

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, thus 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 BE SEPARATED

BABIES SHOULD NEVER CRY

NEW PARADIGM CONSTRUCT

SUPPORT TO THE DYAD

Maternal care

BREASTFEEDING

Nurture



SSC

Stimulation

BASIC ASSUMPTION:

NEVER SEPARATE !!

FOUNDATION / PLATFORM / BASE

KANGAROO MOTHER CARE = THE ORIGINAL PARADIGM

Skin-to-skin contact

Breastfeeding

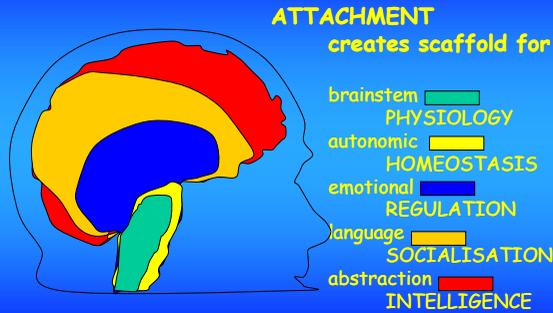
Support to the dyad

ATTACHMENT

REGULATION

WELL-BEING

"HIGHER COGNITIVE FUNCTIONS"



“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 stabilising environment for these infants”

J.V. Browne 2004 (p294)

Fetal environment

Labour Ward
perinatology
active birth
continuum

NICU issues -
sensory focus
organisational

"The Sensory Environment of the NICU: Scientific and Design-Related Aspects"

Clinics in Perinatology,
June 2004, Vol 31(2)
Ed: Robert D. White

PREFACE:
In the past ... NICU's sensory stimuli considered as of minor importance ...

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

VISUAL development
 circadian rhythmicity
 lighting for carers
AUDITORY attention / distraction
SMELL (olfaction) fetal and neonate
CONTACT (skin-to-skin)
 (early relationships)
NICU design

Dr Robert D White

In the early stages of NICU design as life-and-death treatments were being refined, the impact of light, noise, movement and other sensory stimuli was considered 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)
Stanley Graven

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"

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

Early neurosensory visual development of fetus and newborn.

Development has three parts
 activity independent (genetic)
 endogenous spontaneous
 exogenous stimulation (experience)

Visual experience is essential to continued development of the visual system
... the critical period is from the latter part of 2nd trimester through the first 3 years of life.

Clinics in Perinatology,
June 2004, Vol 31(2) page 210
Stanley Graven
*Early neurosensory visual
development of fetus and newborn.*

"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.

Clinics in Perinatology,
June 2004, Vol 31(2) page 210
Stanley Graven
*Early neurosensory visual
development of fetus and newborn.*

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.

Clinics in Perinatology,
June 2004, Vol 31(2) page 210
Stanley Graven
*"Early neurosensory visual
development of fetus and newborn."*

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

Clinics in Perinatology,
June 2004, Vol 31(2)
Scott Rivkees
*"Emergence and influences of
circadian rhythmicity in infants"*

Low light levels regulate the biological clock

Circadian timing system important

"fundamental homeostatic system that potently influences human behaviour and physiology throughout development."

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
*"Effects of the NICU on auditory
attention and distraction"*

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)

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
*"Effects of the NICU on auditory
attention and distraction"*

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

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
"Effects of the NICU on auditory
attention and distraction"

Auditory development
drives visual and motor
development ...
... auditory signal attracts
attention ... motor system
turns head and eyes ...

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
"Effects of the NICU on auditory
attention and distraction"

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 behavioural state
and attentional system function ...

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
"Effects of the NICU on auditory
attention and distraction"

unexpected sounds:
... limited ability to
maintain stable
physiologic function ...

Clinics in Perinatology,
June 2004, Vol 31(2)
Lincoln Gray & Kathleen Philbin
"Effects of the NICU on auditory
attention and distraction"

Preterm infants are exposed to unpredictable
sensory stimuli during a protected 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.

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and premature
infant: functional status and clinical
implications"

Four distinct olfactory structures;
olfactory system
trigeminal nerve
vomeronasal organ
terminal nerve
"multi-channel nasal event"

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

Functional at end of first trimester,
begins very early, experience dependent
"effective from 29w GA" → significant
modulates state organisation
elicits emotional behaviours
activates pre-feeding actions
anticipatory digestive physiology
regulates pace of ingestive behaviour

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

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.

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

Perinatal brains show orientations towards
"neonatal olfactory expectations"

When provided:

calming, autonomic orientation, active
approach, metabolic conservation.

When not fulfilled:

withdrawal, autonomic defense & distress
behaviours, metabolic expenditure

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

Newborn has "prenatal olfactory expectation"
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")

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

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.

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

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

(even though this milk satiates 4 hourly !!)

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

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"

Clinics in Perinatology,
June 2004, Vol 31(2)
Benoist Schaal, et al
"Olfaction in the fetal and prem' ... "

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")

Clinics in Perinatology,
June 2004, Vol 31(2) p293
Joy Browne
"Early relationship environments:
physiology of skin-to-skin contact
for parents and their preterm infants"

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

Clinics in Perinatology,
June 2004, Vol 31(2) p293
Joy Browne
"Early relationship environments:

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"

Clinics in Perinatology,
June 2004, Vol 31(2)
Ed: Robert D. White

"Future NICU design should recognize that the baby must spend most of its time in its mothers arms ..."
(White 2004)

Clinics in Perinatology,
June 2004, Vol 31(2) p293
Robert White
"Mothers' arms – the past and future locus of neonatal care ?"

BARRIERS
privacy
space / layout
sibling / family
role of family in care

FUTURE DESIGN
point of care = mal
"ceiling mounts" ...
support areas
"care-by-parent"

Clinics in Perinatology,
June 2004, Vol 31(2) p293
Robert White
"Mothers' arms – the past and future locus of neonatal care ?"

(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 mothers arms to get the full benefit of her sensory environment as experienced throughout our evolution"

Clinics in Perinatology,
June 2004, Vol 31(2)
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“Future NICU design
should recognize that
the baby must spend
most of its time
in its mothers 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

	<u>No doula</u>	<u>Doula</u>
<i>Guatemala, (Klaus et al 1986)</i>		
Caesarean	19%	7%
Distress	33%	22%
Medication	19%	4%
Other problems	4%	1%
Total problems	74%	34%

Effects of doula care

	<u>No doula</u>	<u>Doula</u>
<i>USA (Kennell et al 1991)</i>		
Epidural	55%	8%
Caesarean section	18%	8%
Forceps delivery	26%	8%
Fetal distress	24%	10%

Effects of doula care

	<u>No doula</u>	<u>Doula</u>
<i>USA (Kennell et al 1991)</i>		
Caesarean section	18%	8%

Caesarean section 18% 8%

Cost of C/S = R3600 at MMH.

Cost of NVD = R1800 at MMH

Halved C/S rate would save = R2.2 m

A doula for every delivery = R1.6 m

Add epidural saving, less fetal distress ...

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

Birth 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%

Birth 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.

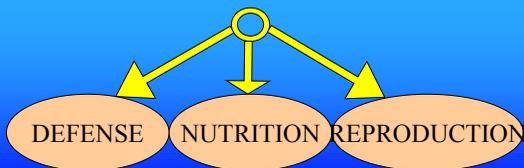
Fundamentally, it returns respect and dignity to the mother.

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.

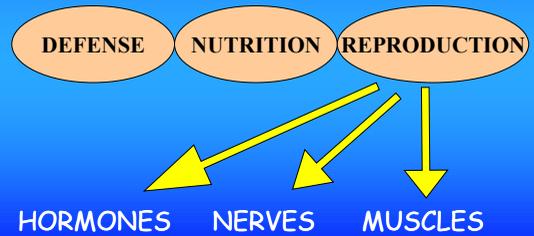
(Equates to better care at lower cost)

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

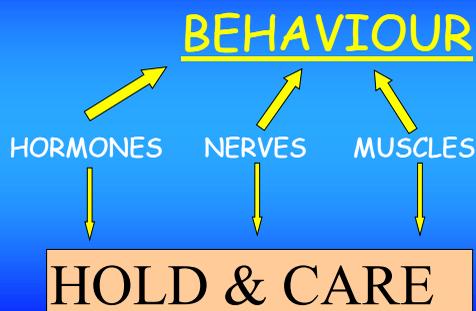
THE HINDBRAIN HAS 3 PROGRAMMES



The reproductive programme
 is in the mother and the baby



Mother's have an innate, inborn



40 million years - primates
 4 million years - HOMINIDS

Newborn apes
 powerful grasp
 reflex, due to
 quadrupedal

Newborn Homo
 weak grasp reflex,
 due to
 bipedal, hairless
 mother

They are
 "carry feeders"

They have to be
 "HOLD feeders"

4 million years - HOMINIDS

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

Newborn Homo
weak grasp reflex,
due to
bipedal, hairless
mother

They have to be
“HOLD feeders”

Maternal effects of separation -

Lack of bonding
Postnatal depression
Breast problems -

PERINATOLOGY !!! -

OBGYN care
= antepartum neonatology

Neonatal care
= postpartum OBGYN

PERINATOLOGY !!! -

OBGYN care
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“practice strategies to
promote dyad care”

R.D. White 2004 (p 384)

PERINATOLOGY !!!

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“The parents body can be seen as
the most optimal, appropriate and
physiologically stabilising
environment for these infants”

J.V. Browne 2004 (p294)

INFRASTRUCTURE

Ceiling mounts - optimal access

Decibelmeter
for silence

Darkened room,

separate light work desk

INFRASTRUCTURE

Modern equipment
single incubator per unit
adequate area,
sliding wallpanels

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 ...

transfer to dad ...

Positions and reconnects: Transfer time 75 secs

After a few moments ...
... awake and alert state

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

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



"PETER"

Mother providing optimal care ...



Sleep, rest and
relaxation ...

... brain development
in progress.

... and optimal stabilisation

"JAKOB"

Born 24w
grams

BPD

On VENTILATOR

Now 1300 g



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

"ANNA"

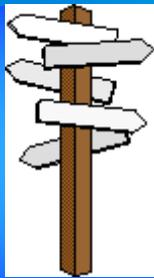
PREMATURE INFANTS WANT
CONTACT - NOT TOUCHING !!
Touching makes UNSTABLE
heart rate and saturation

Stable and happier
when HOLDING !!

Brain development
requires SLEEP !!



TOUCHING → HOLDING



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 !!

a kind of invisible hothouse

BREAST - FEEDING
=
BRAIN - WIRING

Is breastfeeding
IMPORTANT ?



BREASTFEEDING =

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

**NOTHING CAN BE
MORE IMPORTANT !!**

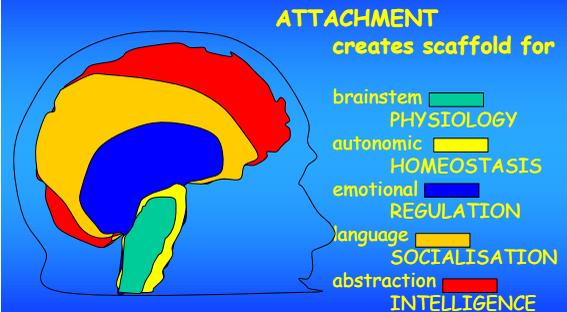
Breastfeeding

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

IS ALSO
MORE
essential for
premature
newborns!

ATTACHMENT
REGULATION
WELL-BEING

"HIGHER COGNITIVE FUNCTIONS"



"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.

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 brf at discharge
- % exclusive breastfeeding 6 mth
- % still breastfeeding 2 years

EXCELLENCE ????

MANAGEMENT OBJECTIVES

Performance indicators:

- % breastfeeding at one hour 100%
- % second feed within 6 hours 100%
- % exclusive brf at discharge 100%
- % exclusive breastfeeding 6 mth 90%
- % still breastfeeding 2 years 60%

= EXCELLENCE !!!



Geddes Productions
P.O. Box 41761
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(323) 344-8045

www.geddesproduction.com

Get both videos
together on one DVD,
plus a CD with extras

