



Fetal Exposure to Synthetic Oxytocin and Relationship with Prefeeding (PF) Cues Within One Hour Postbirth

Bell, Aleeca, PhD, RN, CNM (UIC College of Nursing); Rankin, Kristin, PhD (UIC School of Public Health); & White-Traut, Rosemary, PhD, NR, FAAN (UIC College of Nursing)

University of Illinois at Chicago, Center for Clinical and Translational Science

Purpose

We introduce a new coding schema of prefeeding (PF) cues to explore whether fetal exposure to synthetic oxytocin (Pitocin) during labor is associated with the infant's level of prefeeding organization shortly after birth.

Definition of PF Cues

Self-regulating oral-motor behaviors that communicate feeding readiness and the ability to self-comfort. Soon after birth, they are goal-directed neurobehavioral tasks to seek, find, and begin sucking on the mother's nipple.

Methods

Subjects

- Convenience sample of 47 healthy full-term infants
- 36 exposed to Pitocin, 11 not exposed to Pitocin
- Exclusion criteria: fetal distress, vacuum/forceps, cesarean, low APGAR

Procedure

- Infants were videotaped for 5 min (45-50 minutes postbirth)
- Coded for frequency of PF cues every 5 secs (total 60 epochs) (Cagan, J. Dissertation, 1993)
- Inter-rater reliability 90% (mean) .72 kappa (median)

Methods

Infant Characteristic	Pitocin (n = 36)	No Pitocin (n = 11)
Sex (% male)	61	64
Black (%)	48	55
Latino (%)	44	46
Other Race/Ethnicity (%)	8	0
Gestational age wks (mean ± SD)	39.6 ± 1.0	39.4 ± 1.2
Birthweight kg (mean ± SD)	3.5 ± 0.5	3.0 ± 1.9
Duration of labor hrs (mean ± SD)	11.6 ± 4.5	8.7 ± 4.6
Epidural (% yes)	72.2	45.5
Pitocin total mU dosage median (25th-75th percentile)	2015 (549 - 5359)	-

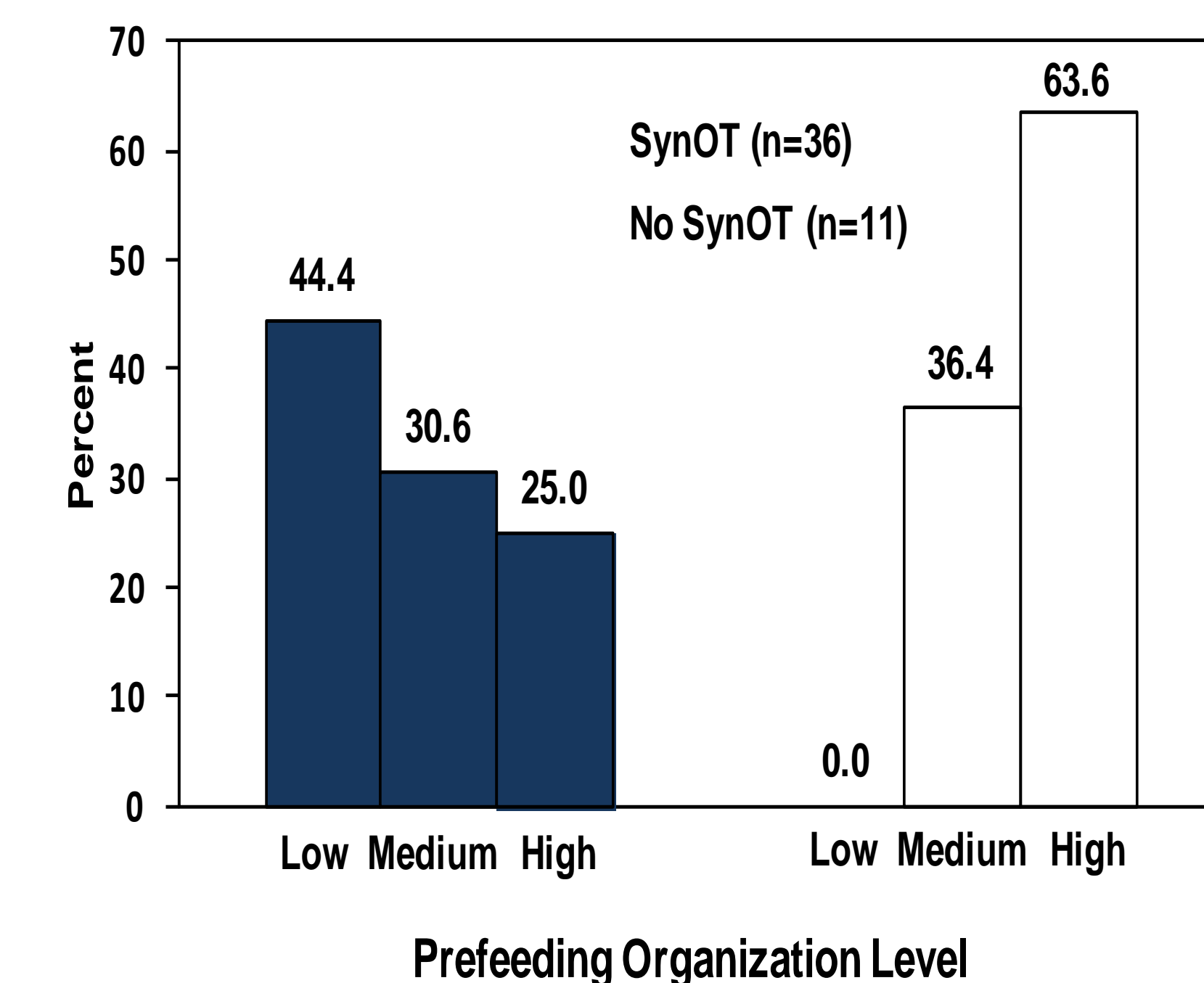
Results

PF Cue (Value)	% of Infants with Observed Type of Cue (N = 47)	# of Epochs (Range = 0-60) Cue was Observed per Infant Mean (SD)
Mouthing or Rooting (1)	93.6	25.0 (12.7)
Tonguing (1)	93.6	18.6 (12.4)
Empty sucking (1)	93.6	16.0 (11.2)
Brief hand to mouth (1)	78.7	7.0 (6.2)**
Hand swipes at mouth (1)	76.6	5.4 (5.4)
Sustained hand to mouth (no sucking) (2)	72.3	9.7 (11.9)**
Sucking on tongue (1)	53.2	2.8 (5.6)
Sucking on hand (3)	53.2	9.5 (15.5)

** $p < .05$, Crude Poisson regression models showing lower incidence of these PF cues in infants exposed to Pitocin versus unexposed

Multivariable Binary Logistic Regression

Showed that infants exposed to Pitocin were at 11.5 times (95% CI: 1.8-73.3) the odds of exhibiting low/medium versus high levels of PF organization compared to unexposed infants (after adjusting for duration of labor and epidural).



Conclusions

- Newborn neurobehavioral cues may be sensitive to Pitocin exposure during labor.
- Our novel operational measure of PF organization may aid in quantifying self-regulation.
- It is unknown if our findings point to a direct or indirect drug effect.

Future Research Questions

- In a larger study, does Pitocin adversely affect PF organization and for how long?
- Is PF organization a reliable predictor of:
 - early self-regulation?
 - breastfeeding initiation and continuation?
 - feeding readiness?
 - weight gain?

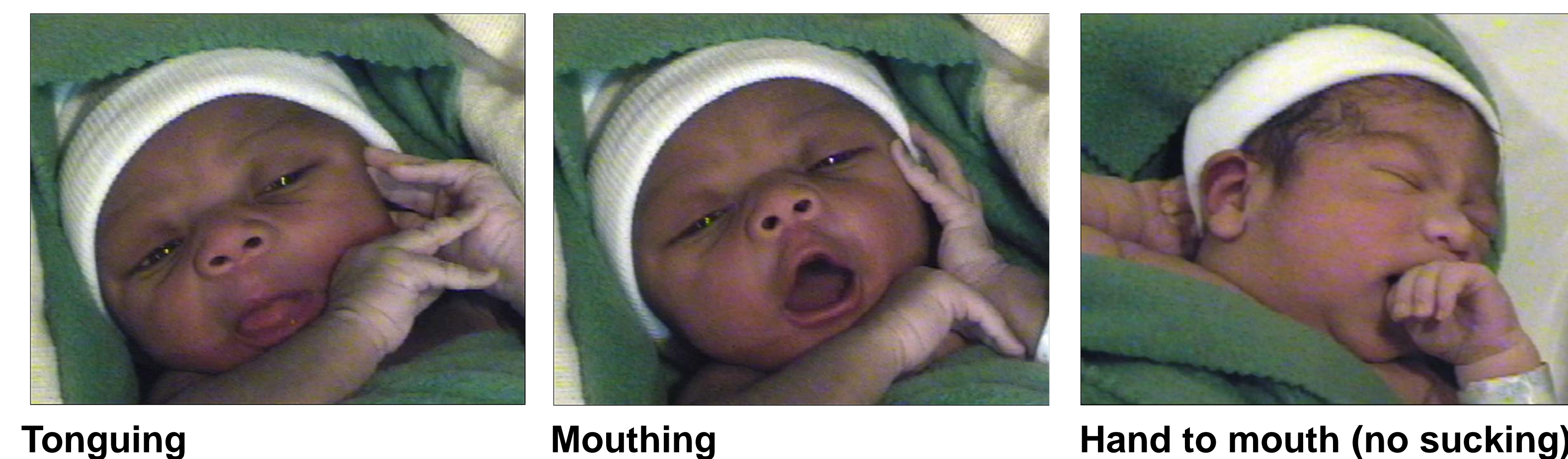


Sucking on hand

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Tonguing Mouthing Hand to mouth (no sucking)

Background

- Exposure to labor pain medication, gastric suctioning, & early infant bathing has altered the frequency and emergence of PF cues soon after birth.
- It is unknown whether Pitocin exposure (to induce or augment labor contractions) can alter infant PF cues.
- Animal data suggest caution in exposing pups to high dosage synthetic oxytocin due to potential effects on endogenous oxytocin (Connelly et al, Society for Neuroscience, Poster, 2011)
- Endogenous oxytocin is known to regulate many systems supporting early neurodevelopment, and is neuroprotective against mild hypoxia during labor.

Level of PF Organization

- Assigned a theoretically-driven weight (rank) to each PF cue of 1 low, 2 medium or 3 high (Brazelton & Nugent, NBAS Manual, 1995)
- Constructed a score summarizing level of PF organization across 60 epochs:
 - Several PF cues may co-occur in each epoch, but only the highest value of PF cue was selected and summed over the 60 epochs
 - Score ranged 0 – 180
 - Right skewed distribution
 - Created tertiles of low (13-44), medium (45-89), & high (90-171) level of PF organization
- Analyzed by level of PF organization.

DESCRIPTION, RANK, & VALUE OF PF CUES		
PF Cue	Description	Rank/Value
Mouthing or Rooting	Mouth opens (no crying or yawning) with or without simultaneous head turn	Low = 1
Tonguing	Tongue darts out of mouth beyond inner lip	Low = 1
Sucking on tongue	Audible sound as tongue leaves roof of mouth generating a sucking movement	Low = 1
Empty sucking	Pressure appears to be generated with empty sucking movements & closed mouth	Low = 1
Hand swipes at mouth	Fleeting hand to mouth contact < 1 sec	Low = 1
Brief hand to mouth	Hand to mouth contact is 1-2.5 sec	Low = 1
Sustained hand to mouth (no sucking)	Hand to mouth contact is > 2.5 sec	Medium = 2
Sucking on hand	Sucking on any part of the hand	High = 3