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## Occupational Therapy in the Neonatal Intensive Care Unit (NICU) & Implementation of the Test of Infant Motor Performance

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# Occupational Therapy's Role in the Neonatal Intensive Care Unit (NICU) & Implementation of the Test of Infant Motor Performance

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## BACKGROUND & PURPOSE

- **NICU:** high-risk, highly technological setting that provides intensive medical care for preterm and/or sick infants (Stanford Medicine, 2022)
  - 10% of births, or 100,000 children annually, are admitted to the NICU (Case-Smith & O'Brien, 2020; University of Iowa Stead Family Children's Hospital, 2022)
- Occupational therapists (OTs) bridge the gap between medical cares (i.e., physiologic stability, medication) and developmental cares (i.e., positioning, stress cues, neuromotor developmental, sensory system development, education) (Nightingler, 2011)
- Preterm infants are more likely to demonstrate alterations in neurobehavior with abnormal reflexes, endure developmental disabilities, more hypotonia and hypertonia, poorer quality of movement, poor academic achievement, sensory deficits, social and feeding challenges, more abnormal signs, lower tolerance of handling, poorer self-regulation, more excitability, and more stress (Aarnoudse-Moens et al., 2009; Maroney, 2019; Ross et al., 2017)
  - When provided with developmentally supportive care, improved outcomes including fewer days on the ventilator, reduction in medical complications, and improved neurodevelopmental outcomes occur (Altimir & Phillips, 2013)
- **TIMP:** norm-referenced assessment; evaluates motor control and organization of posture and movement for functional activities in infants from 32 weeks gestational age to 4 months post-term age (Peyton et al., 2018)
  - Utilized by therapists to 1) identify infants with delayed motor development, 2) discriminate among infants with risk for poor motor outcomes, and 3) measure change resulting from intervention (Physiopedia, n.d.)
  - Sensitively detects small changes in motor performance, demonstrating its effectiveness in tracking developmental change in infants and predicting motor, cognitive, and language outcomes at two years of age (Peyton et al., 2018)

**Purpose Statement:** The purpose of the capstone project was to gain in-depth clinical skills within the NICU setting, educate and collaborate with interdisciplinary healthcare providers, and implement the TIMP into this NICU.

## METHODS & ACTIVITIES

### Identified Need & Project Focus

- Need for identified project through extensive literature review on OT in the NICU and use of the TIMP within OT practice
- Project focus was clinical practice with interprofessional collaboration, education of the IP team and families, and addressing gaps in use and reporting of the TIMP; completed through various activities and deliverables

### Procedures & Activities

- **Goal 1 - Gain expertise and increased knowledge working with the infants and their families in the NICU**
  - Deliverables: continuing education course on brain-oriented care, educational case studies, and maintenance of partial and full caseloads
- **Goal 2 - Education of healthcare practitioners and families through creation and provision of educational materials on relevant NICU-related topics**
  - Deliverables: SWOT analysis, educational handout demonstrating safe handling practices of infants in and out of the isolette, presentation on occupational therapy practice within the NICU and the use of the TIMP, and educational manual with resources for practitioners, future students, and/or NICU families
- **Goal 3 - Interdisciplinary collaboration and leadership skills**
  - Deliverables: interdisciplinary bulletin board on safe sleep practices with supplemental swaddling educational material, TIMP reporting document for Early Access employees
- **Goal 4 - Implementation of the TIMP into MercyOne's NICU**
  - Deliverables: in-depth literature review, literature matrix, guidelines and procedures for implementation documents, and a reporting system of TIMP results

### Participants

- Approximately 100 families and infants in clinical practice component
- Nurses, OTs, and PTs participated in online survey to gather data about other clinicians' use of the TIMP
- Additional participants in educational materials included the IP team, future TIMP users, and future NICU OT students

### Assessment Instruments

- Survey was created to gain basic information on practitioners' use of the TIMP, including how many practitioners had used the assessment, which infants and diagnoses it was used with, how often it was used, etc.
- TIMP was the primary assessment utilized within the project itself; integrating this motor assessment into MercyOne's NICU

## THEORETICAL FOUNDATIONS

### Person-Environment-Occupation-Performance (PEOP) (Baum et al., 2015)

- Occupational performance is ultimately influenced by characteristics of the person (i.e., physiological, psychological, motor, sensory/perceptual, cognitive, or spiritual), features of the environment (i.e., cultural, social support, social determinants, physical and natural environments), and characteristics of the activity, task, or role (Baum et al., 2015)
- Within the NICU: States that as an infant performs occupations, they simultaneously interact with their environment, thus positively or negatively impacting occupational performance

### Als Synactive Theory of Development (Als, 1982)

- Brain-oriented approach with the understanding that every interaction affects the infant's brain development and for understanding premature infants' neurobehavioral organization – autonomic function, motor function, sleep-wake states, attention, and self-regulatory behaviors (Bader, 2012)
- Recognizing discrepancy between perceived need to provide invasive medical care and neonate's significantly limited ability to cope physiologically and neurologically is essential (Als, 1982)

### Newborn Individualized Developmental Care and Assessment Program (NIDCAP) Model (NICAP Federal Foundation, 2023)

- Comprehensive, family-centered, evidence-based approach to developmental care involving seven neuroprotective measures; partnering with families, positioning and handling, protecting skin, minimizing stress and pain, optimizing nutrition, and safeguarding sleep (Altimir & Phillips, 2013)

## RESULTS

- Obtaining specialized clinical skillset, achievement of all goals and deliverables, and impact of the education provided were the most notable impacts of this project
- **Online Survey:** Clinician feedback regarding how the TIMP was used and how outcomes were reported informed the student and site mentor how to move forward with implementation
  - Documents created for future reporting of TIMP scores allowed for ease of reporting for site and site therapists
- **Clinical Skill Development:** Specialty knowledge and skills were obtained and assessed through verbal understanding, return demonstration, and informal evaluation of knowledge, skills, and approval of deliverables
  - Caseload objectives met before time set forth
- **Education to Practitioners and Families:** Feedback from provided education included the perceived benefit of learning about OT in the NICU, therapists feeling they were better equipped to educate other practitioners, basic TIMP understanding
  - Thorough understanding of TIMP through literature review
  - Smoother transitions for infant from safe handling handout
  - Organized, helpful information to prepare future OT students for NICU practice
  - Increased family/practitioner education and awareness of safe sleep practices, preventing SIDS cases

## DISCUSSION

- Synthesis of knowledge, skills, and attitudes gained will continue to shape advocacy for OT in this setting, and information and resources will be carried to other sites
- Benefits will confidently supplement continued efforts towards healthier developmental outcomes NICU patients and ease of extended progress towards implementation of the TIMP for therapists and other providers
- Highlights the value of interdisciplinary care and necessity for consistent, continuous education and leadership within this setting on relevant topics that improve infant and family care



## IMPLICATIONS

### OT in the NICU

- OTs have the unique ability and extensive background to address these risks head on by targeting patient's needs as early as one week of life, no matter their gestational age
- Need for continued presence of OT practitioners within NICUs and expansion of therapy positions within NICUs that currently do not provide it
- Recommended that OT continues to advocate for their importance within the NICU setting, as they have the expertise to alter and improve developmental outcomes in preterm and/or medically unstable infants
- Brain-oriented, neurosensory-conscious evaluation and intervention will continue to have lasting effects on neonates who require a NICU stay

### OT's Use of the TIMP

- Continued research is needed for the TIMP to be widely recognized and adopted in practice
- Because this assessment is considered the current gold standard and can sensitively detect changes in motor development, it should continue to be sought out and used by practitioners
- Continued analysis and exploration of the test can ultimately lead to even stronger infant outcomes and allow for the ability to address deficits early on

## REFERENCES

