Neurologically Supportive Labor ward and NICU Environments

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EVIDENCE FOR SAFETY OF INCUBATORS ...

DOES NOT EXIST !!!

EVIDENCE FOR DANGER OF INCUBATORS ...

DOES EXIST !!!

INCUBATOR

SEPARATION

DISSOCIATION

DIS-REGULATION

NEUROPATHOLOGY

SEPARATION VIOLATES THE INNATE AGENDA OF MOTHER AND NEWBORN

MATERNAL-INFANT SEPARATION IS ABUSE
Schore

Critical period:

“Early interpersonal events positively and negatively impact the structural organisation of the brain.”

Frontal alpha EEG asymmetry = a measure of temperament (i.e. trait emotion).

an index of potential risk for emotion-related psychopathology.

A sizable literature ( +/- 100 studies ) embeds the measure in a network of psychological and behavioural constructs, that bestowing frontal EEG asymmetry with sizable construct validity as a measure of an underlying approach-related or withdrawal-related motivational style, or as an index of potential risk for emotion-related psychopathology.

BABIES SHOULD NEVER CRY

KANGAROO MOTHER CARE = THE ORIGINAL PARADIGM

Skin-to-skin contact
Breastfeeding
Support to the dyad

NEW PARADIGM CONSTRUCT

SUPPORT TO THE DYAD

Maternal care BREASTFEEDING SSC

Nurture Stimulation

BASIC ASSUMPTION:
NEVER SEPARATE !!
FOUNDATION / PLATFORM / BASE

ATTACHMENT REGULATION WELL-BEING
“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.

Dr Robert D White

Long-term developmental status must be the focal point for evaluation of the quality of neonatal care

PERINATOLOGY !!! -

OBGYN care = antepartum neonatology

“practice strategies to promote dyad care”
R.D. White 2004 (p 384)

PERINATOLOGY !!!

Neonatal care = postpartum OBGYN

“The parents body can be seen as the most optimal, appropriate and physiologically stablising environment for these infants”
J.V. Browne 2004 (p294)

Fetal environment
Labour Ward
perinatology
active birth
continuum
NICU issues - sensory focus
organisational
PREFACE:
In the past ... NICU’s sensory stimuli considered as of minor importance...

Dr Robert D White

As long-term developmental status has replaced the survival rate as the focal point for evaluation of the quality of neonatal care, interest in the impact of the physical environment on the developing premature brain has accelerated.

Clinics in Perinatology,
June 2004, Vol 31(2)

Early neurosensory visual development of fetus and newborn.

Below 30w GA, fetus has no pupillary constriction, adequate only after 34w GA.
Eyelids below 32 weeks do not limit light entry.
"In utero, fetus not exposed to light"

Much of this development occurs unrelated to stimuli or experience, but there are continuous "spontaneous synchronous retinal waves"
“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 or phases for healthy visual development is very significant and potentially lasts a life time.

For components of visual experience to develop, connections from the primary visual cortex must extend to other areas ..... 

... also to hippocampus and amygdala, which link emotional responses to visual images.

Activity-dependent processes are extremely vulnerable to events and conditions in NICU: protect REM sleep and dark periods eliminate direct light exposure to eyes limit noise & competing stimuli

Low light levels regulate the biological clock Circadian timing system important .... “fundamental homeostatic system that potently influences human behaviour and physiology throughout development.”

Ear sends signals to CNS by 23w GA External sounds all heard – but very dampened Mothers voice distinguishable .... salient tied to circadian rhythms and vestibular and other sensations. (Voice discrimination ... early language)

Mother’s voice: “fetal listener making subtle discriminations” discriminate between actual voice and tape recording of voice between familiar and new nursery rhyme musically aware, “C” vs “D”, by octave
Auditory development drives visual and motor development ... … auditory signal attracts attention … motor system turns head and eyes ...

Neonates are unable to focus auditory attention. They listen simultaneously to everything … unexpected sounds … … brain reveals a limited ability to maintain stable physiologic, motor, or behavioral state and attentional system function …

Preterm infants are exposed to unpredictable sensory stimuli during a prolonged period …

Prolonged exposure to the chaotic sensory environment of the NICU during critical periods of brain development is increasingly implicated as a contributor to attentional difficulties.

Functional at end of first trimester, begins very early, experience dependent “effective from 29w GA” → significant modulates state organization … emotional behaviors activates pre-feeding actions anticipatory digestive physiology regulates pace of ingestive behavior
Perinatal brains show orientations towards 
"neonatal olfactory expectations"
the original reference for these is the amniotic pool for preterm infants and the mother’s body for term (and preterm !!) infants.

Newborns prefer amniotic fluid (AF) smell > milk
Breast / bottle fed babies offered choice of 
amniotic fluid versus familiar milk ...  

**BREAST**
- d2: 50% AF 50% milk
- d4: 0% AF 100% milk

**BOTTLE**
- d2: 100% AF 0% milk
- d4: 100% AF 0% milk

Newborns prefer amniotic fluid (AF) smell > milk

**Rat pups delivered prematurely → SURVIVAL**
given straight to dam 100%
warm box, amniotic odor 90%
warm box, maternal saliva 80%
warm box, no smells at all 75%
warm box, smell of mint 50%
(mint odor “inhibited motor activity”)

Premies fed through non-oral pathways LACK sucking-breathing-swallowing coordination integration of chemosensation-food intake cephalic phase of digestive processes;  
→ therefore display : 
"poorer and more unstable sucking performance than their orally fed peers"

Interference with transnatal olfactory continuity → decreased suckling success 
Foreign odors cause aversion 
"differential behavior" in approach tendencies, (R brain) ingestive performance and readiness to learn.
We propose that both brain expectations for odors from the uterine environment and the readiness of the neonatal brain to acquire novel odor information can be exploited clinically to alleviate the newborns’ stress resulting from deprivation of the regulatory processes provided by the mother” (Bergman: “by skin-to-skin contact”)

The mother and infant at birth are ready to develop optimal attachment relationships and to work together toward organised cognitive, social and emotional development.

The parent’s body can be seen as the most optimal, appropriate, and physiologically stabilising environment for (preterm infants).

Policies to make “new paradigm for caregiving” should “encourage” (not “allow”) “parent participation guidelines”

“Future NICU design should recognize that the baby must spend most of its time in its mother’s arms…”

(Our care) still views the infant as a solitary individual who sleeps most of the time in a bed. Future NICU design should recognize that the baby must spend most of its time in its mother’s arms to get the full benefit of her sensory environment as experienced throughout our evolution.”
"Future NICU design should recognize that the baby must spend most of its time in its mother's arms …” (White 2004)

**Doula care**

“doula” – Greek word for a “birth companion”

In 127 out of 128 societies

reported in a major anthropological study of non-industrialised geographically isolated societies

“a woman is in attendance throughout labour”

not the father …

not a midwife!!

**Effects of doula care**

<table>
<thead>
<tr>
<th></th>
<th>No doula</th>
<th>Doula</th>
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</thead>
<tbody>
<tr>
<td>Guatemala, (Klaus et al 1986)</td>
<td></td>
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</tr>
<tr>
<td>Caesarean</td>
<td>19%</td>
<td>7%</td>
</tr>
<tr>
<td>Distress</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td>Medication</td>
<td>19%</td>
<td>4%</td>
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<tr>
<td>Other problems</td>
<td>4%</td>
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<tr>
<td>Total problems</td>
<td>74%</td>
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<tr>
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</thead>
<tbody>
<tr>
<td>USA (Kennell et al 1991)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidural</td>
<td>55%</td>
<td>8%</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>18%</td>
<td>8%</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>26%</td>
<td>8%</td>
</tr>
<tr>
<td>Fetal distress</td>
<td>24%</td>
<td>10%</td>
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<tr>
<td>Caesarean section</td>
<td>18%</td>
<td>8%</td>
</tr>
<tr>
<td>Cost of C/S</td>
<td>R3600</td>
<td>R1800</td>
</tr>
<tr>
<td>Cost of NVD</td>
<td>R1800</td>
<td>R1800</td>
</tr>
<tr>
<td>Halved C/S rate</td>
<td>R2.2m</td>
<td></td>
</tr>
<tr>
<td>A doula for every delivery</td>
<td>R1.6m</td>
<td></td>
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<tr>
<td>Add epidural saving, less fetal distress ...</td>
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**Birthing position**

1000 year old Mexican statue of woman in labour, as exhibited in Denmark for 20 years.

- Same Mexican statue, placed vertically
- Toes curl appropriately
- Leaves do not fall off her shoulders
- Headpiece undisturbed
Birthing position

In 80% of societies, mothers deliver in upright position, which increases the pelvic outlet diameter by 28%.

Duration of labour is reduced by 25-36%.

Birthing position

Mothers in Active Birth will “instinctively” choose birth positions appropriate to the lie and presentation of the fetus. Squatting, kneeling, lying, crouching … There is only one bad position = lithotomy.

Active Birth

Active birth is NOT
- providing a place
- with amenities
- alternative or complementary care
- abdicating clinical responsibility

Active Birth …

… enables a labouring woman to respond naturally and instinctively to her birthing process, and to make appropriate choices. Women are encouraged to remain mobile and upright and to adopt the position of their choice during labour and birth, and unnecessary restrictions and procedures are minimized. Fundamentally it is an attitude of respect and support for the labouring woman and her family.

(Adopted by ABU Board, 28 August 2002)

Active Birth

Active Birth is about allowing the mother to be in tune with herself and her pregnancy, to empower her and give her control of her own labour. Active Birth provides time and space for the family to bond and grow.

Active Birth

Fundamentally, it returns respect and dignity to the mother.
Doula care, Active Birth, and the Birth positions described have evolutionary and neurobehavioural origins, evidenced in anthropological studies, which minimise the very high risk of adverse outcome from CPD.

(Equates to better care at lower cost)

The neurobehavioural programmes originate in the LIMBIC SYSTEM expressed through hypothalamus (autonomic nervous system), hypophysis (endocrine system, hormones), and cerebellar connections (somatic system).

The reproductive programme is in the mother and the baby.

The hindbrain has 3 programmes:
- Defense
- Nutrition
- Reproduction

Hormones, Nerves, Muscles

Mother's have an innate, inborn behaviour:
- HORMONES
- NERVES
- MUSCLES

HOLD & CARE

40 million years – primates
Newborn apes powerful grasp reflex, due to quadrupedal
They are "carry feeders"

4 million years – HOMINIDS
Newborn Homo weak grasp reflex, due to bipedal, hairless mother
They have to be "HOLD feeders"
Personal testimony of a mother at International KMC Workshop

“The instinct of a mother to hold and care for her baby is primordial and primitive, and an overwhelmingly powerful feeling.”

Jane Davis, Bogota, Dec 1998

Maternal effects of separation -
Lack of bonding
Postnatal depression
Breast problems -

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= antepartum neonatology
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INFRASTRUCTURE
Ceiling mounts - optimal access
Decibelmeter for silence
Darkened room, separate light work desk
**INFRASTRUCTURE**

Modern equipment
- single incubator per unit
- adequate area,
- sliding wall panels
- closed and open incubators
- "NIDCAP" ethos

Babies contained in "slippers" (sw. toffla)

**INFRASTRUCTURE**

ADD one adjustable
ADULT BED
ADD MOTHER
and
FATHER

---

**“PETER”**

Born 25w GA
520g

SSC started d1
2x daily
6-8 h a time

Now 27w GA
620 grams
CPAP

Parents unbundle and prepare ...
Nurse disconnects CPAP & monitor ...

Children ready to transfer ...
...

**Determinations**

... awake and alert state
... then settles down to a sleep cycle ...

Parents provide nursing care ...
... feeding paced by monitor ...
... flushing gavage tube ...

... then settles down ...
... then settles down to a sleep cycle ...

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... then settles down ...
... then settles down to a sleep cycle ...

Parents provide nursing care ...
... feeding paced by monitor ...
... flushing gavage tube ...

**“JAKOB”**

Born 24w GA
520g
BPD

On VENTILATOR

Now 1300 g

Same technology
NEW HABITAT

Mirror allows for eye to eye contact

---

**“PETER”**

Mother providing optimal care ...

Sleep, rest and relaxation ...
... brain development in progress ...
... and optimal stabilisation

**“JAKOB”**

Same technology
NEW HABITAT

Mirror allows for eye to eye contact
**“ANNA”**

Stepdown care...
double bed...parents 24/7
equipment available....

Mother is providing SSC throughout every day, shares nights with father!

Mother is PRIMARY CAREGIVER
Nurse is PRIMARY SUPPORTER

**Fetal environment**

Labour Ward
perinatology
active birth
continuum
NICU issues - sensory focus organisational (PHOTOS)

**WHAT IS BREASTFEEDING?**

BREASTFEEDING =
A place dependent, brain-based behaviour of the newborn.

**Is breastfeeding IMPORTANT?**

BREASTFEEDING =
Is more than eating: primary purpose is BRAIN-WIRING!!

**BREAST - FEEDING = BRAIN - WIRING**

Stable and happier when HOLDING!!

Brain development requires SLEEP!!

Touching makes UNSTABLE heart rate and saturation

**TOUCHING → HOLDING**
Is breastfeeding IMPORTANT?

Breastfeeding =
Is more than eating:
primary purpose is
BRAIN-WIRING!!

NOTHING CAN BE
MORE IMPORTANT!!

Skin-to-skin contact IS MORE essential for premature newborns!

ATTACHMENT
REGULATION
WELL-BEING

“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.

“HIGHER COGNITIVE FUNCTIONS”

MANAGEMENT OBJECTIVES

Performance indicators:
% breastfeeding at one hour

IF NOT BREASTFEEDING AT ONE HOUR = FAILURE … DIS-EASE WILL FOLLOW!!
### MANAGEMENT OBJECTIVES

**Performance indicators:**

- % breastfeeding at one hour
- % second feed within 6 hours
- % exclusive breastfeeding at discharge
- % exclusive breastfeeding 6 mth
- % still breastfeeding 2 years

**EXCELLENCE ????**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Goal</th>
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<tbody>
<tr>
<td>% breastfeeding at one hour</td>
<td>100%</td>
</tr>
<tr>
<td>% second feed within 6 hours</td>
<td>100%</td>
</tr>
<tr>
<td>% exclusive breastfeeding at discharge</td>
<td>100%</td>
</tr>
<tr>
<td>% exclusive breastfeeding 6 mth</td>
<td>90%</td>
</tr>
<tr>
<td>% still breastfeeding 2 years</td>
<td>60%</td>
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= EXCELLENCE !!!