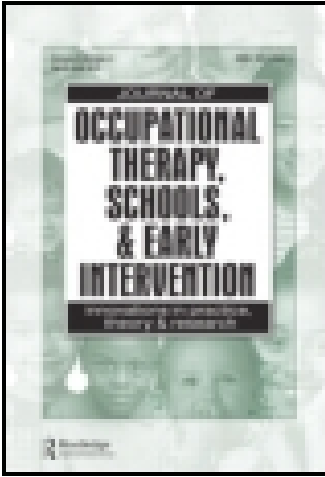


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Publisher: Routledge

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Journal of Occupational Therapy, Schools, & Early Intervention

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/wjot20>

NICU Primer for Occupational Therapists: Exploring the Needs of Fragile Infants, the Context in Which They Are Cared For, and the Role of OT in This Specialized Practice Area—Part I of II

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Published online: 14 Jun 2010.

To cite this article: Kari J. Tanta & Shelley Youngblood Langton (2010) NICU Primer for Occupational Therapists: Exploring the Needs of Fragile Infants, the Context in Which They Are Cared For, and the Role of OT in This Specialized Practice Area—Part I of II, *Journal of Occupational Therapy, Schools, & Early Intervention*, 3:2, 179-186, DOI: [10.1080/19411243.2010.491020](https://doi.org/10.1080/19411243.2010.491020)

To link to this article: <http://dx.doi.org/10.1080/19411243.2010.491020>

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EYE ON EI

Edited by Kari J. Tanta

NICU Primer for Occupational Therapists: Exploring the Needs of Fragile Infants, the Context in Which They Are Cared For, and the Role of OT in This Specialized Practice Area—Part I of II

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The purpose of this article is to provide an introduction to occupational therapy (OT) practice in the neonatal intensive care unit (NICU). As Part I of a two-part series, this article focuses on the provision of an introduction to the needs of critically ill newborns and the development of their feeding, neuromotor, sensory, and attachment systems. The article further outlines the therapeutic context of the NICU and the role of OT in this environment. The goal of this article is to promote understanding and appreciation of the role of OT in this advanced practice setting.

Keywords Occupational therapy (OT), neonatal intensive care unit (NICU), infants, pediatric

Introduction

Critically ill newborns are generally cared for in hospital neonatal intensive care units (NICUs). The medical needs of these infants originate from myriad events such as birth trauma, congenital issues, and/or prematurity of birth itself. These fragile infants often struggle with life-threatening conditions and circumstances that impact development of

Received 20 May 2010; accepted 25 May 2010.

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their feeding, neuromotor, sensory, and attachment systems. To address the complexity of their issues, these infants are cared for in a highly specialized environment under the skillful and tender care of a dedicated team of professionals. Occupational therapists working in NICUs possess the necessary skills and experience needed for this advanced practice environment—an environment that is often misunderstood or underestimated with regard to its prerequisites for practice.

In Part I of a two-part series in *Eye on EI*, we will begin to explore the needs of these fragile infants, the context in which they are cared for, and the role of occupational therapy (OT) in NICU practice.

A Systems Look at Fragile Infants

Premature infants and other critically ill babies are at risk for presenting with a host of immature developmental systems. Occupational therapists working with this population need to be grounded in normal systems development and on the variants that premature neonates often present with. This section will provide the reader with a cursory look at the feeding, neuromotor, sensory, and attachment systems that are common cornerstones of therapeutic NICU care.

Feeding System

Premature infants often have difficulty feeding orally and obtaining enough nutrients for adequate growth (Caretto, Topolski, Linkous, Lowman, & Murphy, 2000; Hunter, Mullen, & Dallas, 1994); coordinating the suck–swallow–breathe triad to prevent aspiration of liquids while feeding (Glass & Wolf, 1998; Mathew, 1988); and operating immature lungs to breathe on their own (Glass & Wolf; Mathew). Immature oral reflexes, high stress levels, reduced oral sensory input, and decreased opportunity to suck as a result of non-oral feedings can all contribute to oral feeding inefficiencies and delayed oral motor development (Anderson, 1986; Case-Smith, 1988; Einarsson-Backes, Deitz, Price, Glass, & Hays, 1994; Hunter et al.). These experiences can further lead to poor growth and longer hospital stays, as an infant's ability to fully feed by bottle and/or breast is a common criterion necessary for discharge to home (Shaker, 1999).

Neuromotor System

Prematurity may also result in barriers to the development of typical motor patterns. The positions experienced by a healthy term infant may not be possible for a medically compromised infant (e.g., prone, side lying), therefore putting the premature baby at risk for future neurodevelopmental delays. According to Hunter (2005), without the uterine wall boundary afforded to infants in utero, a prematurely born infant is unopposed in his or her active extension motor pattern. In addition, the premature infant does not have the motor control or the central nervous system maturity to return to a flexed, midline position on its own. This flexed midline posture is important for infants as it encourages hand-to-face and hand-to-mouth activity, promotes organization and a calm state, promotes flexor tone development, and helps to prevent deformities of a positional origin (Hunter). As well, a neonate lying in an insecure position may experience decreased physiologic stability, as evidenced by increased agitation, stress, and extensor posturing, all of which interfere with feeding and caregiving (Hunter). Konishi, Kuriyama, Mikawa, and Suzuki (1987) found that excessive supine positioning can lead to such developmental problems as assuming

a preferential head position to the right, developing extensor hypertonia, and developing generalized asymmetrical postures and gait patterns.

Sensory System

When developing in utero, the sensory systems of a fetus develop in sequence (Campbell, 1985; Graven, 1997). Infants born preterm possess fragile or underdeveloped sensory systems that must now process novel light, sound, touch, and pain stimuli. The common belief in the era of the 1960s and 1970s was that care providers needed to make up for a neonate's inability to interact with his or her environment by providing him or her with supplementary stimulation (Campbell; Hunter, 2005). As understanding of fetal and infant development has increased, however, there has been a paradigm shift. Many now believe that receiving stimuli such as light, sound, and touch before an infant's system is ready for it can cause negative developmental issues. Retinal damage, interference with aspects of auditory development such as sound frequency discrimination and pattern recognition, and developmental disturbance as a result of sleep deprivation are all negative effects of stimulation on the neonate (Graven). This understanding has led to the more recent use of more individualized, developmental approaches to neonatal care. These approaches are relationship-based and family-centered, and they strive to "structure the NICU environment and caregiving practices according to the ongoing neurobehavioral cues of each infant . . ." (Hunter, p. 690).

Attachment System

The typical healthy attachment process between infant and parent may be disrupted when a baby's condition dictates the use of complex medical equipment (e.g., monitors and isolettes). Disruption of parent–infant attachment may also occur as a result of the infant's difficulties with feeding (Olson & Baltman, 1994). Feeding is typically a special time for bonding between a new baby and his or her caregivers. The premature infant who requires therapeutic intervention for feeding is often difficult to feed and gives inconsistent cues, which serve to raise parents' levels of stress and feelings of inadequacy, depriving the infant of essential emotional bonding (Einarsson-Backes et al., 1994; Glass & Wolf, 1998; Olson & Baltman). Parents of babies in the NICU often experience depression, anxiety, and feelings of helplessness, which negatively affect their interactions with their preterm baby (Melnyk et al., 2006). The disrupted attachment process experienced by many premature infants can continue to affect parent–child interaction for many years and may result in problem behaviors in older children (Lyons-Ruth, 1996). Given the number and range of potential complications a neonate may incur, appropriate care for this population should include preventive therapy tailored to its unique needs, as well as specialized medical intervention.

Therapeutic Context of the NICU: Who Cares for These Babies and What Do They Need to Know?

There are a multitude of professionals working with infants in the NICU. Team members include medical personnel such as neonatologists, registered nurses, respiratory therapists, cardiologists, and speech pathologists, physical and occupational therapists, social workers, and dietitians. Each profession has its own expectations for performance within the context of NICU practice. We will take a look at practice guidelines for the therapy disciplines of speech and language pathology, physical therapy, and OT in an attempt to

gain further clarity of OT's role in the NICU. (The reader is encouraged to further explore referenced documents to get a more complete picture of discipline-specific guidelines.)

The American Speech and Hearing Association (ASHA) published a document illustrating the speech language pathologist's (SLP's) role and responsibilities within the NICU environment. These guidelines describe the appropriate roles for an SLP on the NICU team as those of communication evaluation and intervention, feeding and swallowing evaluation and intervention, parent/caregiver education and counseling, staff/team education and collaboration, and "other roles" (ASHA, 2005, p. 10). The ASHA (2004) states that SLPs working in the NICU should possess knowledge and skills in the areas of infant communication, cognition, feeding, and swallowing development, all within the context of the family.

In the realm of physical therapy, the care of a neonate is considered to be a highly specialized area of pediatric practice appropriate only for physical therapists who have undergone specific training for this population (Sweeney, Heriza, Reilly, Smith, & VanSant, 1999). Sweeney et al. state that because of the ongoing examination, interpretation, and implementation required for treating a neonate, it is inappropriate for physical therapy assistants and aides to handle them. In the NICU guidelines released by Sweeney et al. with support from the American Physical Therapy Association, the roles of a PT serving neonates are delineated as screening, development and implementation of risk-management plans, and examining and interpreting findings in the areas of movement characteristics and posturing; sensory and perceptual development; behavioral signs related to autonomic, state, and regulatory patterns; and oral motor development and feeding.

As in physical therapy, the field of OT considers practice in the NICU to be highly specialized and to require advanced training (American Occupational Therapy Association [AOTA], 2000). The knowledge and skills considered by the AOTA to be necessary for the neonatal OT encompass three areas: the infant, the family, and the environment. In regard to knowledge pertaining to infants, OTs should have or know the following:

- A medical knowledge base as the foundation for understanding infant behavior
- Knowledge of factors that may influence infant and child development
- Knowledge of the unique developmental course, abilities, and vulnerabilities of infants in the NICU
- Knowledge of evolving developmental approaches in the NICU
- Specific skills related to OT with infants in the NICU (AOTA, 2000, pp. 642–644).

When working in the NICU, an OT should also possess knowledge of NICU culture and environmental issues related to the unique sensory properties of the unit, the social and physical environments, and the relationship of these contextual issues to the infant's behavioral organization. Along with knowledge and skills related to environment is the need for OTs in the NICU to possess solid foundational knowledge and experience related to collaboration and working with families in the NICU.

What Is the Role of Occupational Therapy in the NICU?

As can be seen from previous discussion, there is a strong history of role variety and overlap among the three therapeutic disciplines in the NICU. This variety, with its resultant multidisciplinary teaming, is a valuable aspect of providing appropriate care for infants in the NICU. It is with an eye on the role of OT practice in the NICU specifically, that we now explore the historical role of OT NICU practice.

Evolution of Occupational Therapy Practice in the NICU

With increasing recognition of the developmental needs of the NICU population in the 1970s, occupational therapists began serving these babies' needs, utilizing their understanding of infant development and specialized skills in treating infants (Gorga, 1994). The role of OT in the NICU has evolved to include treatment of client factors, such as positioning and motor development, and contextual factors such as a nurturing home environment and relationships.

The AOTA (2000) put forth this position on the appropriateness of OT in the NICU:

Occupational therapy's domain of concern, encompassing the inter-action among the biological, developmental, and psychosocial aspects of human function as expressed in daily activities and occupations, makes it particularly suited to address the needs of the developing infant and family. The unique occupational therapy method of activity analysis and adaptation to achieve a functional outcome is valuable in improving the match between the infant's capabilities and the physical and social environment, which is known as "goodness-of-fit." (p. 641)

With its combination of training in psychosocial interventions and neuromuscular physiology, OT is the ideal profession to call on to fill the developmental therapist role needed in the NICU (Hunter, 2005).

Feeding Intervention

In the NICU setting, OTs are involved with feeding evaluations and treatment of feeding issues (Caretto et al., 2000; Hunter, 2005; Mathew, 1988). Compared with medical members of the NICU team such as the doctor and nurse, occupational therapists take a broader approach in addressing feeding problems in neonates. This focus includes "oral-motor and feeding skills, infant emotional health, development of parent-infant relationships, and teaching parents how to interpret their infant's cues" (Caretto et al., p. 60). According to Hunter, an OT in the NICU attends to many factors during feeding evaluations: environmental and seating factors and individual infant factors of anatomy, physiology, behavioral status, and neuromuscular status. As shown by Einarsson-Backes et al. (1994), OT intervention can provide improved feeding outcomes for infants in the NICU. The authors examined the effects of oral support during feeding on the neonate's sucking efficiency and found that babies were significantly more efficient during feeding when provided support on their cheeks and chin.

Neuromuscular Intervention

Proper neuromuscular development is an area of concern for neonates. Much care needs to be taken when positioning infants in the NICU so as to maximize developmentally beneficial tone and posture while minimizing the amount of adverse stimuli and behavioral disruption to which a baby is subjected. Occupational therapists, with their knowledge of neuromuscular anatomy and physiology coupled with understanding of infant and child development, are well equipped to provide this positioning (AOTA, 2000).

In a clinical study conducted by two occupational therapists, Monfort and Case-Smith (1997) found that the use of a prone positioning device significantly increased scapular

upward rotation in preterm infants in an NICU. When the same infants were positioned prone without the device, they displayed increased downward rotation and winging of the scapula, both of which are common sequelae of the abnormal muscle tone found in preterm infants (Montfort & Case-Smith). These sequelae are contributed to by improper positioning and interfere with a baby's ability to bring his or her arms forward and hands to midline for exploration (Georgieff & Bernbaum, 1986).

In another discussion of the neurodevelopmental care of neonates, Aucott, Donohue, Atkins, and Allen (2002) conveyed the merits of utilizing an occupational therapist or physical therapist to address the neuromotor needs of this population, citing the experience of these disciplines in working with infants with cerebral palsy as relevant and valuable. Splinting is a technique used by occupational therapists to improve function of muscles and joints of the upper extremities by supporting joints in functional positions. Various forms of this technique are commonly used with children and adults with neuromotor dysfunction. Anderson and Anderson (1988) have shown this technique to be effective with clients in the NICU as well. The authors reported two case studies wherein neonates with hand dysfunction, one as a result of a skin graft and one with a brachial plexus injury, experienced positive outcomes after splinting techniques applied by an occupational therapist. The infants in the study regained or developed full range of motion, intact sensation, and increased muscle use of their involved hands after intervention.

Parent Education

Occupational therapists in the NICU are also in large part responsible for parent training and education. Caretto et al. (2000) surveyed 100 NICU occupational therapists regarding their role in parent education. Responding occupational therapists reported being highly involved in the education topics of positioning (100%), developmental milestones (97%), infant assessments (94%), infant states and cues (92%), early intervention services (89%), parent-infant interaction (89%), feeding (86%), and play (86%). White et al. (2000) surveyed occupational therapists and parents of babies in NICUs nationwide to gather information about parent education delivered in the NICU. The authors found that 88% of occupational therapists in NICUs who provided parent education about feeding were confident or very confident about parents' understanding of the education and techniques shared by the occupational therapist. Seventy-five percent of parents surveyed reported that they were very confident in their understanding of the feeding information and support they received from occupational therapists prior to their babies' discharge from the NICU. Given the reality that neonates are primarily under the care of their mothers once discharged from the NICU, it is of utmost importance that the mothers receive education and support in basic caregiving of their fragile baby.

Conclusion

In this article, we have presented a brief overview of OT in the NICU in an attempt to increase understanding of and appreciation for the care provided in this advanced practice setting. We encourage readers who are interested in entering this practice area to further explore information related to neonatal development and NICU practice guidelines. We will also continue to bring information related to neonatal care to you through future Eye on EI columns. In the next issue, please look for Part II of this series wherein we will further explore NICU practice and present the results of a study of therapeutic staffing trends in NICUs in the Northwest.

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