cycle
- ▶ Few, if any, tachycardic/bradycardic
- ▶ HR –variation is within normal limits
- ▶ Non-chaotic pattern

Test Conditions



Incubator Group



SSC Group

Developmental Outcomes are result of SLEEP

- ▶ Sleep is the window to the brain.
 - ▶ Infants should have more quiet sleep than active
 - ▶ Need good quiet sleep to have good quality active sleep
 - ▶ Increasing lengths of quiet sleep is sign of brain's development
 - ▶ Cycling of sleep is important.
 - ▶ KC DOES ALL OF THESE (Ludington-Hoe et al., 2006, Scher et al., 2009)
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In US: 2 big goals: BF and Sleep

- ▶ Implementing KC on a broad and routine basis should be a standard care for better health throughout life.
- ▶ Think developmental origins of later disease & Kangaroo Care!!!!



Remember... Persistence does pay
off

