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## REVIEW OF VIDA

By Roger E. Sheldon, MD, MPH

Developmentally appropriate care of pre-term infants in NICUs, or “developmental care,” has been moving from a theoretically good idea to an evidence-based best practice over the last 10-15 years. Built on the concept that different sorts of care are needed by different individual babies, and by babies of different developmental ages/stages, developmental care holds out the promise that most aspects of neurodevelopment can be preserved even in the face of extreme prematurity. While the evidence has not yet convinced all the meta-analysts, numerous NICUs are adopting all or part of the developmental care model based on steadily accumulating randomized controlled trials suggesting better neurodevelopmental outcomes from shorter hospitalizations for less money[1,2,3,4]. Preliminary data, not yet published, appears poised to add to the underpinnings of the approach. Among the aspects of developmental care that have had the greatest acceptance to date are:

1. Reductions in sensory inputs (bright light, loud sound, scents and tactile experiences) that would not be encountered at similar gestations in utero;
2. Preservation of sleep by clustering care and allowing more extended intervening sleep;
3. Avoidance of pain and other noxious sensory experiences to the extent possible;
4. Provision of “facilitation”—physical containment and soothing to the child during noxious experiences;
5. Exposure to parents’ skin-to-skin holding (“kangaroo mother care”).

The concepts of developmentally appropriate care came out of the work of Heidelise Als, building on concepts of Blurton Jones, Palay, Werner, Denny-Brown, Gesell, and others. Dr. Als’s extended aspects of behavioral assessment (after T. Barry Brazelton and others) into the world of the extremely pre-mature baby. Perception of the reactions and the approach or avoidance behaviors of the preemie led to an understanding of what experiences a tiny preterm could cope with at various gestational ages. Tailoring



care to the individual child, based on his or her specific reactions and capabilities is a central concept of Newborn Individualized Developmental Care and Assessment Program (NIDCAP)[5]. Intuitive human kindness in avoiding or reducing noxious experiences has now found support in controlled trials showing increases in brain connectivity and augmented myelination among infants cared for in this way[6].

Building on neuroscience and the concept that neural circuits develop and synapses are recruited by the repetitive use of those circuits for good or ill (“Neurons that fire together, wire together”), atten-

tion is now being paid to the proper augmentation and sequencing of brain tract development, connections, and myelin deposition.

For example, obstruction of one eye in kittens leads to near-absence of the optic visual pathway serving that eye[7], while experimental opening of the eyes of newborn rats and puppies earlier than “intended” can be shown to interfere not with subsequent eyesight, but with the hearing and olfactory pathways that should be developing around the time of birth[8]. Visual inputs in this case are thought to interfere by taking precedence, out of sequence, over the hearing inputs important at that age. While similar effects cannot ethically be shown in human infants, one can argue that out-of-sequence sensations and experiences should be avoided until they are “supposed” to be happening.

Equally important but less well studied is avoiding the enhancement of pathways (pain, arousal, avoidance, dissociative responses) that should not be fortified at this (or any) gestational age. The normal “pruning,” by apoptosis, of more than half of the neurons initially present at 28 weeks gives shape to each brain over months to years; not eliminating the cells and pathways that should disappear will fashion a brain much different from the one “intended.” Neonatal experiences truly matter.

The subject of this review is a series of video programs on DVD that explains current thinking and evidence regarding developmental care, two for professionals and one for parents and the public. Produced under an NIH grant (from the National Institute of Child Health and Human Development) by VIDA Health Communications, Inc. of Cambridge, Massachusetts ([www.VIDA-health.com](http://www.VIDA-health.com)), these videos provide high-quality, foot-noted discussions presenting experts in the field, showing the behaviors of the newborns, and detailing aspects of care that make up the developmental approach. Parent experiences and reactions are also presented.

The first video, “Focus on the Brain: The Science of Preterm Infant Behavior,” begins

with concepts in brain development and describes the scientific under-pinnings of developmental care. Chapters include:

1. The Overlooked Organ
2. Fetal and Neonatal Brain Basics
3. How Relationships and Environment Shape the Brain
4. The Sequence of Sensory Development, and
5. The Role of Sleep in Preterm Brain Health.

Comments from Stan Graven, George Little, Peter Gorski, Heidelise Als, Petra Hüppi, Frank Duffy, Adre Du Plessis, Bob White and others weave the story of environment in the NICU and the brain changes that can be attributed to developmental care. Numerical footnotes provide references to the literature for the assertions made in the comments.

The second video, "Focus on the Brain: Clinical Practices for Special Care Nurseries" details clinical methods and approaches in four areas:

1. Observing Infant Behavior,
2. Brain Sensitive Care,
3. Parents As Partners, and
4. Environments for Brain Building.

These demonstrations of practical, bedside approaches can assist a NICU team in adopting developmental practices. Especially useful are the video clips of various behaviors not easily recorded, and the suggestions for developmentally appropriate bedside care.

The third video, "No Matter How Small," describes the concept and methods in lay terms for families. In 39 minutes, it includes 6 chapters:

1. Not What I Expected: NICU Beginnings;
2. Parents Matter: You Make Things Better;
3. Brain Basics: What Shapes Development;
4. Born Amazing: Infant Senses and Strengths;
5. Reading Your Baby: Behavior, Signs and Signals; and
6. Close and Connected: Nurturing in the NICU.

The tone is supportive and reassuring to families that they can play a role in the child's development and parent their child in a supportive and productive way. It encourages fathers to be involved in kangaroo care and other aspects of the child's day—thus supporting involvement by the often-discouraged or excluded fathers. I suspect that it will assist us in involving fathers in their child's life. It supports

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mothers in kangaroo care and encourages lactation and breast milk supply.

Production values and sound quality are very good, with professional quality available light video revealing preemie behaviors that are often missed or misinterpreted. A quiet sound track of gentle music gives an impression of the sort of quiet and calm that is being promoted during NICU care.

The script is sophisticated and clear in its descriptions and arguments. The interview clips are to the point and well sequenced to explain the state of the science, and to make the case for brain-sensitive care. The methodology section in video two provides easily understandable advice for moving toward this sort of care.

I feel that these videos are an excellent addition to your teaching and parent-support process—providing as they do, a clear review of the evidence and the steps to take in considering or adopting aspects of developmental care for your patients and families.

Dr. Sheldon is Co-Director of the Sooner NIDCAP Training Center at OU, and a member of the Board of Directors, NIDCAP Federation, International.

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