Capturing the Moment: International Evidence Supporting Early Oral Motor Therapy (PIOMI)

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Premature Infant Oral Motor Intervention

- Provides assisted movement to activate muscle contraction
- Provides movement against resistance to build strength
- Focus is to increase functional response to pressure and to movement, and control of movement for the lips, cheeks, jaw, and tongue
- Cheeks, lips, gums, tongue and palate are targeted per specific techniques for **3 minutes** } **5 minutes**
- Ends with non-nutritive sucking for **2 minutes**

Feeding Difficulties in Preterm Infants

- Functional and neurologic immaturity of the oral motor structures
- Immature sucking skills
- Lack of coordination of suck, swallow & breathe
- Exposure to negative oral stimuli
- Inability to maintain physiologic stability & weight during oral feeding progression

→ Feeding difficulty & prolonged length of hospital stay

Preterm Oral Musculature

Preterm infants have poor oral-motor control related to:

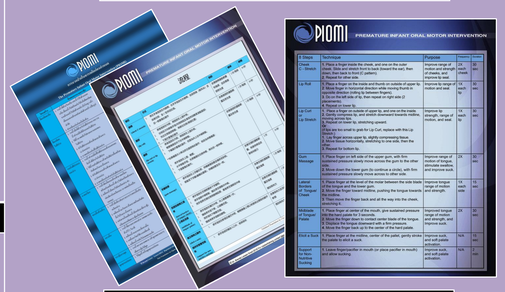
- Weaker muscle tone around mouth
- Less sensation
- Decreased lip strength and lip seal
- Less tongue strength
- Decreased sucking strength & endurance

Introduction

Oral feeding is a complex task for preterm infants and dependent upon maturation of CNS and influences from chemosensory and perioral tactile input. The functional and neurologic immaturity of the oral motor structures is evident in the poorly developed oral musculature, reduced sensation in the intraoral/perioral areas, lack of lip seal, and reduced tongue and cheek strength. Early oral motor therapy can be provided to activate sensation, improve muscle contractility, and increase oral motor organization. **There is substantial international evidence supporting the positive effect of oral motor therapy on feeding maturation, resulting in significantly faster transitions to full oral feeding and thus shortening length of hospital stay.** The PIOMI was developed specifically as an *early* prefeeding intervention, to capitalize on the early neural networking opportunities in the preterm brain. The intervention has demonstrated strong intervention fidelity and provides a standardized approach to applying early therapy.

The purpose of this presentation is to summarize the growing international evidence for PIOMI specifically. The results will be:

1) Using the converging evidence to create a recommended PIOMI PROTOCOL
2) Using the identification of missing variables in the studies to create a Guide on "NECESSARY VARIABLES to include in an Oral Motor Study".

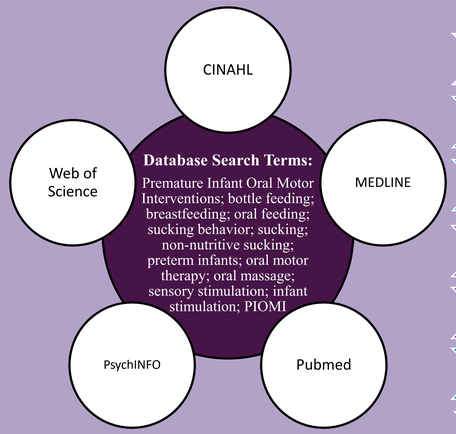


Purpose

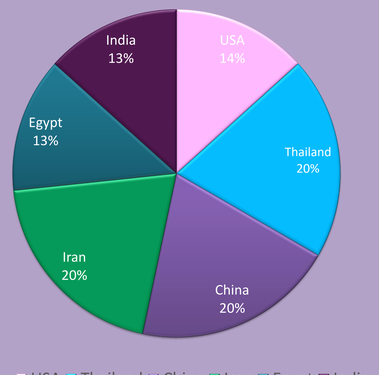
We reviewed studies specifically using the PIOMI for oral motor therapy to summarize the evidence of the effect of the PIOMI on the feeding outcomes below:

Readiness to Feed → Transition to Full Oral Feeds → Length of Say

Methods



Countries



Summary of all PIOMI Studies

	LEVEL of EVIDENCE	SAMPLE SIZE	PMA	DAYS of PIOMI vs. ROUTINE CARE	FEEDING EFFICIENCY	LENGTH of STAY
Lessen 2011; USA	RCT Level 1	n = 19 Control = 9 Exp. = 10	Born: 26-29 PIOMI Start: 29	7 days	↓ time to full feed (p < 0.029)	↓ 2.6 days
Mahmoudi et al 2013; Iran	RCT Level 1	n = 40 Control =20 Exp. = 20	Born: 28-32 PIOMI Start: 30	7 days	Earlier fdg readiness 2.19 days (p < 0.034)	↓ 2.9 days (p < 0.027)
Rearkyai et al 2014; Thailand	Quasi Level 3	n = 30 Control = ? Exp. = ?	Born: 31-34 PIOMI Start: > 32	7 days	↑ volume (p < 0.001)	Not reported
Tang & Yang 2014; China	Uncertain	n = 60 Control = 20 Exp. = 30	Born: Unknown PIOMI Start: Unknown	Unknown	↓ time to full feed (p < 0.05)	↓ 2.9 days (p < 0.027)
LinLin et al 2016; China	Convenience Sample	n = 60 Control = 30 Exp. = 30	Born: Preterm PIOMI Start: Unknown	7 days Comparator = NNS	Breast feeding ↑ at 1 & 3 months after discharge	Not reported
Osman et al 2016; Egypt	RCT Level I	n = 75 Control = 25 Exp. A = 25 Exp. B = 25	Born: 30-32 PIOMI Start: > 30	Group A = 7 days Group B = to full feed	Extended PIOMI decreased time to full feed by 3 days (p < 0.0001)	Extended PIOMI discharged 4 days earlier than Group A
Kamitsuka et al 2017; USA	Pre-Post Intervention	n = 270 Control = 129 Exp. =141	Born: < 30 PIOMI Start: 30	Unknown	↓ time to full feed; Earlier fdg readiness; ↓ home tube feeds (p < 0.001)	Unknown
Arora et al 2018; India	RCT Level 1	n = 30 Control = 14 Exp. = 16	Born: 28-32 PIOMI Start: 32.5	7 days 3x per day Comparator = Unstructured peri-oral stroking	↓ time to full feed by 0.9 days to Wati Spoon; Earlier fdg readiness (NOMAS)	No significant difference
Chailangka et al 2018; Thailand	Quasi Level 3	n = 30 Control = 15 Exp. = 15	Born: 31-34 PIOMI Start: > 31	7 days (with breast milk on lips) Comparator = PIOMI (alone)	PIOMI + breast milk on lips led to ↑ volume consumption	Not reported
Thakker et al 2018; India	RCT Level 1	n = 102 Control = 51 Exp. = 51	Born: 30-34 PIOMI Start: 33.5 (@ 1st fdg)	First feed to full feeds 2x per day	↓ time to 4 oral feeds and 8 oral feeds per day (p < 0.001)	↓ 2.76 days (p < 0.001)
Zhang et al 2018; China	Uncertain	n = 58 Control = 28 Exp. = 30	Born: Unknown PIOMI Start: Unknown	Unknown	↓ time to full feed; ↑ NNS score (p < 0.05)	No significant difference
Lessen Knoll et al 2019; Thailand	RCT Level 1	n = 30 Control = 15 Exp. = 15	Born: 26-34 PIOMI Start: 33.2	7 days	↑ volume consumption; Earlier fdg readiness (NOMAS) (p < 0.05)	Not reported
Mahmoudi et al 2019; Iran	RCT Level 1	n = 40 Control = ? Exp. = ?	Born: 28-32 PIOMI Start: 30	7 days	↓ time to full feed by1.95 days; Earlier fdg readiness (PTOFRAS)	↓ 2.9 days (P < 0.027)
Ghomi, H. et al 2019; Iran	RCT Level 1	n = 30 Control = 15 Exp. = 15	Born: 26-29 PIOMI Start: 29	10 days	Earlier fdg readiness ↑ oral-motor progression	↓ 9.47 days (p < 0.03)
Osman 2019; Egypt	Descriptive Analysis Level 6	n = 75 Control = 25 Exp. A = 25 Exp. B = 25	Born: 28-32	All 75 in sample scored on NOMAS	Better NOMAS = ↓ transition time (p < 0.0001)	Better NOMAS = ↓ LOS (p < 0.001)

15 studies on PIOMI

- NONE had Negative Effects on Feeding
- ALL 15 had Positive Effects on Feeding → 7 out of 7 studies found ↓ LOS

Feeding Efficiency	Readiness to Feed	NNS	Breast Feeding	Need for Home Tube Feedings
12 Studies	5 Studies	1 Studies	1 Studies	1 Studies
All 12 studies found ↑ feeding efficiency w/ PIOMI	All 5 studies found earlier readiness to feed w/ PIOMI	Found ↑ NNS scores w/ PIOMI	Found ↑ breast feeding rates at 1 & 3 months w/ PIOMI	Found ↓ need for home tube feedings w/ PIOMI

Recommended PIOMI Protocol

- PIOMI improves feeding efficiency & decreases LOS.
- PIOMI is safe 1x day @ 29 weeks and leverages early brain plasticity.
- There is a + effect from continued therapy as PMA progresses.
- Breast milk on the lips also enhances + effect.

Therefore:

Initiate PIOMI early at 29 weeks, 1x day. Increase to 2x day at 31 weeks and continue therapy until full oral feedings. Use breast milk on the lips during therapy.

GUIDE on NECESSARY VARIABLES to include in an Oral Motor Study

- Birth PMA (range) to enter study
- PMA at start of PIOMI
- PMA at end of PIOMI
- PMA at first feeding
- PMA at full oral feedings
- PMA at discharge
- # times per day doing PIOMI
- # days doing PIOMI
- Endpoint for PIOMI (a set # of days, or until full oral feedings, or until discharge?)
- Feeding protocol used in the unit: IDF, Other?
- Detail how feeding readiness was measured: NOMAS, PTOFRAS, Other?
- Detail how feeding efficiency was measured: volume in first 5 minutes? Total volume?
- Ratio of who did therapy: staff: parent
- Ratio of who did feedings: staff: parent
- Describe all neuroprotective measures being used in unit for both groups

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