

Neonatology Special Interest Group

Resource Guide for Physical Therapy Practice in the NICU

The Neonatology Special Interest Group, Section on Pediatrics, American Physical Therapy Association: <http://www.pediatricapta.org/special-interest-groups/neonatology/index.cfm> has developed a resource guide for individuals interested in learning about physical therapy practice with neonates.

Full text copies of articles can be obtained through ArticleSearch@apta.org.

This resource list is a starting point before working with a mentor in the specialized area of 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 mentorships are recommended before working in the neonatal intensive care unit.

PHYSICAL THERAPY NEONATOLOGY FELLOWSHIP PROGRAMS

[Nationwide Children's Hospital Neonatology Fellowship](#)

RF-PTCAS Participant: [Program Profile](#)

700 Children's Drive
C4973

Columbus, OH 43205

Contact: Kimberley Scott PT, DPT

Phone: 614/722-6642

Email: kimberley.scott@nationwidechildrens.org

[Rocky Mountain University of Health Professions & Seattle Children's Hospital Neonatology Fellowship](#)

122 East 1700 South

Provo, UT 84606

Contact: Jane Sweeney PT, PhD

Phone: 253/265-3866

Fax: 253/265-3867

Email: jsweeney@rmuohp.edu

[The Children's Hospital of Philadelphia Neonatology Fellowship](#)

RF-PTCAS Participant: [Program Profile](#)

34th & Civic Center Blvd.

Philadelphia, PA 19104

Contact: Diane Versaw-Barnes PT, DPT

Phone: 267/426-5002

Fax: 215/590-6162

Email: versaw@email.chop.edu

<http://www.abptrfe.org/FellowshipPrograms/ProgramsDirectory/>

CONFERENCES, ASSOCIATIONS, AND WEB RESOURCES

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- **Annual Gravens Conference on the Physical and Developmental Environment of the High Risk Infant**
 - The Gravens Conference is a 4 day medical education conference designed to bring the latest evidence-based information to a multidisciplinary audience of clinicians. The conference design is a day of science, a day for themed tracks, a day of abstracts and workshops, and a final 1/2 day for exploring spirituality in the NICU, and a continuation of the Family Support theme.
 - <http://neonatalcareacademy.com/events/gravens-conference-2017/>
- **APTA/ Academy of Pediatric Physical Therapy Annual Conference**
 - (APPTAC) features the more than 50 educational tracks in 8 pediatric specialty areas focused on pediatric physical therapy. In addition to fabulous programming, APPTAC features an Exhibit Hall, a Practice Fair, Poster Presentations, exercise initiatives, leadership events, and social events. APPTAC is a great chance to network with colleagues across the country and around the world and may be a helpful part of PCS prep.
 - <http://apptac.org/events/annual-conference/2017/>
- **APTA/Combined Sections Meeting**
 - www.apta.org/CSM/
- **Caring Essential Collaborative**
 - Caring Essentials informs to transform the neonatal patient experience of care - bringing the latest evidence-based research to your clinical practice in the NICU!
 - <https://www.caringessentials.net>
- **Creative Therapy Consultants**
 - Online education, hands-on training, advanced level certification, workshops, lectures, and DVDs designed for all staff in the NICU or Special Care Nursery
 - <https://www.creativetherapyconsultants.com/our-company/>
- **Dandle Lion Medical**
 - Dandle-LION Medical webinars are recorded and can be viewed live, with an opportunity to ask questions, or as a recording. Both ways offer a FREE CEU. Go to www.dandlelion-webinars.com to register for a current webinar and view all previous webinars.
- **Education Resources**
 - Professional Partners with NANT for NICU Education
 - www.educationresourcesinc.com
- **Infant Driven Feeding**
 - Infant-Driven Feeding® (IDF) provides education related to oral feeding practice for neonatal caregivers worldwide.
 - <http://www.infantdrivenfeeding.com>
- **Infant Health Foundation**
 - The purpose of the Infant Health Foundation is to improve the care of babies and infants by developing and publishing evidence-based protocols, best practices and standards. Over time the Foundation intends to develop into a collecting point for information and education about the care of babies and infants from many sources.
 - <https://babosys.wordpress.com>
- **March of Dimes**
 - 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
 - <http://www.marchofdimes.com>

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- **National Association of Neonatal Nurses (NANN)**
 - www.nann.org
 - The **Developmental Care Specialist** designation (intended for all neonatal healthcare professionals, including, but not limited to, nurses and therapists) offers clinicians with developmental care experience an opportunity to apply and assess their knowledge through the completion of a 100-item test. The test includes both cognitive assessment questions and scenario-based cases.
 - <http://apps.nann.org/store/product-details?productId=361>
- **National Association of Neonatal Therapists**
 - An organization of neonatal therapists who aim to improve neurodevelopmental outcomes for premature and sick infants.
 - <http://neonataltherapists.com>
- **NANT Annual Conference**
 - The overall objectives of the conference are: Define the current state of evidence for neonatal therapy related interventions in the NICU. Describe evidence based feeding practices and innovations for the neonatal population. List strategies to improve family centered care in the NICU. Discuss NICU interventions that support infant neuroprotection and neurodevelopment. Identify program components for optimizing therapy following NICU discharge. (Multiple speakers present, each with own learning objectives.)
 - NANT strives to offer attendees, presenters, exhibitors and guests an experience that encompasses all of our Core Values while delivering a quality program that is well constructed and delivered with customer service in mind. To that end, we hold the event in venues that offer our attendees a comfortable and beautiful environment for learning and the exchange of ideas. (Couldn't find cost)
 - <http://www.nantconference.com/2018/earlynotification/>
- **Neonatal Developmental Care**
 - 6 Developmental Care Training DVDs (updated 2009) also in CD
 - These 6 trainings (CD or DVD format) are designed for the bedside 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.
 - www.neonataldevelopmentalcare.com
- **Neonatal Therapy National Certification Board**
 - Neonatal therapy certification identifies physical therapists, occupational therapists and speech-language pathologists who have demonstrated the time, knowledge, and commitment to serve high risk infants in the neonatal intensive care unit.
 - <https://www.ntnbc.com>
- **Pediatric Continuing Education Summer Institute**
 - RMUoHP Continuing Education Programs Continuing education courses for health professionals are offered by RMUoHP regularly. Cost for full program: \$1950.00
<https://rmuohp.edu/academics/continuing-education>
 -
- **Quantum Caring**
 - A blog about the neonatal intensive care unit, its patients, their families, and the clinicians who serve them.
 - <https://quantumcaring.blogspot.com/?view=classic>
- **Quantum Caring Conference**

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- Science & Soul 2018 brings together leading scientists, researchers, clinicians and educators to translate advances in our understanding of early life adversity, epigenetics and parental mental health into actionable improvements in the care of critically ill newborns, infants and families.
- Science & Soul 2018 will have a positive impact on neonatal and pediatric clinical practice with the following objectives:
- To bring together international experts to catalyze and advance evidence-based practice in trauma-informed, neuroprotective care of the critically ill newborn, infant, and family across all healthcare settings.

ESSENTIAL READINGS: CRITICAL FOR THE PHYSICAL THERAPIST PROVIDING CARE IN THE NICU

- 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.
 - http://www.perinat56.org/images/JR2016/Blanchard%202009%20Neonatal_Physical_Therapy_Part_I_Clinical.21.pdf
- 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.
 - http://mobile.journals.lww.com/pedpt/Fulltext/2010/02210/Neonatal_Physical_Therapy_Part_II_Practice.2.aspx
- McManus, Beth M. PT, MPH, ScD, PCS; Chambliss, Juliette Hawa PT, DPT; Rapport, Mary Jane PT, DPT, PhD Application of the NICU Practice Guidelines to Treat an Infant in a Level III NICU Pediatric Physical Therapy: Summer 2013 - Volume 25 - Issue 2 - p 204–213 doi:10.1097/PEP.0b013e31828a4870
 - http://mobile.journals.lww.com/pedpt/Fulltext/2013/25020/Application_of_the_NICU_Practice_Guidelines_to.17.asp
- Eilish Byrne and Suzann K. Campbell (2013). *Physical Therapy Observation and Assessment in the Neonatal Intensive Care Unit. Physical & Occupational Therapy In Pediatrics* Vol. 33 , Iss. 1,2013 Ch. 29 The Neonatal Intensive Care Unit. *Campbell's Physical Therapy for Children Expert Consult 5th Edition* Editors:: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem
 - <https://evolve.elsevier.com/cs/product/9780323390187>

THEORETICAL PRINCIPLES THAT GUIDE PHYSICAL THERAPY PRACTICE IN THE NICU

Family-Centered Care

- Trends in Family-Centered Care in Neonatal Intensive Care Maree, Carin PhD; Downes, Fiona MS (MCur–Neonatal Nursing) *Journal of Perinatal & Neonatal Nursing: July/September 2016 - Volume 30 - Issue 3 - p 265–269* doi: 10.1097/JPN.0000000000000202
 - http://journals.lww.com/jpnnjournal/Abstract/2016/07000/Trends_in_Family_Centered_Care_in_Neonatal.24.aspx

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- [Family support and education](#) Goldstein LA. Phys Occup Ther Pediatr.2013 Feb;33(1):139-61. doi: 10.3109/01942638.2012.754393. Review.PMID: 23311525
 - <https://www.ncbi.nlm.nih.gov/pubmed/23311525>
- 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 <https://www.ncbi.nlm.nih.gov/pubmed/21255703>
- Patient's Bill of Rights:
 - For example see:www.chop.edu/about/our-philosophy-of-care/patients-bill-of-rights.htm
- S L Hall, M T Hynan, R Phillips, S Lassen, J W Craig, E Goyer, R F Hatfield and H Cohen. The neonatal intensive parenting unit: an introduction. *Journal of Perinatology* advance online publication 10 August 2017; doi: 10.1038/jp.2017.108
 - http://www.nature.com/jp/journal/vaop/ncurrent/full/jp2017108a.html?WT.feed_name=subjects_medical-research&foxtrotcallback=true
- Hall, S., Phillips, R., Hynan, M. (2016). Transforming NICU Care to Provide Comprehensive Family Support. *Newborn & Infant Nursing Reviews*, 16, 69-73.

Synactive Theory of Development

- Yvette Blanchard PT, ScD, PCS & Gunn Kristin Øberg PT, PhD, PCS (2015) Physical therapy with newborns and infants: applying concepts of phenomenology and synactive theory to guide interventions, *Physiotherapy Theory and Practice*, 31:6, 377-381, DOI: 10.3109/09593985.2015.1010243
 - <http://www.tandfonline.com/doi/full/10.3109/09593985.2015.1010243>
- A Synactive Model of Neonatal Behavioral Organization:Heidelise Als *Physical & Occupational Therapy In Pediatrics* Vol. 6 , Iss. 3-4,1986

Dynamic Systems Theory and Theory of Neuronal Group Selection

- Hadders-Algra, M. (2000), The Neuronal Group Selection Theory: a framework to explain variation in normal motor development. *Developmental Medicine & Child Neurology*, 42: 566–572. doi:10.1111/j.1469-8749.2000.tb 00714.x

Neuroplasticity

- Cerebral plasticity: Windows of opportunity in the developing brain Ismail, Fatima Yousif et al.*European Journal of Paediatric Neurology* , Volume 21 , Issue 1 , 23 - 48

International Classification of Functioning, Disability and Health (ICF)

- Ch. 1 Evidence-based decision Making in Pediatric Physical Therapy Campbell's Physical Therapy for Children Expert Consult 5th EditionEditors:: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem <https://evolve.elsevier.com/cs/product/9780323390187>

Trauma Informed Care

- Marcellus et al. (2016). Trauma-Informed Care in the NICU: Implications for early childhood development. *Neonatal Network*,35(6), 359-366.
- Trauma-Informed Care in the NICU: Evidenced-Based Practice Guidelines for Neonatal Clinicians 1st Edition [Mary Coughlin RN MS NNP](#) (Author) ISBN-13: 978-0826131966 ISBN-10: 0826131964 <http://www.springerpub.com/trauma-informed-care-in-the-nicu.html>
- Transformative Nursing in the NICU: Trauma-Informed Age-Appropriate Care 1st Edition by [Mary Coughlin RN MS NNP](#) ISBN-13: 978-0826196576 ISBN-10: 0826196578
 - <http://www.springerpub.com/transformative-nursing-in-the-nicu.html>

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Developmental Care

- Guidelines for the Institutional Implementation of Developmental Neuroprotective Care in the Neonatal Intensive Care Unit. Part A Isabelle Milette, Marie-Josée Martel, Margarida Ribeiro da Silva, Mary Coughlin McNeil *Canadian Journal of Nursing Research* Vol 49, Issue 2, pp. 46 - 62
First published date: May-17-2017 [10.1177/0844562117706882](https://doi.org/10.1177/0844562117706882)
- Developmental Care of Newborns and Infants: A Guide for Professionals. Edited by Carole Kenner, PhD RNC-NIC FAAN and Jacqueline M. McGrath, PhD RN FNAP FAAN. Published August 1, 2010. Reviewed July 2015
- On-Line Training Modules: **NANN Developmental Care Modules.**
<http://apps.nann.org/store/product-details?productId=390> Cost: \$199.00

TYPICAL DEVELOPMENT

Central Nervous System And Musculoskeletal System

- Ch. 29 NICU & Ch. 5 Musculoskeletal: Campbell's Physical Therapy for Children Expert Consult 5th Edition Editors: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem <https://evolve.elsevier.com/cs/product/9780323390187>
- Neonatology at a Glance, 3rd Edition [Tom Lissauer](#), [Avroy A. Fanaroff](#), [Lawrence Miall](#), [Jonathan Fanaroff](#) August 2015, ©2014, Wiley-Blackwell ISBN : 978-1-118-76732-0 <http://www.wiley.com/WileyCDA/WileyTitle/productCd-EHEP003344.html>

Sensory Development

- [Melinda B. Clark-Gambelunghe](#), [David A. Clark](#). (2015) Sensory Development. *Pediatric Clinics of North America*, Volume 62, Issue 2, Pages 367-384.
- [Pineda et al.](#) (2016). Enhancing sensory experiences for very preterm infants in the NICU: An integrative review. *Journal of Perinatology*, 16, 1-10.

Behavioral State Regulation And Behavioral Stress Cues

- <http://www.pediatrics.emory.edu/divisions/neonatology/dpc/nicubeh.html>
- http://specialstart.ucsf.edu/sstp/download/getting_to_know.pdf
- [Foreman SW, Thomas KA, Blackburn ST.](#) Preterm Infant State Development: Individual and Gender Differences Matter. *Journal of obstetric, gynecologic, and neonatal nursing : JOGNN / NAACOG*. 2008;37(6):657-665. doi:10.1111/j.1552-6909.2008.00292.x. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2765199/>
- [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.

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Motor And Sensory Motor Skills

- Ch 3 Motor Development and control, Ch 4: Motor Learning: Campbell's Physical Therapy for Children Expert Consult 5th Edition Editors:: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem
<https://evolve.elsevier.com/cs/product/9780323390187>
- Pathways Awareness Foundation (<http://www.pathways.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.

Social Development And Infant/Parent Interaction

- www.zerotothree.org
- Infant/parent interaction: Hope empowerment model
 - <http://www.copeforhope.com/nicu.php>
 - <http://www.copeforhope.com/pdf/Nationwide-Childrens-Hospital-Study.pdf>
 - Melnyk, B.M., Feinstein, N.F., Alpert-Gillis, L., Fairbanks, E., Crean, H., Sinkin, R.A., et al. (2006). Reducing premature infants' length of stay and improving parents' mental health outcomes with the Creating Opportunities for Parent Empowerment (COPE) Neonatal Intensive Care Unit Program: A randomized controlled trial. *Pediatrics*, 118, e414-e1437.
 - http://pediatrics.aappublications.org/content/118/5/e1414.long?sso=1&sso_redirect_count=1&nfstatus=401&nftoken=00000000-0000-0000-0000-000000000000&nfstatusdescription=ERROR%3a+No+local+token
- Sweeney, S., Rothstein, R., Visintainer, P., Rothstein, R., Singh, R. (2016). Impact of kangaroo care on parental anxiety level and parenting skills for preterm infants in the neonatal intensive care unit. *Journal of Neonatal Nursing*, 23 (3), 151-158.
- Shaw, R., St John, N., Lilo, E., Jo, B., Benitz, W., Stevenson, D., & Horwitz, S. (2013). Prevention of traumatic stress in mothers with preterm infants: A randomized controlled trial. *Pediatrics*, 132, e886-e894.
- Athanasopoulou E, Fox JR: Effects of kangaroo mother care on maternal mood and interaction patterns between parents and their preterm, low birth weight infants: a systematic review, *Infant Ment Health J* 35(3): 245-262, 2014.

Early Cognitive Development And Learning Opportunities In Infancy

- Oudgenoeg-Paz, O., Mulder, H., Jongmans, M. J., Van Der Ham, I. J. M., & Van Der Stigchel, S. (2017). The link between motor and cognitive development in children born preterm and/or with low birth weight: A review of current evidence.
<https://doi.org/10.1016/j.neubiorev.2017.06.009>
- www.zerotothree.org

OUTCOMES OF NEONATES AT RISK/ATYPICAL DEVELOPMENT

Infants Born Preterm (Social/Developmental)

- Hornman, J., de Winter, A. F., Kerstjens, J. M., Bos, A. F., & Reijneveld, S. A. (2016). Emotional and behavioral problems of preterm and full-term children at school entry. *Pediatrics*,

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- e20152255.PDF:<http://pediatrics.aappublications.org/content/pediatrics/early/2016/04/19/peds.2015-2255.full.pdf>
- Joseph, R. M., O'Shea, T. M., Allred, E. N., Heeren, T., Hirtz, D., Paneth, N., Leviton, A., & Kuban, K. C. (2017). Prevalence and associated features of autism spectrum disorder in extremely low gestational age newborns at age 10 years. *Autism Research, 10*(2), 224-232. PDF: <http://onlinelibrary.wiley.com/doi/10.1002/aur.1644/pdf>
 - Jeanie L. Cheong, MD; Lex W. Doyle, MD; Alice C. Burnett, PhD; et al Association Between Moderate and Late Preterm Birth and Neurodevelopment and Social-Emotional Development at Age 2 Years *JAMA Pediatr.* 2017;171(4):e164805. doi:10.1001/jamapediatrics.2016.4805
 - Pierrat Véronique, Marchand-Martin Laetitia, Arnaud Catherine, Kaminski Monique, Resche-Rigon Matthieu, Lebeaux Cécile et al. Neurodevelopmental outcome at 2 years for preterm children born at 22 to 34 weeks' gestation in France in 2011: EPIPAGE-2 cohort study *BMJ* 2017; 358 :j 3448
 - Einspieler C, Bos AF, Libertus ME, Marschik PB. The General Movement Assessment Helps Us to Identify Preterm Infants at Risk for Cognitive Dysfunction. *Frontiers in Psychology.* 2016;7:406. doi:10.3389/fpsyg.2016.00406.<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4801883/>
 - Crozier, S., Goodson, J., Mackay, M., Synnes, A., Grunau, R., Miller, S., Zwicker, J. (2016). Sensory processing patterns in children born very preterm. *American Journal of Occupational Therapy, 70* (1), 1-7.
 - Kelsey Philpott-Robinson, Shelly J Lane, Larissa Korostenski, Alison ELan. The impact of the Neonatal Intensive Care Unit on sensory and developmental outcomes in infants born preterm: A scoping review. *British Journal of Occupational Therapy* Vol 80, Issue 8, pp. 459 - 469 First published date:June-29-2017 [10.1177/0308022617709761](https://doi.org/10.1177/0308022617709761)
<http://journals.sagepub.com/doi/pdf/10.1177/0308022617709761>

Infants with Neonatal Abstinence Syndrome & infants with exposure to morphine for pain control

- Ko JY, Patrick SW, Tong VT, Patel R, Lind JN, Barfield WD. Incidence of neonatal abstinence syndrome--28 states, 1999-2013. *MMWR Morb Mortal Wkly Rep* 2016;65:799-802.
- Krans EE, Patrick SW. Opioid Use Disorder in Pregnancy: Health Policy and Practice in the Midst of an Epidemic. *Obstetrics and Gynecology.* 2016 Jul;128(1). 4-10.
- Patrick SW, Schumacher RE, Horbar JD, Buus-Frank ME, Edwards EM, Morrow KA, Ferrelli KR, Piccirillo AP, Gupta M, Soll RF. Improving Care for Neonatal Abstinence Syndrome. *Pediatrics.* 2016 May;137(5).
- Howard, MB, Schiff, DM, Penwill, N, Si, W, Rai, A, Wolfgang, T, et al. (2017). Impact of parental presence at infant's bedside on neonatal abstinence syndrome. *Hospital Pediatrics, 7*(2), 63-69.
- Bagwell et al. (2016). Improving skin integrity in babies diagnosed with neonatal abstinence syndrome. *Neonatal Network, 35*(5), 1-7.

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- Zwicker et al. (2016). Smaller cerebellar growth and poorer neurodevelopmental outcomes in very preterm infants exposed to neonatal morphine. *Journal of Pediatrics*. doi: 10.1016/j.jpeds.2015.12.024.

Infants With Genetic Conditions

- <https://www.genome.gov/10001204/specific-genetic-disorders/>

Infants With Cardiovascular And Pulmonary Conditions

- Ch 25 Children requiring long term mechanical ventilation, Ch 28: Congenital Heart Conditions: *Campbell's Physical Therapy for Children Expert Consult 5th Edition* Editors:: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem <https://evolve.elsevier.com/cs/product/9780323390187>
- Cheatham SL, Carey H, Chisolm JL, Heathcock JC, Steward D. Early results of neurodevelopment following hybrid stage I for hypoplastic left heart syndrome. *Pediatric Cardiology* 2015;36:684-691.
- Brain Injury and Neurodevelopmental Outcome in Congenital Heart Disease: A Systematic Review. Review article Mebius MJ, et al. *Pediatrics*. 2017 Jul;140(1). pii: e20164055. doi: 10.1542/peds.2016-4055. Epub 2017 Jun 13.

Infants With Neonatal Brain Injury

- Rogers EE, Hintz SR. Early neurodevelopmental outcomes of extremely preterm infants. *Sem Perinatol* 2016;40:497-509.
- Cole et al. (2017). Clinical characteristics, risk factors, and outcomes associated with neonatal hemorrhagic stroke: A population-based case-control study. *JAMA Pediatrics*
- Hielkema et al. (2016). Motor and cognitive outcome after specific early lesions of the brain – A systematic review. *Developmental Medicine & Child Neurology*, 58, 46-52.

Infants With Neuromuscular Injury

- Chang, KW, Yang, LJ, Driver, L., & Nelson, V. (2014). High prevalence of early language delay exists among toddlers with neonatal brachial plexus palsy. *Pediatric Neurology*, 51, 384-389.
- Ch 9 Congenital Muscular Torticollis, Ch 20: Brachial Plexus Injury: *Campbell's Physical Therapy for Children Expert Consult 5th Edition* Editors:: Robert Palisano Margo Orlin Joseph Schreiber Hardcover ISBN: 9780323390187 eBook ISBN: 9780323390781 Imprint: Saunders Published Date: 13th Decem <https://evolve.elsevier.com/cs/product/9780323390187>

Infants born Late Preterm

- Spittle et al. (2017). Neurobehavior at term-equivalent age and neurodevelopmental outcomes at 2 years in infants born moderate-to-late preterm. *Developmental Medicine and Child Neurology*, 59(2), 207-215.
- Hadders-Algra. (2017). Neurobehavior at term in infants born moderately and late preterm is associated with cognition at 2 years. *Developmental Medicine and Child Neurology*, 59(2), 122-123.

Infants born Preterm

- Breeman et al. (2017). Neonatal predictors of cognitive ability in adults born very preterm: A prospective study. *Developmental Medicine and Child Neurology*.
- Serenius et al. (2016). Neurodevelopmental outcomes among extremely preterm infants 6.5 years after active perinatal care in Sweden. *JAMA Pediatrics*, 170(10), 954-963.

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- Crozier et al. (2016). Sensory processing patterns in children born very preterm. *American Journal of Occupational Therapy*, 70(1), 1-7.
- Subedi et al. (2017). Developmental trajectories in children with prolonged NICU stays. *Archives of Disease in Childhood*, 102(1), 29-34.
- Segal et al. (2016). Relationship between central hypotonia and motor development in infants attending a high-risk neonatal neurology clinic. *Pediatric Physical Therapy*, 28(3), 332-336.

EXAMINATION AND EVALUATION

Examination procedures for neonates:

Determining physiologic and behavioral readiness for neonatal physical therapy examination
Monitoring autonomic, behavioral state, and motor stability throughout an examination
Conducting observational examination techniques
Administering minimal contact examination techniques
Determining when standardized assessment is safe to perform and clinically warranted
Providing standardized assessments developed for neonates born preterm or at term gestation

- White Matter Injury and General Movements in High-Risk Preterm Infants C. Peyton, E. Yang, M.E. Msall, L. Adde, R. Støen, T. Fjørtoft, A.F. Bos, C. Einspieler, Y. Zhou, M.D.Schreiber, J.D. Marks, A. Drobyshevsky *American Journal of Neuroradiology* Jan 2017, 38 (1) 162-169; DOI: 10.3174/ajnr.A4955 <http://www.ajnr.org/content/38/1/162>
- Einspieler C, Peharz R, Marschik PB. Fidgety movements - tiny in appearance, but huge in impact. *J Pediatr (Rio J)*. 2016;92(3 Suppl 1):S64-70. http://ac.els-cdn.com/S0021755716000516/1-s2.0-S0021755716000516-main.pdf?_tid=0f28061e-9729-11e7-be49-00000aab0f26&acdnat=1505159006_039a27f61f660223f938fba2f378063c
- Oana Craciunoiu and Liisa Holsti. A Systematic Review of the Predictive Validity of Neurobehavioral Assessments During the Preterm Period. *Physical & Occupational Therapy In Pediatrics* Vol. 37 , Iss. 3,2017
- Novak et al. Early, accurate diagnosis and early intervention in cerebral palsy. *JAMA Pediatr* doi:10.1001/jamapediatrics.2017.1689
- Sweeney J.K., Blackburn S.T. (2013). Neonatal Physiological and Behavioral Stress During Neurological Assessment. *Journal of Perinatal and Neonatal Nursing*. 27 (3): 242-252.
- Craciunoiu et al. (2016). A Systematic review of the predictive validity of neurobehavioral assessments during the preterm period. *Physical & Occupational Therapy in Pediatrics*, 1-16.
- Dunsirn et al. (2016). Defining the nature and implications of head turn preference in the preterm infant. *Early Human Development*, 96, 53-60.

Neonatal Test and Measures

HINE (Impairment Measure)

Purpose: Prognostic information regarding motor outcome, identify infants who may benefit from therapy

Age Range: 2-24 months

Areas Tested: 26 items assessing cranial nerve function, posture, quality, and quantity of movements, muscle tone, and reflexes and reactions

Training required: Nationwide Children's Hospital (free)

Cost: score sheet available <http://dx.doi.org/10.1016/j.pediatrneurol.2016.09.010>

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Optimality score for the neurologic examination of the infant at 12 and 18 months of age
Haataja, Leena et al. The Journal of Pediatrics, Volume 135, Issue 2, 153 - 161
Implementation of the Hammersmith Infant Neurological Examination in a High-Risk Infant
Follow-Up Program <http://www.sciencedirect.com/science/article/pii/S0887899416305653>
Training Video <https://www.dropbox.com/s/6goyj19tie8rtga/video.mp4?dl=0>

NIDCAP (Impairment Measure/Activity Measure)

NEONATAL INDIVIDUALIZED DEVELOPMENTAL CARE AND ASSESSMENT
PROGRAM (NIDCAP) (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. <http://nidcap.org/en/about-us/faq/>

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

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.

NBO (Participation Measure)

The Newborn Behavioral Observations (NBO)

Purpose: not an assessment tool per se but a relationship-building tool designed to help clinicians sensitize parents to their child's competencies and uniqueness, and support the development of positive parent-infant and clinician-parent relationships. It consists of a structured set of 18 neurobehavioral items observed with the 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

Areas Tested: Training required: Two day offsite

Fee: cost/person

<http://products.brookespublishing.com/Understanding-Newborn-Behavior-and-Early-Relationships-P211.aspx> [The Newborn Behavioral Observations \(NBO\) System Training Workshops](http://www.brazelton-institute.com/clnbas2.html)

NNNS (Impairment Measure)(NICU Neonatal Network Scale)

Purpose: examines the neurobehavioral organization, neurological reflexes, motor development - active and passive tone, and signs of stress and withdrawal of the at-risk and drug-exposed infant. It was designed to provide a comprehensive assessment of both neurological integrity and behavioral function.

Age Range: 34 weeks-45 weeks

Areas Tested:

The examination includes 3 parts:

- 1) neurologic items that assess active and passive tone and primitive reflexes as well as items that reflect CNS integrity
- 2) behavioral items including state and sensory and interactive responses
- 3) stress/abstinence items particularly appropriate for high-risk infants.

Training required: Training seminars are structured to meet the specific needs of those being trained. Training is intensive, didactic and very hands-on. The preferred approach is to arrange

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two training sessions several weeks apart to allow for a period of time between sessions during which the trainee(s) can practice administering and scoring the exam. However, with adequate preparation, most examiners can complete the training within a single 5-day training session. * Some examiners with extensive infant experience and pre-visit preparation, can achieve certification in less than 5 days.

https://www.brown.edu/research/projects/children-at-risk/sites/brown.edu.research.projects.children-at-risk/files/uploads/NNNS%20Training%20Program%20FAQ_0.pdf

Cost: cost associated per trainee (+ travel expenses for the trainee or trainer)

- Cost is associated per trainee for NNNS kit, which includes 1 NNS manual, 2 head supports, 1 flashlight, 1 bell, 1 ball, 1 rattle. This fee includes domestic shipping only.

<https://www.brown.edu/research/projects/children-at-risk/about/nns-training-and-certification-program-0>

<https://www.brown.edu/research/projects/children-at-risk/sites/brown.edu.research.projects.children-at-risk/files/uploads/NNNS%20Procedures.pdf>

TIMP (Activity Measure)

TEST OF INFANT MOTOR PERFORMANCE (TIMP)

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: 34-weeks gestational age through 4-months post-term (or full term to 4-months)

Areas Tested: 13 observed behaviors and 25 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 one position to another, distal selective control of the fingers and ankles, antigravity control of arm and leg movement.

Training required: approximately 14 hours of study plus a minimum of 10 hours practice testing infants.

Cost: includes self-instructional DVD, User's Manual and TIMP test forms or \$500 for e-Learning course with User's Manual, TIMP test forms, and age calculator

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 <http://thetimp.com>

GMA General Movement Assessment (Impairment Measure)

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

Age Range: Birth to 20 weeks post term.

Areas Tested:

Training required: **BASIC COURSE:** Four-days-course is to provide an introduction **Prechtl's Method on the Qualitative Assessment of General Movements** in young infants. Cost: \$900.00

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ADVANCED COURSE: This four-days-course is for participants who are already engaged in applying **Prechtl's Method on the Qualitative Assessment of General Movements**. This training will deal with the details of the assessment, the proper terminology and technique as well as with the application of individual developmental trajectories. Cost \$900.00

Prechtl's Method on the Qualitative Assessment of General Movements in Preterm, Term and Young Infants. Christa Einspieler, Heinz FR Prechtl, Arend F Bos, Fabrizio Ferrari & Giovanni Cioni ISBN 1 898683 40 9 2004.

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

Cost: \$ 65.00. Includes a DVD giving 15 cases selected from the book

- <http://general-movements-trust.info/51/papers>
- <http://general-movements-trust.info/5/home>

- General Movement Trust video
- https://www.dropbox.com/scl/fi/42wcqbyom0tv64y/Spontaneous%20Motor%20Activity.mp4?dl=0&oref=e&r=AAc4jPjcfgoIF0YbN0jpu7SOa2RG94vgx_IG397Sp2GEOYVLAUKQx7dn3iji-LdA32wZSDWuY-tGx07NUEM_1BZnN-JqXpCzQGBJeigT201LiKnyC9JydAlCrtDQ01jggT8_1EWq0A8YIiUlqXgNoP75VuowQtbQZOi0XFgmUcwXCq4cbHHBITsc1NWXFBr5n-k&sm=1

Finnegan (Impairment Measure)

NEONATAL ABSTINENCE SCORING FORM

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 online

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. http://www.lkpz.nl/docs/lkpz_pdf_1310485469.pdf

<https://www.neoadvances.com/authors.html>

Pain Scales of Neonates and Infants

NPASS

CRIES

NEONATAL INFANT PAIN SCALE (NIPS)

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 online.

Author: J. Lawrence, D. Alcock, P. McGrath, J. Kay, S.B. MacMurray, C. Dulberg Publisher: Neonatal Network. 1993;12(6):59-66.

Lawrence J, Alcock D, McGrath P, Kay J, MacMurray SB, Dulberg C. The development of a tool to assess neonatal pain. Neonatal Network. 1993;12:59-66. [PubMed] <https://com-jax->

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emergency-paini.sites.medinfo.ufl.edu/files/2015/02/Neonatal-Infant-Pain-Scale-NIPS-pain-scale.pdf

THE PREMATURE INFANT PAIN PROFILE (PIPP)

Purpose: A behavioral 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

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.

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

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 online.

Authors: Sandra I. Merkel, Terri Voepel-Lewis, Jay R. Shayeivitz, Shobha Malviya Publisher: Pediatric Nursing, 1997 May-Jun;23(3):293-7.

<http://wps.prenhall.com/wps/media/objects/3103/3178396/tools/flacc.pdf>

- Prevention and Management of Procedural Pain in the Neonate: An Update
COMMITTEE ON FETUS AND NEWBORN and SECTION ON ANESTHESIOLOGY AND PAIN
MEDICINE Pediatrics Jan 2016, peds.2015-4271; DOI: 10.1542/peds.2015-4271
<http://pediatrics.aappublications.org/content/early/2016/01/22/peds.2015-4271>

SAFE AND EFFECTIVE INTERVENTIONS

Please refer to essential reading before going further

Global

- [Res Dev Disabil](#). 2017 May;64:108-117. doi: 10.1016/j.ridd.2017.03.009. Epub 2017 Apr
Occupational therapy, physical therapy and speech-language pathology in the neonatal intensive care unit: Patterns of therapy usage in a level IV NICU. [Ross K1](#), [Heiny E1](#), [Conner S2](#), [Spener P2](#), [Pineda R3](#). <https://www.ncbi.nlm.nih.gov/pubmed/28384484>
- Age-Appropriate Care of the Premature and Critically Ill Hospitalized Infant
http://nann.org/uploads/Education/Age-Appropriate_Care-FINAL.pdf
- Hughes et al. (2016). Motor development interventions for preterm infants: A systematic review and meta-analysis. Pediatrics, 138(4)
- Spittle et al. (2016). The role of early developmental intervention to influence neurobehavioral outcomes of children born preterm. Seminars in Perinatology, 40(8), 542-548.
- Dusing et al. (2016). Supporting mother-infant interaction in the NICU may enhance oral motor skills, weight gain, and feeding volume: A pilot study. Developmental Medicine & Child Neurology, 58, 13-14.
- Dusing et al. (2016). Initial efficacy of SPEEDI: A developmental intervention provided for 15 weeks in the NICU and community improves motor abilities in infants born very preterm or with brain injury. Developmental Medicine & Child Neurology, 58(S5), 14-15

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Positioning To Support Alignment And Movement

- King, C., & Norton, D. (2017). Does therapeutic positioning of preterm infants impact upon optimal health outcomes? A literature review. <https://doi.org/10.1016/j.jnn.2017.03.004>
- Madlinger-Lewis L, Reynolds L, Zarem C, Crapnell T, Inder T, Pineda R. The Effects of Alternative Positioning on Preterm Infants in the Neonatal Intensive Care Unit: A Randomized Clinical Trial. *Research in developmental disabilities*. 2014;35(2):490-497. doi:10.1016/j.ridd.2013.11.019. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3938096/>
- McCarty (2017) Dolichocephaly in Preterm Infants: Prevalence, Risk Factors, and Early Motor Outcomes. *American Journal of Perinatology*. <https://www.thieme-connect.com/products/ejournals/html/10.1055/s-0036-1592128>
- 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.
- 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.
- SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment TASK FORCE ON SUDDEN INFANT DEATH SYNDROME *Pediatrics* Oct 2016, e20162938; DOI: 10.1542/peds.2016-2938
- [Adv Neonatal Care](#). 2012 Jun;12(3):172-5. doi: 10.1097/ANC.0b013e318256b7c1. Positioning after feedings: what is the evidence to reduce feeding intolerances? [Elser HE1](#).

Handling

- Gunn Kristin Øberg, Yvette Blanchard & Aud Obstfelder. [Therapeutic encounters with preterm infants: interaction, posture and movement](#). *Physiotherapy Theory and Practice* Vol. 30, Iss. 1, 2014
- Ludington-Hoe S. (2011) Evidence based review of physiological effects of kangaroo care. *Women's Health Reviews*. 7(3), 243-253.
- Charpak N, Ruiz JG, Zupan J, Cattaneo A, Figueroa Z, Tessier R, Cristo M, Anderson G, Ludington S, Mendoza S, Mokhachane M and Worku B . 2005. Charpak et al 2005 [Kangaroo Mother Care 25 years after](#) *Acta Paediatrica* 94: 514-522 (DOI: 10.1080/08035250510027381)
- Hilderman CGE, Harris SR. Early intervention post-hospital discharge for infants born preterm. *Phys Ther* 2014;94:1211-1219
- White-Traut RC, Nelson MN, Silvestri JM, Vasani U, Littau S, Meleedy-Rey P, Gu G and Patel M . 2002. [Effect of auditory, tactile, visual, and vestibular intervention on length of stay, alertness, and feeding progression in preterm infants](#). *Developmental Medicine and Child Neurology* 44: 91-97.
- Valizadeh L, Sanaeifar M, Hosseini MB, Jafarabadi MA, Shamili A. Effect of early physical activity programs on motor performance and neuromuscular development in infants born preterm: A randomized clinical trial. *J Caring Sci* 2017;6:69-81.
- Fucile S, Gisel EG. Sensorimotor interventions improve growth and motor function in preterm infants. *Neonatal Network* 2010;29(6):359-366
- Ustad T, Evensen KAI, Campbell SK, Girolami GL, Helbostad J, Jorgensen L, Kaaresen PI, Oberg GK. Early parent-administered physical therapy for preterm infants: A randomized controlled trial. *Pediatrics* 08/2016;138(2). DOI:10.1542/peds.2016-0271.

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- Stalnaker & Poskey (2016). Osteopenia of prematurity: Does physical activity improve bone mineralization in preterm infants? *Neonatal Network*, 35(2), 95-104.

Massage

- Diego MA, Field T, Hernandez-Reif M. Preterm Infant Weight Gain is Increased by Massage Therapy and Exercise Via Different Underlying Mechanisms. *Early human development*. 2014;90(3):137-140. doi:10.1016/j.earlhumdev.2014.01.009.
- Niemi A-K. Review of Randomized Controlled Trials of Massage in Preterm Infants. McClafferty H, ed. *Children*. 2017;4(4):21. doi:10.3390/children4040021.
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5406680/>

Environmental Modifications

- Filippa, M., Panza, C., Ferrari, F., Frassoldati, R., Kuhn, P., Balduzzi, S. and D'Amico, R. (2017), Systematic review of maternal voice interventions demonstrates increased stability in preterm infants. *Acta Paediatr*, 106: 1220–1229. doi:10.1111/apa.13832
- Pineda RG, Stransky KE, Rogers C, et al. The Single Patient Room in the NICU: Maternal and Family Effects. *Journal of perinatology : official journal of the California Perinatal Association*. 2012;32(7):545-551. doi:10.1038/jp.2011.144.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3790962/>
- Single-Family Room Care and Neurobehavioral and Medical Outcomes in Preterm Infants Barry M. Lester, Kathleen Hawes, Beau Abar, Mary Sullivan, Robin Miller, Rosemarie Bigsby, Abbot Laptook, Amy Salisbury, Marybeth Taub, Linda L.Lagasse, James F. Padbury *Pediatrics* Oct 2014, 134 (4) 754-760; DOI: 10.1542/peds.2013-425
<http://pediatrics.aappublications.org/content/134/4/754.long>
- Auditory Exposure in the Neonatal Intensive Care Unit: Room Type and Other Predictors *The Journal of Pediatrics*, Volume 183, Issue null, Pages 56-66.e3
- Roberta Pineda, Polly Durant, Amit Mathur, Terrie Inder, Michael Wallendorf, Bradley L. Schlaggar
<http://www.sciencedirect.com/science/article/pii/S0022347616315670?showall%3Dtrue%26via%3Dihub>
- Newborn and Infant Nursing Reviews
Volume 16, Issue 4, Pages A1-A8, 173-348 (December 2016)
Special Issues on NICU Design and Infant Mental Health in the Intensive Care Unit and Beyond
Edited by Joy V. Browne, Robert White and Ayelet Talmi
<http://www.sciencedirect.com/science/journal/15273369/16/4?sdc=1>
- Differential Effects of the Single-Family Room Neonatal Intensive Care Unit on 18- to 24-Month Bayley Scores of Preterm Infants.
Vohr B, et al. *J Pediatr*. 2017.

Developmental Care

- NANN Developmental Care Modules
This purchase gives you access to all 27 modules, with 38.0 CNE contact hours. Included in this set is a PDF overview for each module as well as a post-test and evaluation the learner will complete to receive the designated contact hours. The modules are an aid and do not include an in-depth description of the subject matter. Instead, they are study guides that augment and build on what learners are reading and studying or upon their professional experiences in developmental care as a means to promote understanding and retention.
<http://apps.nann.org/store/product-details?productId=390>

Splinting

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- Protocol Development for Infants with Orthopedic Complications in the Neonatal Intensive Care Unit: Brachial Plexus Injuries and Clubfoot Kari J. Tanta PhD OTR/L FAOTA, Kari Gunsolus, Nicole Harley MOT OTR/L, Kara Grosvenor OTR/L, Janalynn Garcia OTR/L & Tracy Jirikowic PhD OTR/L *Journal of Occupational Therapy, Schools, & Early Intervention* Vol. 5 , Iss. 3-4,20

Wound Care

- Blume-Peytavi U, Hauser M, Stamatatos GN< Pathirana D, Garcia Bartels N. Skin care practices for newborns and infants: Review of the clinical evidence for best practices. *Pediatr Dermatol.* 2012;28(3):241-54.
- Lund CH., Osborne JW., Kuller J., Lane AT., Lott JW., and Raines DA.: Neonatal skin care: clinical outcomes of the AWHONN/NANN Evidence-Based Clinical Practice Guideline. Association of Women's Health, Obstetric and Neonatal Nurses and the National Association of Neonatal Nurses. *J Obstet Gynecol Neonatal Nurs* 2001; 30: 41 [PubMed]
- Ness, Dawn, Davis, Carey. Neonatal skin care: a concise review. *International Journal of Dermatology.* 2013, 52, 14-22
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3985526/pdf/wound.2013.0477.p>
- Fox, MD. Wound Care in the Neonatal Intensive Care Unit. *Neonatal Network.* 2011;30(5):291-303

Determining The Need For And Completing Oral Motor Or Feeding Readiness Assessments And Providing Oral Motor Intervention In Preparation For Oral Feeding

- 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 Systematic 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.
- Garber, J. [Oral–Motor Function and Feeding Intervention](#). *Physical and Occupational Therapy in Pediatrics* 2013 (DOI:10.3109/01942638.2012.750864)
- Crowe L, Chang A, Wallace K. [Instruments for assessing readiness to commence suck feeds in preterm infants: effects on time to establish full oral feeding and duration of hospitalisation.](#) *Cochrane Database of Systematic Reviews* 2012, Issue 4. Art. No.:CD005586. DOI: 10.1002/14651858.CD005586.pub2.
- Fucile S, Gisel EG, McFarland DH and Lau C. [Oral and non-oral sensorimotor interventions enhance oral feeding performance in preterm infants.](#) *Developmental Medicine and Child Neurology* 53: 829-835 (DOI:10.1111/j.1469-8749.2011.04023.x)
- Fucile S, McFarland DH, Gisel EG, Lau C. [Oral and non oral sensorimotor interventions facilitate suck-swallow-respiration functions and their coordination in preterm infants.](#) *Early Human Development* 2011 (DOI:10.1016/j.earlhumdev.2011.09.007)
- Lau C . 2013. [Is there an advantage for preterm infants to feed orally in an upright or sidelying position?](#) *Journal of Neonatal Nursing* 19:28-32 (DOI:10.1016/j.jnn.2012.03.013)
- Lau C, Smith EO. [A novel approach to assess oral feeding skills of preterm infants.](#) *Neonatology* 2011;100:64-70.

Feeding Books

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Ross ES, Philibin MK. SOFFI: AN evidence-based method for quality bottle-feeding of preterm, ill, and fragile infants. *J Perinat Neonatal Nurs.* 2011 OCT-Dec; 25(4): 349-359.

Philibin MK, Ross ES. The SOFFI Reference Guides: Text, Algorithms, and Appendices: A manualized method for quality. *Bottle Feedings. J Perinat Neonatal Nurs.* 2011 Oct-Dec; 25(4):360-380.

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.

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.

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.

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.

<http://www.nomasinternational.org/index.php>

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.

Cost: Order all 11 talks in Series One for \$375

Introductory, intermediate and advanced material

(\$850 if taken individually)

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Series 2 The 12 talks in this online course focus on the etiology, diagnosis, and treatment of feeding difficulties in the term and preterm infant. Evaluation and treatment strategies for the “difficult to feed” infant both in the NICU or special care nursery are discussed as well as those feeding issues that persist after discharge.

Series 3:

The full course is made up of all 12 talks. Each talk runs about 1 hour.

Cost: Order all 12 talks in Series Two for \$375

Introductory, intermediate and advanced material

http://www.nomasinternational.org/about_training.php

- 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;
<http://shaker4swallowingandfeeding.com>

PRODUCTS DEVELOPED FOR NICU

- <http://www.usa.philips.com/healthcare/solutions/mother-and-child-care/infant-positioning>
 - Positioning Products including gel positioning aids, snuggle up, Frederick T Frog, Prone plus, Bendy bumper
- www.dandlelionmedical.com
 - Positioning products including dandleRoo, DandleRoo Lite, Dandle Wrap, Dandle Pal
- www.resqwedge.com
 - Wedge positioner and sling for reflux.
- www.sundancesolutions.com/neonatal/
 - Positioning products including fluidized products
- <http://www.nurturedbydesign.com/en/thezaky/>
 - Positioning tool that can use mother's scent and be used for boundaries and containment
- <http://tortlemedical.com>
 - The positioning system includes the turtle air and turtle midliner for head positioning.
- <http://www.halosleep.com/in-hospital-sleepsack-program/>
 - supplier of sleep sacks and hospital sleep sack program
- <https://www.catapult-products.com/>
 - Swaddle bathing product TurtleTub

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COMMUNICATION AND COLLABORATION

Developing And Implementing Parent/ Caregiver Education Programs For Adult Learners With Diverse Backgrounds/ Providing Family Education In A Culturally Sensitive Manner

- Dusing SC, Murray T, Stern M. Parent preferences for motor development education in the neonatal intensive care unit. *Pediatr Phys Ther* 2008;20:363-368.
- Goldstein LA, Campbell SK. Effectiveness of the Test of Infant Motor Performance as an educational tool for mothers. *Pediatr Phys Ther.* 2008;20:152-159.
- Aydon, L., Hauck, Y., Murdoch, J., Siu, D. and Sharp, M. , Transition from hospital to home: Parents perception of their preparation and readiness for discharge with their preterm infant. *J Clin Nurs.* Accepted Author Manuscript.
doi:10.1111/jocn.13883<http://onlinelibrary.wiley.com/doi/10.1111/jocn.13883/abstract;jsessionid=357E4A9EAF53825F8416D367FF63882C.f02t03>
- Boykova. (2016). Transition from hospital to home in preterm infants and their families. *Journal of Perinatal & Neonatal Nursing*, 30(3), 270-272.
- Martin et al. (2016). Racial differences in parental satisfaction with neonatal intensive care unit nursing care. *Journal of Perinatology*, 36(11), 1001-1007
- Skeens et al. (2016). Health literacy and preferences for sources of child health information of mothers with infants in the neonatal intensive care unit. *Advances in Neonatal Care*, 16(4), 308-314.
- Adama et al. (2016). Parents' experiences of caring for preterm infants after discharge from neonatal intensive care unit: A meta-synthesis of the literature. *Journal of Neonatal Nursing*, 22(1), 27-51.
- National Association of Neonatal Nursing
NANN offers several resources for neonatal families. As part of the *Advances in Neonatal Care: Family Teaching Toolbox*.
<http://nann.org/education/educational-products/family-patient-education-products>
- *Transitioning Newborns from NICU to HOME: A Resource Toolkit*, Agency for Healthcare Research and quality
https://www.ahrq.gov/professionals/systems/hospital/nicu_toolkit/index.html

Consulting With Other Professionals ✕ Collaborating As Part Of An Interdisciplinary Developmental Team/Communicating With Physicians, Occupational Therapists, Speech Language Pathologists, Respiratory Therapists, Child Life, Social Workers, And Other Professionals

- *Barbosa V., Teamwork in the NICU Physical & Occupational Therapy in Pediatrics*, 33(1):5-26, 2013 © 2013 by Informa Healthcare USA, Inc. Available online at [http://informahealthcare.com/potpDOI: 10.3109/01942638.2012.72955](http://informahealthcare.com/potpDOI:10.3109/01942638.2012.72955)
<http://www.rheapaul.com/Files/Teamwork%20in%20NICU.pdf>
- Rapport MJ, Sweeney JK, Dannemiller L, Heriza CB. Student experiences in the neonatal intensive care unit: addendum to neonatal physical therapy competencies and clinical training models. *Pediatr Phys Ther.* 2010;22(4):439-440.

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Planning For Discharge, Including Community Resources, Car Seats, And Other Equipment Or Therapy Needs

- Safe Transportation of Preterm and Low Birth Weight Infants at Hospital Discharge Marilyn J. Bull, William A. Engle Pediatrics May 2009, 123 (5) 1424-1429; DOI: 10.1542/peds.2009-0559 <http://pediatrics.aappublications.org/content/123/5/1424>
- Early Therapy Services Following Neonatal Intensive Care Unit Discharge Odochi Nwabara, Cynthia Rogers, Terrie Inder & Roberta Pineda *Physical & Occupational Therapy In Pediatrics* Vol. 37 , Iss. 4,2017 Send your article selections to [Article Search@apta.org](mailto:ArticleSearch@apta.org) to receive full text copies of the articles.
- Spittle A, Orton J, Anderson PJ, Boyd R, Doyle LW. Early developmental intervention programmes provided post hospital discharge to prevent motor and cognitive impairment in preterm infants. *Cochrane Database of Systematic Reviews* 2015, Issue 11. Art. No.: CD005495. DOI: 10.1002/14651858.CD005495.pub4.
 - <https://www.ncbi.nlm.nih.gov/pubmed/26597166>
- 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

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