Effects of swaddling during bottle feeding in infants born preterm: A randomized crossover study

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### BACKGROUND

- American Academy of Pediatrics recommends achievement of successful oral feeding to support growth before discharge from Neonatal Intensive Care Unit (NICU) (Bell et al., 2008).
- Feeding is a complex task and neurologic immaturity affects state regulation, physiologic stability, tone and postural control, and coordination of suck-swallow-breath (Ross & Philbin, 2011).
- Swaddling in infants born preterm has been found to improve response to pain, state regulation, physiologic regulation, stress responses, and motor coordination (Fearon et al., 2007; Huang et al., 2004; Neu & Browne, 1997; Short et al., 1996).
- Conceptual framework was based on Synaesthetic Theory of Development (Als, 1982).
- Infant’s ability to meet developmental demands is affected by interaction of subsystems with the infant born preterm having difficulty regulating subsystems especially when challenged by environmental and developmental demands.
- By supporting one subsystem (motor), the other systems will be supported (autonomic, state, and attentional).
- Swaddling was supported by multiple experts to be a supportive intervention when feeding an infant born preterm (Philbin & Ross, 2011; Shaker, 2013).
- Swaddling was not consistently used in the NICU during bottle feeding and effects of swaddling during feeding in infants born preterm have not been reported.
- Objective: The purpose of this study was to examine the effects of swaddling during bottle feeding on feeding performance in infants born preterm.

### METHODS

- Approved by IRB at Rocky Mountain University of Health Professions and NYU Langone Medical Center.
- Randomized cross-over design
- Each subject received both the swaddled intervention and the unswaddled control condition during two consecutive feedings within one day with randomization of the starting condition
- Treatment: Swaddling (the wrapping of an infant’s body with a blanket, holding the upper and lower extremities in a flexed, midline position)
- Measures:
  - Feeding efficiency: “the amount taken from the bottle compared to the amount swallowed and the effort expended.” (Ross & Philbin, 2011)
  - Feeding quality: “the infant is safe, physiologically stable, actively participating, and behaviorally organized generally and in omorer activity, and comfortable.” (Ross & Philbin, 2011)
  - Feeding environment and conditions were kept constant between feedings, including OT research assistants, congregated approach to feeding (Thoyre et al., 2012), Similac, slow flow nipple (hospital-standard nipple) on voluted bottle, positioning in an elevated, sidelying position (Park et al., 2014), infant clothing of hospital infant shirt, diaper, no hat, and set up of room, lighting, and chair.
  - Data recorded: volume expressed, fluid (weight) on chin cloth, feeding duration, bradycardia (HR<100) frequency, oxygen desaturations (SpO2<90%), frequency. Early Feeding Skills Assessment score (Thoyre, Shaker, & Pridham, 2005)

### RESULTS

- Data analysis was completed using dependent t-test and Wilcoxon Signed Ranks Test
- Frequency of Oxygen Desaturations ≤5 sec in duration (p=0.160)
- Frequency of Bradycardia ≤2 sec in duration (p=0.137)
- Percent of Physician-prescribed volume consumed: Swaddled = 95.8% vs Unswaddled = 92.8% (p=0.154)
- Rate Fluid Consumed (p=0.742)
- Rate (mL/min) 40 50 60 70 80
- Volume Consumed (p=0.154)
- Unswaddled 0.5 1 2 3 4 5 6 7 8 9 10
- Swaddled 0.5 1 2 3 4 5 6 7 8 9 10

### CONCLUSIONS

- Swaddling resulted in positive feeding quality outcomes during bottle feeding in infants born preterm
- No statistically significant (p>0.05) differences were found between swaddled and unswaddled conditions in feeding efficiency (volume and rate) or physiologic parameters (bradycardia and oxygen desaturations)
- Emerging evidence is demonstrated for use of swaddling during bottle feeding
- Swaddling can be a low-cost intervention in NICU environment as part of infant-directed feeding procedures focused on feeding quality
- Further research is needed on effects of swaddling during bottle feeding over time, at different points in feeding maturation, and with different populations

### DISCLOSURE

None of the planners, reviewers or presenting authors have any financial relationships with commercial interests to disclose.

### REFERENCES