Changing the trajectory of feeding outcomes... with droplets of milk



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1

What happened?



2

Milk Drop Study

- Concern: ELBW / LBW infants
  - Increase oral aversion
  - Inability to take full oral feedings at 40-44 weeks CGA
- Hospital IRB / Medical team
  - Request / approved
  - Offer droplets of milk
  - Purpose: oral enjoyment
  - Focus: 24-33^{+6} week gestational age

3



Rodriguez et al

- Pilot study: Safety / Immune
- Subjects: ELBW: m wgt 657g/m GA 25.5 wks
- Method: 48h of life - 0.2 ml every 2h x 48h
- Results: All completed protocol
  Immune response - variable
  O2 saturations stable / increased
  All sucked on ETT

4

Eating is a learned behavior



- In utero…sucking and swallowing
- Repetitive behavior
  - Experienced / coordinated
  - Swallows 7 to 15 oz. daily

Bingham 2008, Jadchlera 2017, Selman 2024

5

Annually 13.4 million infants….



- Oral invasion: birth…routinely 3-6 hrs
- Immaturity: tube fed
- Deprivation: sucking & swallowing

Bingham 2008, Jadchlera 2017, Selman 2024

6

80% premature infants...



- Threshold of tolerance
- Negative outweighs positive
- Avoid / refuse = oral aversion

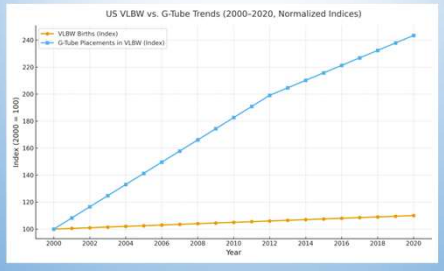
Bingham 2008, Jadchlera 2017, Selman 2024

7



8

US Trends: VLBW and Gastrostomy tubes



2016 study...G-tube at NICU discharge...independent predictor of neurodevelopmental delay
2020 study...Delayed oral feedings...associated with adverse neurodevelopmental outcomes

Fox 2014, Jadcherla 2016, Hatch 2018, Lainwala 2020, Cleveland Clinic 2022

9

Between 23-32 weeks gestation



- Premature brains
  - growing rapidly
  - making connections
  - based on experiences
- More negative than positive
  - affect ability & desire to eat

Schaaf 2010, Pickler 2013, Parham 2015, Lockridge 2018

10

Safe and effective oral feeding:



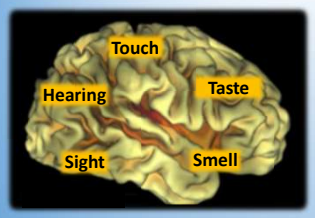
- Depends on:
  - development
  - maturity
  - coordination
- Breast or bottle ~ 32-34 weeks



9-11 weeks
taping...suctioning...tubes...oral care
minimal oral enjoyment
most critical time
structural differentiation of the brain

Arvedson 2006, , Amaizu 2008, Dodrill 2011, Lau 2015, Shaker 2017, Kaya 2017

11



Neuroplasticity:

- Ability to change
- Based on experiences
- Filtered through senses

Kolb 1998, Markham 2004, Pickler 2010, Seassau 2023, Selman 2024

12

Doing what we already do…



- Adding enjoyable oral component
  - deliberately / consistently
  - around the clock
  - gavage feedings

Kolb 1998, Markham 2004, Pickler 2010, Seassau 2023, Selman 2024

13

Stay…gently touch…talk…observe



14

The Milk Drop Intervention:



- Place at least a drop or two of milk on your lips
- OFFER a swab or pacifier - stroking your lips

You become a participant

- If you ACCEPT - offer more milk
  a drop at a time – pacing you as you suck
- If you RESPOND by licking - offer more milk
  a drop at a time – pacing you as you lick
- If you DON'T RESPOND - let you rest

15

Results: Milk Drop Study

Gestational Age	Control Infants	Control's Avg LOS	Subject Infants	Subject's Avg LOS	Avg difference LOS in days
24	2	135.0	2	90.0	▼ 45.0
25	3	127.7	3	86.0	▼ 41.7
26	6	90.8	6	88.8	▼ 2.0
27	5	98.2	5	83.4	▼ 14.8
28	5	64.8	5	53.0	▼ 11.8
29	6	65.8	6	56.8	▼ 9.0
30	9	55.4	9	47.2	▼ 8.2
31	20	38.5	20	41.5	▲ 3.0
32	16	34.6	16	30.1	▼ 4.5
33	27	24.1	27	23.6	▼ 0.5
	99	49.30	99	44.11	
Estimated savings on these 99 infants: > $663,000.00					

1600 NICU professionals…requested how to start a Milk Drop Program

16

Oral Care



Brushing our teeth

Given during cares
Oral care is done TO the baby
Insert a swab = INVASION
Not necessarily enjoyable

VS

Milk Drops



Going out for dinner

Cares done…nested – gavage started
Focus…OFFERING milk drops
Infant = PARTICIPANT
Enjoyable eating social interaction

17



18

Natural progression….cue based feedings



- Nurses taught parents…
  - Cues…infant guides
  - Slowly…a drop at a time
  - Pacing…start - stop - restart

19

Parent comments:



Dad of 24 weeker now 35 weeks:
Our little guy's oxygen levels are at their best when he is getting those few drops of milk.



Mother of 27 week twins - home at 37 weeks:
Milk drops are so important
My babies are coming home exclusively breastfeeding - just what I hoped for.

20

Nurses' comments:



Empowers



Comforting



Reconnect





Full term
- vented
- 60% O2.
- dopamine
- fentanyl drips
- additional sedation

After milk drops
- infant calmed
- no extra sedation
- wean ventilator
- wean pressors.

The mother said…
I am helping my baby

21

NICU therapists:



Bottle Feeding:
- complex
- nipple flow
- negative pressure
- bolus size…near oropharynx



2025 Study:
Results …staying on CPAP
- reduction / duration of hypoxemia
- increase lung volume at 6mo
- support brain and lung growth

Milk drops…

Thoyre 2010,Glass 2014, Jadchlera 2017, Shaker 2022, Lalmiwala 2022, RCSLT 2023, McEvoy 2025

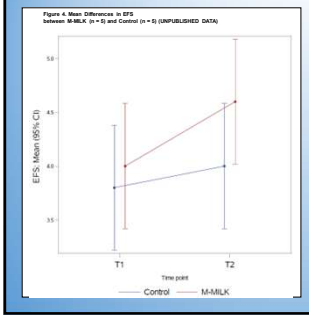
22

Research & Milk Drops



23

2024 pilot study…Loyola University, Chicago



Impact of milk drops on oral feeding skills

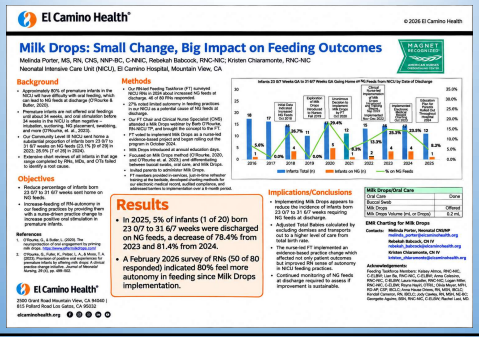
Early Feeding Skills (EFS) Assessment
- Engaged
- Organized
- Coordinated
- Physiological stability

Milk drop group - better feeding skills:
- First feeding
- Discharge
- Improvement overtime

RO1 5yr longitudinal study to continue

24

2025…El Camino CA….decrease in NG's at DC



El Camino Health

Milk Drops: Small Change, Big Impact on Feeding Outcomes

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Background

- Approximately 80% of premature infants in the NICU will have difficulty with oral feeding, which can lead to NG feeds at discharge (O'Rourke & Butler, 2020).
- Premature infants are not offered oral feedings until 32 weeks gestation and typically remain 24 weeks in the NICU to allow negative – intubation, suctioning, NG placement, swaddling, and pacifier use (Pineda et al., 2018).
- Our Community Level III NICU sent home a substantial proportion of infants born 23 0/7 to 31 6/7 weeks with NG feeds (18 of 78) in 2023, (35.9% (7 of 19) in 2024).
- Extensive chart reviews of all infants in that age range completed by RNs, MDs, and OTs failed to identify a root cause.

Objectives

- Reduce percentage of infants born 23 0/7 to 31 6/7 weeks sent home on NG feeds.
- Increase feeding of RN-autonomy in our feeding practices by providing them with a simple, non-invasive practice change to increase positive oral stimulation in premature infants.

Methods

- Our Infant Feeding Taskforce (FT) surveyed NICU RNs in 2024 about increased NG feeds at discharge. 46 of 80 RNs responded.
- The FT identified oral feeding practices in our NICU as a potential cause of NG feeds at discharge.
- The Lead and Clinical Nurse Specialist (CNS) attended a Milk Drops webinar by Beth O'Rourke, RN-NICU-TP, and brought the concept to the FT.
- FT voted to implement Milk Drops as a nurse-led evidence-based project and began rolling out the practice change in 2025.
- Milk Drops introduced at around education days.
- Focused on Milk Drops method (O'Rourke, 2020), Pacifier Activated Feeding (PAF), transition between bassal swabs, oral care, and Milk Drops.
- Invited parents to administer Milk Drops.
- Collaborated with our IT team to explore whether training at the bedside, developed feeding methods for our electronic medical record, audited compliance, and addressed barriers to implementation over a 6-month period.

Results

- In 2025, 5% of infants (1 of 20) born 23 0/7 to 31 6/7 weeks were discharged on NG feeds, a decrease of 78.4% from 2023 and 81.4% from 2024.
- A February 2026 survey of RNs (50 of 80 responded) indicated 80% feel more autonomy in feeding since Milk Drops implementation.

Implications/Conclusions

- Implementing Milk Drops appears to reduce the incidence of infants born 23 0/7 to 31 6/7 weeks requiring NG feeds at discharge.
- Adjusted Total Babies calculated by Total Babies minus Outborn babies, due to a higher level of care from total birth rate.
- The nurse-led FT implemented an evidence-based practice change which is low-cost, non-invasive, simple, but improved RN sense of autonomy in NICU feeding practices.
- Continued monitoring of NG feeds at discharge required to assess if improvement is sustainable.

Milk Drops/Oral Care	
Oral Care	Done
Milk Drops	
Milk Drops	Offered
Milk Drops Volume (mL or Drops)	0.2 mL

EMR Charting for Milk Drops:
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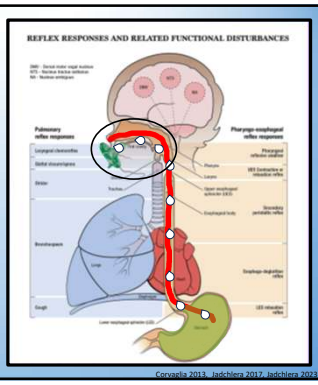
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25

Decade of evidence

- Swallowing function:
  - neuromuscular stimulation
  - sustained practice
  - time - aerodigestive reflexes
- Milk drops aligns…
  - safely practice SSB…<u>droplets</u>
  - develop upper airway protection
- Association of hunger…
  - enjoyment of eating
  - feeling full



Corvaglia 2013, Jadchlera 2017, Jadchlera 2023

26

A few sweet videos



27



28



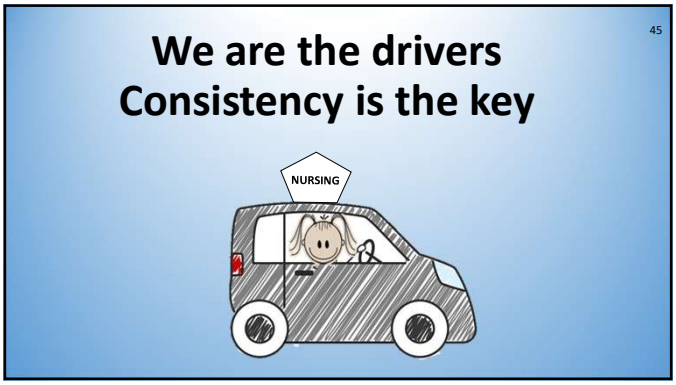
29



30



31



32



33



34



35



36


What can and did happen…
23+ wks-born
3rdDOL milk drops start
28 wks PDA ligated
35 wks trsf Level 4 NICU
severe chronic lung
Mom requests….
52 wks 1st bottle-HFNC
54 wks Demand fdgs
~ 76 wks
Viral pnuemonia
PICU > ECMO
56 wks Home NC
Full oral feeding
4 weeks later relaxing at home
Holding her bottle WITH HER FEET

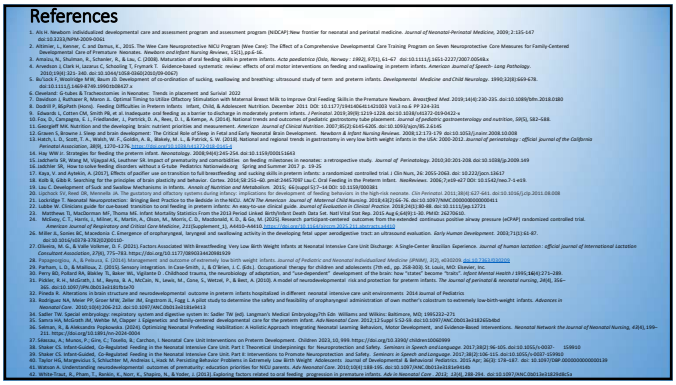
37


Life is so good
Mommy – Daughter Day

38


NURSE
How to start a
Milk Drop Program

39


References

40