

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

***This list was developed as a resource for physical therapists who are interested in learning about neonatal physical therapy practice. The resources alone are not sufficient to prepare a therapist for practice in the Neonatal Intensive Care Unit. Additional experience and mentorship is recommended.***

### **EBP Articles/Books or Texts**

Sweeney, JK, Heriza CB, Blanchard Y. Neonatal Physical Therapy. Part I: Clinical competencies and neonatal intensive care unit clinical training models. *Pediatr Phys Ther.* 2009 Winter, 21(4):296-307.

Sweeney JK, Heriza CB, Blanchard Y, Dusing SC. Neonatal Physical Therapy. Part II: Practice frameworks and evidence-based practice guidelines. *Pediatr Phys Ther.* 2010 Spring, 22(1):2-16.

Als, H. A synactive model of neonatal behavioral organization: Framework for the assessment and support of the neurobehavioral development of the premature infant and his parents in the environment of the neonatal intensive care unit. *Phys Occup Ther Pediatr.* 1986;6:3-55.

#### **Neonatology at a Glance. 2<sup>nd</sup> edition**

Tom Lissauer and Avory A. Fanaroff

Publisher: Wiley-Blackwell (2011)

ISBN:9781405199513

Purpose: This “at-a- glance” guide provides an overview of common information on perinatal medicine, the normal newborn infant, preterm infants and neonatal problems encountered in Intensive Care Units, and a concise and clear approach for management of these conditions.

Cost: approx. \$40.00. Available on line.

#### **Developmental and Therapeutic Interventions in the NICU**

Elsie Vergara and Rosemarie Bigsby

Publisher: Paul H Brookes Pub Co. (2003)

ISBN:155766675X

Purpose: This text provides an overview of therapy practice in the NICU from the perspective of occupational therapists. Roles and theory of therapy interventions as well as providing general information on the NICU environment and medical management are presented. Chapters on basic information regarding both feeding and positioning are presented as well. Other topics include an overview of medical conditions of newborns, commonly used interventions, learning objectives, and examples.

Cost: approx. \$50.00 Available on line.

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

### **Developmental Care of Newborns and Infants 2<sup>nd</sup> ed. National Association of Neonatal Nurses.**

Carole Kenner and Jacqueline McGrath

Publisher: National Association of Neonatal Nursing (NANN - 2010)

Purpose: This text is an overview of developmental care in the NICU with chapters written by authors with expertise in the specific topic covered in the chapter. Topics include theoretical perspective, program development and implementation and technical information about diagnoses and procedures as well as chapters devoted to topics in intervention. The chapters on positioning, feeding and kangaroo care are useful references for current developmental care practice in these areas. A comprehensive review of the evidence including the relative strength of the evidence is provided in each area addressed

Cost: approx. \$105.00. Available from [www.nann.org](http://www.nann.org)

### **Physical Therapy for Children, 4th ed.,**

Suzann K. Campbell, Robert J. Palisano, Margo Orlin

Publisher: Saunders Elsevier (2011)

ISBN: 9781416066262

Purpose: This text is a comprehensive book of common pediatric physical therapy diagnoses, interventions and case studies. Specifically chapter 28, The Special Care Nursery provides information regarding physical therapy in the NICU. Chapters 27 offers information about intervention with families and their environments and chapter 29 provides information about serving infants, toddlers and their families under IDEA.

Cost: approx. \$100.00. Available on line.

## **Developmental Assessment used in the NICU**

### **TEST OF INFANT MOTOR PERFORMANCE (TIMP)**

Authors: Suzann K. Campbell, Gay L. Girolami, Thubi H.A. Kolobe, Elizabeth Osten, and Maureen Lenke

Publisher: Infant Motor Performance Scales, LLC, 1301 W. Madison St. #526, Chicago, IL. 60607-1953

Purpose: To identify infants with deficits in postural control and to document the effects of developmental therapy to improve postural control needed for functional movement in early infancy

Age Range: 32-weeks gestational age through 4-months post-term (or full term to 4-months)

Areas Tested: 27 observed behaviors and 26 elicited behaviors assessing the ability to orient and stabilize the head in space and in response to auditory and visual stimulation in supine, prone, side lying, upright, and during transitions from

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

one position to another, body alignment when the head is manipulated, distal selective control of the fingers, wrists, hands, and ankles, antigravity control of arm and leg movement.

Cost: \$186.00 includes training CD, Manual, and scoring sheets  
(available through <http://the timp.com>)

### **NEONATAL INDIVIDUALIZED DEVELOPMENTAL CARE AND ASSESSMENT PROGRAM (NIDCAP)**

Author: Heidelise Als

Publisher: National NIDCAP Training Center, Enders Pediatric Research Laboratories, The Children's Hospital, 320 Longwood Avenue, Boston, MA 02115

Purpose: Used to determine the infant's physiological and behavioral responses to the environment to assist parents and caregivers.

Training program recommended to become reliable in test administration.

Age Range: Neonates to 4-weeks post-term  
Areas Tested: Criterion-referenced assessment of physiological and behavioral responses in the areas of autonomic, motor and attention.

Training required: 1-2 years contact (<http://www.nidcap.org>) for further information.

### **QUALITATIVE ASSESSMENT OF GENERAL MOVEMENT OF INFANTS (GMA)**

Author: Christa Einspieler, Heinz FR Prechtl, Arend F Bos, Fabrizio Ferrari and Giovanni Cioni

Publisher: Cambridge University Press, Journals Fulfillment Department, 100 Brook Hill Drive, West Nyack, New York, NY 10994-2133

Purpose: A quick, non-invasive, non-intrusive with high reliability and high validity for the early detection of neurological anomalies.

Areas Tested: Observation of general movements in preterm, term, and young infants.

Age Range: Birth to 20 weeks post term.

Cost: \$ 65.00. Includes a CD-ROM giving 15 cases selected from the book. Each is of about one minute in duration and demonstrates the different age-specific movement patterns.

### **The Newborn Behavioral Observations (NBO) System Handbook**

Author: J. Kevin Nugent, Constance H. Keefer, Susan Minear, Lisa C. Johnson, Yvette Blanchard

Publisher: Paul H. Brookes Publishing Co., P.O. Box 10624, Baltimore, Maryland 21285-0624

Purpose: A short, easy-to-use, interactive observational tool. With the Newborn Behavioral Observations (NBO) system, professionals will have a structured set

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

of 18 observations (see sidebar) for infants from birth to approximately 3 months. Including parents as partners, professionals guide the observation, discuss the baby's abilities and behaviors with parents, encourage parent insights and questions, and suggest specific ways to support the child's development. (Appropriate use of the NBO tool in clinical practice requires training through the NBO training program.)

Age Range: birth to 3 months

Cost: \$55.00

### **Pain and Abstinence Scales of Neonates and Infants**

#### **NEONATAL INFANT PAIN SCALE (NIPS)**

Author: J. Lawrence, D. Alcock, P. McGrath, J. Kay, S.B. MacMurray, C. Dulberg

Publisher: Neonatal Network. 1993;12(6):59-66.

Purpose: To measure pain in preterm and full term infants

Age Range: Birth to 1-year

Areas Tested: Scored on 6 parameters: facial expression, cry, breathing patterns, arms, legs, and state of arousal.

Cost: Available on line.

#### **THE PREMATURE INFANT PAIN PROFILE (PIPP)**

Author: Bonnie Stevens, Celeste Johnson, Patricia Petryshen, and Anna Taddio

Publisher: (1996). Premature infant pain profile: development and initial validation. Clinical Journal of Pain, 12: 13-22.

Purpose: A behavior measure of pain for premature infants.

Age Range: < 28 weeks to >= 36 weeks gestation

Areas Tested: Behavioral observation as an indication of pain.

Cost: Available on line.

#### **FACE, LEGS, ACTIVITY, CRY, AND CONSOLABILITY BEHAVIORAL PAIN SCALE (FLACC)**

Authors: Sandra I. Merkel, Terri Voepel-Lewis, Jay R. Shayevitz, Shobha Malviya

Publisher: Pediatric Nursing. 1997 May-Jun;23(3):293-7.

Purpose: To quantify pain behaviors in children who are not able to verbalize pain

Age Range: Birth to 18-years

Areas Tested: Observation of facial expression, leg movement, activity, cry and consolability.

Cost: Available on line.

## Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

### **NEONATAL ABSTINENCE SCORING FORM**

Author: LP Finnegan

Publisher: Current therapy in neonatal-perinatal medicine. 2ed. Ontario: BC Decker: 1990. Available through Western Australia Centre for Evidence Based Nursing and Midwifery, January 2007.

Purpose: 21 items scored on a 1-5 point scoring system to quantify severity of neonatal exposure of term infants to toxic substances.

Areas Tested: Central nervous system, gastrointestinal, metabolic, vasomotor, and respiratory disturbances.

Cost: Available on line.

### **Interventions**

#### **Positioning**

#### **Journal Citations**

Grenier I, Bigsby R, Vergara E, Lester B. Comparison of motor self-regulatory and stress behaviors of preterm infants across body positions. *Am J Occup Ther.* 2003 May-Jun;57(3):289-97.

Malusky S, Donze A. Neutral head positioning in premature infants for intraventricular hemorrhage prevention: an evidence-based review. *Neonatal Netw.* 2011 Nov-Dec;30(6):381-96.

McMullen, S. Lipke, B. LeMura, C. Sudden Infant Death Syndrome Prevention: A Model Program for NICUs. *Neonatal Netw.* 2009 Jan-Feb;28(1):7-12.

Nakano H, Kihara H, Nakano J, Konishi Y. The influence of positioning on spontaneous movements of preterm infants. *Journal of Physical Therapy Science* 2010;22(3):337-45.

Sweeney J, Gutierrez T. Musculoskeletal implications of preterm infant positioning in the NICU. *J Perinat Neonat Nurs.* 2002 Jun;16(1):58-70.

### **Positioning Products**

[www.healthcare.philips.com](http://www.healthcare.philips.com) Children's Medical Ventures, sells prone plus, squishon and other positioning devices.

[www.dandlelionmedical.com](http://www.dandlelionmedical.com) Website for the Dandle Roo and other positioning devices.

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

[www.resqwedge.com](http://www.resqwedge.com) Wedge positioner and sling for reflux.

[www.sundancesolutions.com/neonatal/](http://www.sundancesolutions.com/neonatal/) Website for Z flo positioning devices.

[www.thezaky.net](http://www.thezaky.net) : positioner used in some NICU's, also gaining popularity for term healthy babies as well. Multiple instructional videos on Utube.

Handling

### **Kangaroo care**

Ludington-Hoe S. (2011) Evidence based review of physiological effects of kangaroo care. Women's Health Reviews. 7(3), 243-253.

### **Feeding**

#### **Journal Citations**

Shaker CS. Perspectives on swallowing and swallowing disorders (dysphagia). Oct. 2010, (19):68-74

Arvedson J, Clark H, Lazarus C, Schooling T, Frymark T. Evidence-Based Systemic Review: Effects of Oral Motor Interventions on Feeding and Swallowing in Preterm Infants. *Am J Speech Lang Pathol*. 2010 Nov;19(4) 321-340A.

Thoyre SM, Shaker CS, and Pridham KF. The early feeding skills assessment for preterm infants. *Neonatal Netw*. 2005 May–Jun;24(3):7–16.

Shaker CS. Nipple feeding preterm infants: an individualized, developmentally supportive approach. *Neonatal Netw*. 1999 Apr;18(3):15-22.

Shaker CS. (2010) Improving feeding outcomes in the NICU: Moving from volume-driven to infant-driven feeding. ASHA Perspectives on Swallowing and Swallowing Disorders(Dysphagia). October 19, 68-74.

### **Feeding Books**

**Pediatric Swallowing and Feeding: Assessment and Management** 2<sup>nd</sup> edition (Early childhood intervention series)

Edited by: Joan Arvedson and Linda Brodsky

Publisher: Singular Publishing Group. Inc., 410 West "A" Street, Suite 325, San Diego, California 92101-7904

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

Purpose: This book provides a comprehensive, interdisciplinary approach to feeding and swallowing management of infants. Topics include anatomy, embryology, physiology, pediatric and neurodevelopmental evaluation, nutrition, feeding assessment, tone and positioning.  
Cost: \$136.00 available on line.

### **Feeding and Swallowing Disorders in Infancy: Assessment and Management**

Authors: Robin Glass and Lynn Wolf

Publisher: Therapy Skill Builders a Division of Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204-2498.

Purpose: This text provides a comprehensive description of infant feeding, evaluation and intervention from a medical perspective. This book provides detailed descriptions of individual infant case presentations and treatment strategies to address feeding impairments. Evidenced based references are provided at the end of each chapter. Topics include specific diagnostic categories, comprehensive approach to feeding evaluations, diagnostic tests and procedures, and treatment strategies for feeding dysfunction.

Cost: \$199.00 available on line.

### **Feeding /Assessments**

#### **NEONATAL ORAL-MOTOR ASSESSMENT SCALE (NOMAS)**

Author: Murray A. Braun and Marjorie M. Palmer

Purpose: To screen for oral motor dysfunction in the neonate, distinguish infants with normal sucking from those with disorganization, identify infants with poor feeding abilities, and distinguish inefficient from efficient feeders.

Age Range: Neonate to 3-months of age

Areas Tested: 26-items divided into 2 categories: jaw movements and tongue movements: rate, rhythmicity, consistency of degree of jaw excursion, direction, range of motion, timing of tongue movement, Tongue configuration

Cost: \$875.00 for three day comprehensive training for certification. Contact NOMAS International, 1528 Merrill Road, San Juan Bautista, Ca. 95045 for course dates.

NOMAS on line training:

The 11 talks in this online course focus on feeding difficulties in term and preterm infants, evaluation and treatment of sensory and motor-based feeding problems after discharge from NICU or special care nursery, videofluoroscopic studies of infants and children showing examples, procedure and diagnosis, and weaning from tube to oral feeding using a sensory-based protocol. Each talk runs about one hour.

Certification not available.

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

Cost: \$375.00

### **EARLY FEEDING SKILLS ASSESSMENT (EFS)**

Author: Catherine Shaker, Suzanne Thoyre, and Karen Pridham

Publisher: *Neonatal Network*. 2005 May-Jun; 24 (3): 7-16.

Purpose: a checklist for assessing infant readiness for and tolerance of feeding and for profiling the infant's developmental stage regarding specific feeding skills: the abilities to remain engaged in feeding, organize oral-motor functioning, coordinate swallowing with breathing, and maintain physiologic stability.

Age Range: Infants

2 day training workshop on how to use the tool. Contact Catherine Shaker:

[pediatricseminars@gmail.com](mailto:pediatricseminars@gmail.com); <http://shaker4swallowingandfeeding.com>

Cost: Approximately \$350.00

### **Family Centered Care**

#### **Articles:**

Gooding JS, Cooper LG, Blaine BA, Franck LS, et. al. Family support and family-centered care in the neonatal intensive care unit: origins, advances, impact. *Seminars in Perinatology*. 2011, 35(1) 20-28

Griffin T. Family-centered care in the NICU. *J. Perinat Neonat Nurs*. 2006, 20(1)98-102

### **Patient's Bill of Rights**

For example see:

[www.chop.edu/about/our-philosophy-of-care/patients-bill-of-rights.html](http://www.chop.edu/about/our-philosophy-of-care/patients-bill-of-rights.html)

### **Courses/Continued Education**

Combined Sections Meeting/ APTA

[www.apta.org/CSM/](http://www.apta.org/CSM/)

Annual Gravens Conference on the Physical and Developmental Environment of the High Risk Infant

[www.cme.hsc.usf.edu](http://www.cme.hsc.usf.edu)

Developmental Interventions in Neonatal Care

Contemporary Forums

[www.contemporaryforums.com](http://www.contemporaryforums.com)



## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

Section of Pediatrics Annual Conference

APTA Section of Pediatrics

[www.sopac.us](http://www.sopac.us)

National Association of Neonatal Therapists

NANT Annual Conference

[www.neonataltherapists.com](http://www.neonataltherapists.com)

### **DVDs/online education**

Neonatal Developmental Care

[www.neonataldevelopmentalcare.com](http://www.neonataldevelopmentalcare.com)

6 Developmental Care Training DVDs (updated 2009) also in CD

These 6 trainings (CD or DVD format) are designed for the bed-side health-care staff, and include evidence and research supporting developmental care practices, photo and video demonstrations. In addition, information needed to pursue continuing education credits is available to download.

National Association of Neonatal Nurses (NANN)

[www.nann.org](http://www.nann.org)

Dandle Lion Medical

[www.dandlelionmedical.com](http://www.dandlelionmedical.com)

Provides many free webinars about caring for infants in the NICU.

Conferences and classes are also available.

Pathways Awareness Foundation

<http://www.pathwaysawareness.org>

Educational videos

Topics include: sensory, motor and communication development of infants; typical and atypical infant development at 2 and 6 months; and videos of infants in therapy sessions.

March of Dimes (<http://www.marchofdimes.com>)

Provides information on risk factors for a premature birth, common conditions treated in the NICU, terminology and equipment, prematurity, genetic disorders birth defects, and resources for families.

Cost: Free

VIDA Health Communications, Inc

[www.vidahealth.com](http://www.vidahealth.com)

Educational DVD's

## **Neonatology Special Interest Group: Resource List for Physical Therapy Practice in the NICU**

---

Developed by a NN SIG Committee lead by: Nancy Garcia, Bertie Gatlin & Sue Hausch

### *Part 1: The Science of Preterm Infant Development*

Topics include: fetal and neonatal brain basics, how relationships and environment shape the brain, the sequence of sensory development, and the role of sleep in preterm brain health

### *Part 2: Clinical Practices for Special Care Nurseries*

Topics include: observing infant behavior, brain sensitive care, parents as partners, environments for brain building.

Cost: \$395.00

NIDCAP Federation International

[www.nidcap.org](http://www.nidcap.org)

Provides training and information on developmentally appropriate care for the preterm and term infants. Information on NIDCAP certification and certification in NONB. Publishes the *Developmental Observer*, a free online newsletter with information for families and clinicians.

## **Regional Referrals for Early Intervention Services** **IDEA legislation**

*Early intervention services to eligible children and families are federally mandated through the **Individuals with Disabilities Education Act**. The Part C program mandates a statewide, comprehensive, multidisciplinary service system to address the needs of infants and toddlers who are experiencing developmental delays or a diagnosed physical or mental condition with a high probability of an associated developmental disability in one or more of the following areas: cognitive development, physical development, language and speech development, psychosocial development, and self-help skills. Commonly cited factors that may put an infant or toddler at risk of developmental delay include prenatal exposure to toxins through maternal substance abuse, respiratory distress as a newborn, low birth weight, brain hemorrhage, and infection.*

National Dissemination Center for Children with Disabilities

State Resources at <http://www.nichy.org/state-organizations-search-by-state>

Pick a state and this site will take you to your local EI provider