Evaluating the Evidence for the Effectiveness of Premature Infant Oral Motor Intervention (PIOMI)

Megan Weinzapfel, B.S.
Western Kentucky University

Introduction

Several studies have evaluated the effectiveness of PIOMI when used for premature infants' oral feeding. PIOMI is an oral motor intervention technique that begins with movement, stretching, and pressure to oral musculature and ends with non-nutritive sucking. Shortly after developing PIOMI, Dr. Brenda Lessen (2011) conducted a study to assess how well premature infants could tolerate the intervention. Later, Ghomi and his colleagues (2019) claim that PIOMI is a fruitful method for premature infants. Also in 2019, Lessen Knoll and her colleagues declare PIOMI is an effective oral motor therapy for newborns. Mahmood and his colleagues (2019) confirm PIOMI will result in independent feeding significantly earlier. Lastly, Osman and his colleagues (2016) claim a higher dose of intervention will result in full oral feedings sooner. Critical appraisal of these studies may lead to an answer to the modified PICO question:

"Is the use of PIOMI (I) effective in improving oral feeding (O) in preterm infants (P)?"

Clinical Scenario

Laura is 29 weeks post-menstrual age (PMA) and is currently living in the Neonatal Intensive Care Unit (NICU) at Deaconess Women's Hospital. She presents with pediatric dysphagia. Megan is a graduate student who will work with Laura for the next treatment period. Megan's supervisor advised that premature infant oral motor intervention (PIOMI) be used for Laura. Megan would like to learn more about this technique and discover whether PIOMI is effective in improving oral feeding skills in premature infants with pediatric dysphagia.

Purpose

The purpose of this study was to evaluate the research evidence for PIOMI as effective in improving oral feeding in preterm infants.

Five research studies were appraised for strength of evidence following guidelines from Brenda Lessen Knoll (2011).

References

Ghomi, H., Yadegari, F., Soleimani, F., Knoll, B. L., Norozi, M., & Mazouri, A. (2019). The effects of premature infant oral motor intervention (PIOMI) on oral feeding of preterm infants: A randomized clinical trial. *International Journal of Pediatric Otorhinolaryngology*, *120*, 202-209.

Osman, A., Ahmed, E., Mohamed, H., Hassanein, F., & Brandon, D. (2016). Oral motor intervention accelerates time to full oral feeding and discharge. *International Journal of Advanced Nursing Studies, 5*(2), 228-233.

Mahmood, N., Lessen Knoll, B., Keykha, R., Jalalodini, A., & Ghaljaei, F. (2019). The effect of oral motor intervention on oral feeding readiness and feeding progression in preterm infants. *Iranian Journal of Neonatology, 10*(3), 58-63.

Lessen Knoll, B., Daramas, T., & Drake, V. (2019). Randomized controlled trial of prefeeding oral motor therapy and its effect on feeding improvement in a Thai NICU. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 48*, 176-188.

Lessen, B. (2011). Effect of the premature infant oral motor intervention on feeding progression and length of stay in preterm infants. *Advances in Neonatal Care, 11*(2), 129-139.

Research Studies Evaluated

Author (Year)	Participants Age, Diagnosis, Groups	Purpose of Study	Dependent Variable(s)	Results
Ghomi, Yadegari, Soleimani, Lessen Knoll, Noroozi, & Mazouri (2019) Study 1	**N** = 30 **Age:** 26-29 weeks gestational age **Diagnosis:** Pediatric dysphagia **Groups:** (a) Intervention group) (b) Control group	1) To determine if early intervention using PIOMI can improve the oral feeding of premature infants born with a gestational age of 26-29 weeks in the NICU. 2) To determine the impact PIOMI has on duration of reaching one, four, and eight oral feedings, weight gain, and the length of hospitalization in premature infants	• Oral feeding • Weight gain • Length of hospitalization	• Intervention group reached first and eighth oral feeding earlier than the control group. • Length of hospital stay was significantly shorter in the intervention group. • Repeated measures ANOVA showed no statistical significance between groups for weight.
Osman, Ahemd, Mohamed, Hassanein, & Brandon (2016) Study 2	**N** = 75 **Age**: born at 30-32 weeks gestational age **Diagnosis**: Pediatric dysphagia **Groups**: (a) Low dose intervention group (b) High dose intervention group (c) Control Group	To assess whether an oral motor stimulation intervention can decrease the time to achieve full oral feeding and shorten the length of hospitalization in preterm infants	• Full oral feeding • Length of hospitalization	• Time to reach full oral feeding was significantly different among groups. The high dose intervention group gained full oral feedings. • Infants in the high dose intervention group were discharged from the hospital earlier than the low dose and control groups.
Mahmoodi, Lessen Knoll, Kaykha, Jalalodini, & Ghaljael *(2019)* Study 3	**N** = 40 **Age**: 28-32 weeks gestational age **Diagnosis**: Pediatric dysphagia **Groups**: (a) Intervention group (b) control group	To evaluate the effect of oral motor intervention on the early onset of oral feeding in preterm newborns	• Oral feeding • Length of hospitalization	• Intervention group achieved independent feeding significantly earlier than the control group. • The duration of hospitalization was shorter in the intervention groups, compared to the control group.
Lessen Knoll, Daramas, & Drake (2019) Study 4	**N** = 30 **Age:** 32-34 weeks postmenstrual age (PMA) **Diagnosis**: Pediatric dysphagia **Groups**: (a) Intervention group (b) Control group	To evaluate the effect of PIOMI on preterm newborns' feeding efficiency and rates of improvement across days 1, 3, and 5 of oral feeding	• Mean volume (MV) of oral intake • Improvement interval of oral intake	• MV of oral intake was significantly greater in the intervention group on all days of measurement. • The rate of improvement was accelerated in the intervention group.
Lessen *(2011)* Study 5	**N** = 19 **Age:** 26-29 weeks PMA **Diagnosis:** Pediatric dysphagia **Groups:** (a) Intervention group (b) Control group	1) To test the newly developed PIOMI beginning at 29 weeks PMA, before oral feedings were introduced 2) To determine whether pre-feeding intervention would result in shorter transition from gavage to total oral feedings and a shorter length of hospital stay	• Transition from gavage to total oral feedings • Length of hospitalization	• Intervention was well-tolerated by 29-week PMA infants. • Intervention group transitioned from their first oral feeding to total oral feeding 5 days sooner than the control group. • Intervention group was discharged 2.6 days sooner than the control group.

Appraisal of Articles - Group Design

	Ghomi et al. (2019)	*Osman et al. (2016)*	*Mahmoodi et al. (2019)*	*Lessen Knoll et al. (2019)*	*Lessen (2011)*
Treatment comparisons	Yes	Yes	Yes	Yes	Yes
Random assignment	Yes	Yes	Yes	Yes	Yes
Participants	Yes	Yes	Yes	Yes	Yes
Group similarity	Yes	Yes	Yes	Yes	Yes
Blinding	Yes – Research assistant completed randomization, so the medical staff were aware of assignments.	Yes – The assignments were unknown to the medical staff.	Unknown	Unknown	Yes – Curtain was pulled around the infants bed for both the control and intervention group.
Measures	Yes – Weight of baby using the Seca 334 (Mobile digital baby scale)	Yes – Number of days until full oral feeding and hospital stay	Yes – Premature Oral Feeding Readiness Assessment Scale (POFRAS), Amount of oral intake (cc)	Yes – Mean volume of intake (ml)	Yes – Postmenstrual age of babies
Statistical significance	Yes – $p < 0.001$ for weight gain, $p < 0.001$ for length of hospital stay	Yes – *$p < 0.0001$ for feeding progression, $p = 0.0001$ for length of hospital stay*	Yes – $p = 0.034$ for time of beginning oral feeding, $p = 0.027$ for duration of hospital stay	Yes – $p < 0.001$ for mean volume consumed Days 1, 3, and 5	Yes – p – 0.043 for transition to full oral feeding
Practical significance	Yes – Effect size of age and weight was 91%	No	No	Yes – Effect size of oral motor therapy 1.0	No
Total	**8/8**	**7/8**	**6/8**	**7/8**	**7/8**

Prioritizing Research Evidence: ***Strong****:* 7-8 points ***Emerging****:* 4-6 points ***Weak****:* 0-3 points

Findings:

- Infants who received PIOMI reached full oral feedings earlier than those who did not receive intervention.
- Infants who received PIOMI transitioned from gavage to full oral feedings sooner than those who did not receive intervention.
- The mean volume of oral intake was sgreater in infants who received PIOMI than those who did not.
- The length of hospitalization was significantly shorter amongst infants who received PIOMI than those who did not.
- There were no significant differences in weight gain when comparing infants who received PIOMI and the control group.

Clinical Application:

Based on the findings related to the strength of the research studies appraised, Megan should:

1. Implement oral motor intervention once per day before feedings to provide assisted movement, stretching, and pressure to oral musculature.
2. Implement non-nutritive sucking for 2 minutes immediately prior to feeding.
3. Continue to implement PIOMI until the infant reaches eight full oral feedings per day.