

Neonatal Therapy

Elizabeth Cronkrite, MA, CCC-SLP

Disclosures

- No financial or non-financial disclosures

Objectives

- Identify reasons an infant may be admitted to the Neonatal ICU
- Describe the environment of the NICU
- Outline the Scope of Practice of a Neonatal Therapist
- Discuss the basics of providing Developmental Care
- Consider the role of the SLP in the NICU as a feeding expert

History of Neonatology

- 1870: Infant mortality more than 230/1,000 births
- 1896: Dr. Couney brought the incubator to the US
- 1920: Formula feeds are introduced
- 1930: New incubator could deliver oxygen to the baby inside and was used in the first dedicated transport vehicle in Chicago

History of Neonatology

- 1959: Dr. Mary Ellen Avery and Jere Mead describe deficiency of surfactant in the lungs of infants with respiratory distress syndrome
- 1965: First NICU opened in the US at Yale Hospital
- 1970: Dr. Heidelise Als introduced the Newborn Individualized Developmental Care and Assessment Program (NIDCAP)

Levels of Care

- Level I – Well Newborn Nursery
- Level II – Special Care Nursery
- Level III – NICU
- Level IV – Regional NICU

The Neonatal ICU

- Complications from prematurity
- Birth anomalies
- Brain injury
- Cardiac conditions
- Infection
- Jaundice
- Neonatal Abstinence Syndrome (NAS)
- Respiratory distress

Neonatal Therapy (NT)

“Neonatal Therapy is the art and science of integrating typical development of the infant and family into the environment of the NICU.”

NANT Core Scope of Practice



Neonatal Therapy

- PT, OT, and/or SLP
- Complex subspecialty
- Multidisciplinary approach

Foundational Skills

- Intervention requires continuous assessment
- Factors affecting assessment and intervention
- Individualized to meet the unique needs of each infant and family

Foundational Knowledge

- Dynamic Systems Theory
- Synactive Theory
- Family Centered Care
- Attachment Theory
- Acute and chronic stress and pain
- Neurodevelopment (motor, sensory, autonomic)
- Neurobehavior
- Fetal/neonatal brain development
- Embryology
- Basic anatomy & physiology of the neonate
- Basic feeding & swallowing
- Atypical and typical preterm development
- Typical neurodevelopmental outcomes of preterm infants
- Medical equipment, procedures, and terminology
- NICU culture

Universe of Developmental Care Model

- Interaction of the body and the environment has a huge impact on brain development
- Experiences create synapses

Fetal Development



- <8 weeks: embryonic period when most organ systems are formed
- 8+ weeks: fetal period marked by significant growth
- 12 weeks: spontaneous movements

<http://www.mediategraphix.com/projects/foetal-development-2013/illustrations-about-development-of-embryo-and-fetus.html>

Fetal Development

- 16 weeks: eye movements begin, swallowing amniotic fluid, growth starts to slow
- 20 weeks (half way!): fetus is active 10-30% of the day, cochlear function develops



<http://www.whattoexpect.com/pregnancy/week-by-week/week-20.aspx>

Fetal Development



<https://www.babycenter.com/pregnancy/week-by-week/30-weeks-pregnancy>

- 23-24 weeks (viability): fat deposits, neurological pain system, lung growth
- 28 weeks: eye blinking
- 32+ weeks: continued fat deposits, growth, and lung development

Environment



Photo: <https://www.pregnety.com/ages/40-week-pregnancy/>

Environment

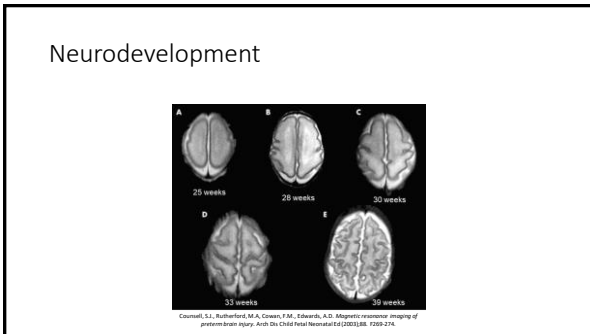


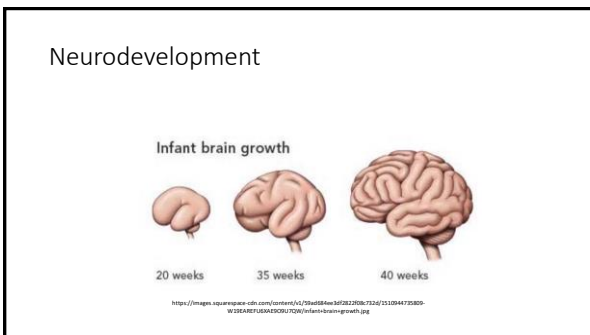
Photos by Elizabeth Conforte



Photo by Elizabeth Conforte







How can we help???

- Look at the infant-environment interaction
- Support the development of the subsystems
 - Neurobehavioral
 - Neuromotor
 - Musculoskeletal
 - Sensory
 - Aerodigestive

Neurobehavioral

- Autonomic
- Motor
- State
- Attention
- Self-regulation

Neuromotor

- Positioning and handling for caregiving, rest, and recovery
- Movement patterns
- Reflex development
- Muscle tone development
- Compromise following insult or injury

Musculoskeletal

- Posture and alignment development
- Antigravity movements
- Physiologic tolerance of activity
- Management of orthopedic anomalies
- Prevention of iatrogenic deformities

Sensory

- Tactile – Vestibular – Olfactory – Gustatory – Auditory – Visual
- Interruptions in the sequence of development can lead to sensory interference
- S.E.N.S.E. Program
 - Ex: 30 weeks: limited light, 30 minutes/day of soft talking, mom's scent, oral care with breast milk, 1.5 hours/day positive touch, 1 hour/day holding

Positioning



<https://healthrights.org.uk/wp-content/uploads/2018/05/Positioning-and-handling-of-the-newborn-19-July-2017-Final-version.pdf>



<https://www.oranivetherapies.com/ideas-to-act-on-2/>

Handling

- Soothing versus procedural touch
- Deep static pressure versus light moving touch
- Preparatory touch
- Slow, intentional movements



<https://newbornsnareed.marchofdimes.org/first-steps/what-you-need-to-know-about-the-2022-newborn-care-plan/>

Environment

- No or low light
- Quiet environment
- Mother's scent
- Breastmilk

Let's talk about feeding

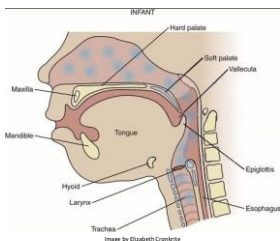


<https://www.parents.com/baby/feeding/feeding-type-type-101/>

Oral Feeding Difficulty

- 40-70% of infants born prematurely or with chronic medical conditions report severe feeding problems
- Structural anomalies (cleft palate, TEF, etc.)
- Infants' response to feeding difficulty is variable

Aerodigestive



Feeding Milestones

- Fetus is swallowing amniotic fluid at 16 weeks
- Non-nutritive and comfort sucking
- 32-34 weeks: will start to show readiness for oral feeds
- 36+ weeks: coordinated and efficient oral feeding

Feeding Interventions

- Non-nutritive suck



Photo by Elizabeth Cronkite

Feeding Interventions

- Oral sensorimotor stimulation



Image by Elizabeth Cronkite

Feeding Interventions

- Cue-based feeding



Photo by Elizabeth Cronkite

Feeding Interventions

- Side-lying position
- Slow flow nipples



<https://www.sctimes.com/story/news/local/2018/12/24/baby-first-christmas-at-child-hospital-nicu/234740002/>

Advocating for SLP in your NICU

- Medically complex and fragile infants
- Risk for feeding difficulty and aspiration
- Oral feeding is complex and can lead to adverse sequelae
- SLPs are swallowing experts

Summary

- NICU admissions
- Foundational Knowledge for a Neonatal Therapist
- Developmental care through a systems approach
- The elemental role of the SLP as a feeding expert

Questions?



References

Aguilar-Vázquez, E., Pérez-Padilla, M. L., Martín-López, M. de, & Romero-Hernández, A. A. (2019). Rehabilitation of sucking and swallowing alterations in premature newborn at the neonatal intensive care unit. *Boletín Médico Del Hospital Infantil De México [English Edition]*, 75(1).

American Academy of Pediatrics. (2012). Levels of neonatal care. *Pediatrics*, 144(5), 1341.

Andrews, B., Pellecette, M., Myers, P., & Hageman, J. R. (April 2014). NICU follow-up: Medical and developmental management age 0 to 3 years. *NeoReviews*, 15(4), e123-e132.

Arora, K., Goel, S., Manerkar, S., Konde, N., Parshai, H., Hegde, D., & Mondkar, J. (2018). Prefeeding oromotor stimulation program for improving oromotor function in preterm infants — A randomized controlled trial. *Indian Pediatrics*, 55(8), 675–678.

Campbell-Yeo, M., Disher, T., Benoit, B., & Johnston, C. (2015). Understanding kangaroo care and its benefits to preterm infants. *Pediatric Health, Medicine and Therapeutics*, 15.

Centers for Disease Control and Prevention. National Center for Health Statistics. Describing the Increase in Preterm Births in the United States, 2014–2016. Retrieved April 19, 2021.

References

Centers for Disease Control and Prevention. (2020, October 30). Premature birth. Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. Reproductive Health. Preterm Birth. Retrieved April 19, 2021.

Collett, B. R., Aylward, E. H., Berg, J., Davidoff, C., Norden, J., Cunningham, M. L., & Speltz, M. L. (2012). Brain volume and shape in infants with deformational plagiocephaly. *Child's Nervous System*, 28(7), 1083–1090.

Coughlin, M. (2021). *Transformative nursing in the NICU: Trauma-informed, age-appropriate care*. Springer Publishing.

Coughlin, M., Lohman, M. B., & Gibbins, S. (2010). Reliability and effectiveness of an infant positioning assessment tool to standardize developmentally supportive positioning practices in the neonatal intensive care unit. *Newborn and Infant Nursing Reviews*, 10(2), 104–106.

Craig, J. W., & Smith, C. R. (2020). Risk-adjusted/neuroprotective care services in the NICU: The elemental role of the neonatal therapist [OT, PT, SLP]. *Journal of Neurology*, 40(4), 549–550.

Edney, S. K., Jones, S., & Boaden, E. (2019). Screening for feeding difficulties in the neonatal unit: Sensitivity and specificity of gestational age vs. medical history. *Journal of Neonatal Nursing*, 25(3), 116–120.

References

Fighting premature birth: The prematurity campaign. Home. (n.d.).
Fontana, C., Meris, C., Pesarin, N., Passera, S., Liotto, N., Morca, F., Roggero, P., & Furnagalli, M. (2018). Effects of early intervention on feeding behavior in preterm infants: A randomized controlled trial. *Early Human Development*, 121, 15–20.
Fry, T. J., Marfurt, S., & Wengier, S. (2018). Systematic review of quality improvement initiatives related to cue-based feeding in preterm infants. *Nursing for Women's Health*, 22(5), 401–410.
Fucile, S., Mikutinov, M., Timmons, K., & Dow, K. (2018). Oral sensorimotor intervention enhances breastfeeding establishment in preterm infants. *Breastfeeding Medicine*, 13(7), 437–476.
Grassi, A., Sgherri, G., Chorna, O., Marci, L., Gagliardi, L., Cecchi, F., Laschi, C., & Guzzetta, A. (2019). Early intervention to improve sucking in preterm infants: A systematic review of qualitative studies. *Advanced Neonatal Care*, 19(2).
Graven, S. N., & Browne, J. V. (2008). Sensory development in the fetus, neonate, and infant: introduction and overview. *Newborn and Infant Nursing Reviews*, 8(4), 169–172.
Guillot, M. (2021). Preterm brain health webinar. *Embrace Aspect Imaging*.

References

Hjartarson, A. (2012). Brain and sensory development in preterm infants. *Creative Therapy Consultants*.
Hunter, J. (2012). Sleep and early brain development in the NICU. *Creative Therapy Consultants*.
John, H. B., Padanabhatti, S. M., Kuruvilla, K. A., Rebelah, G., & Rajapandian, E. (2018). Effectiveness of oral motor stimulation administered by mothers of preterm infants- a pilot study. *Journal of Neonatal Nursing*, 24(5), 261–265.
Kenner, C., & McGrath, J. M. (2010). Developmental care of newborns & infants: A guide for health professionals (second edition). National Association of Neonatal Nurses.
Neonatal Therapy Core Scope of Practice. National Association of Neonatal Therapists. (2021, July 23).
Onglissawan, J., & Chiu, E. H. (Eds.). (2018). *Pediatric Dysphagia: Challenges and controversies*. Springer International Publishing.
Park, J., Padols, B. E., & Theyre, S. M. (2018). Systematic Review: What is the evidence for the side-lying position for feeding preterm infants?. *Advances in Neonatal Care*, 18(4), 285–294.
Pineda, R., Dewey, K., Jacobsen, A., & Smith, J. (2018). Non-nutritive sucking in the preterm infant. *American Journal of Perinatology*, 36(3), 268–276.

references

Pineda, R., Ramey, M., & Smith, J. (2019). Supporting and enhancing NICU sensory experiences (SENSE): Defining developmentally appropriate sensory exposures for high-risk infants. *Early Human Development*, 133, 29–35.
Ranger, M., Zwicker, J. G., Chau, C. M. Y., Park, M. T. M., Chakravorthy, M. M., Poskitt, K., Miller, S. P., Bjornson, B. H., Tam, E. W. Y., Chau, V., Symes, A. R., & Grunau, V. E. (2015). Neonatal pain and infection relate to smaller cerebellum in very preterm children at school age. *The Journal of Pediatrics*, 167(2), 292–298.
Sweeney, J. K., Heriza, C. B., & Blanchard, Y. (2009). Neonatal physical therapy. Part I: Clinical competencies and neonatal intensive care unit clinical training models. *Pediatric Physical Therapy*, 21(4), 296–307.
Sweeney, J. K., Heriza, C. B., Blanchard, Y., & Duong, S. C. (2010). Neonatal physical therapy. Part II: Practice frameworks and evidence-based practice guidelines. *Pediatric Physical Therapy*, 22(1), 2–16.
Thakkar, P. A., Rohit, H. R., Ranjan Das, R., Thakkar, U. P., & Singh, A. (2018). Effect of oral stimulation on feeding performance and weight gain in preterm neonates: A randomized controlled trial. *Paediatrics and International Child Health*, 38(3), 181–186.
Valeri, B. O., Hoels, L., Löffleres, M. B. M. (2015). Neonatal pain and developmental outcomes in children born preterm. *The Clinical Journal of Pain*, 31(4), 355–362.
Waltzman, K. (2012). Infant-driven caregiving. *Creative Therapy Consultants*.