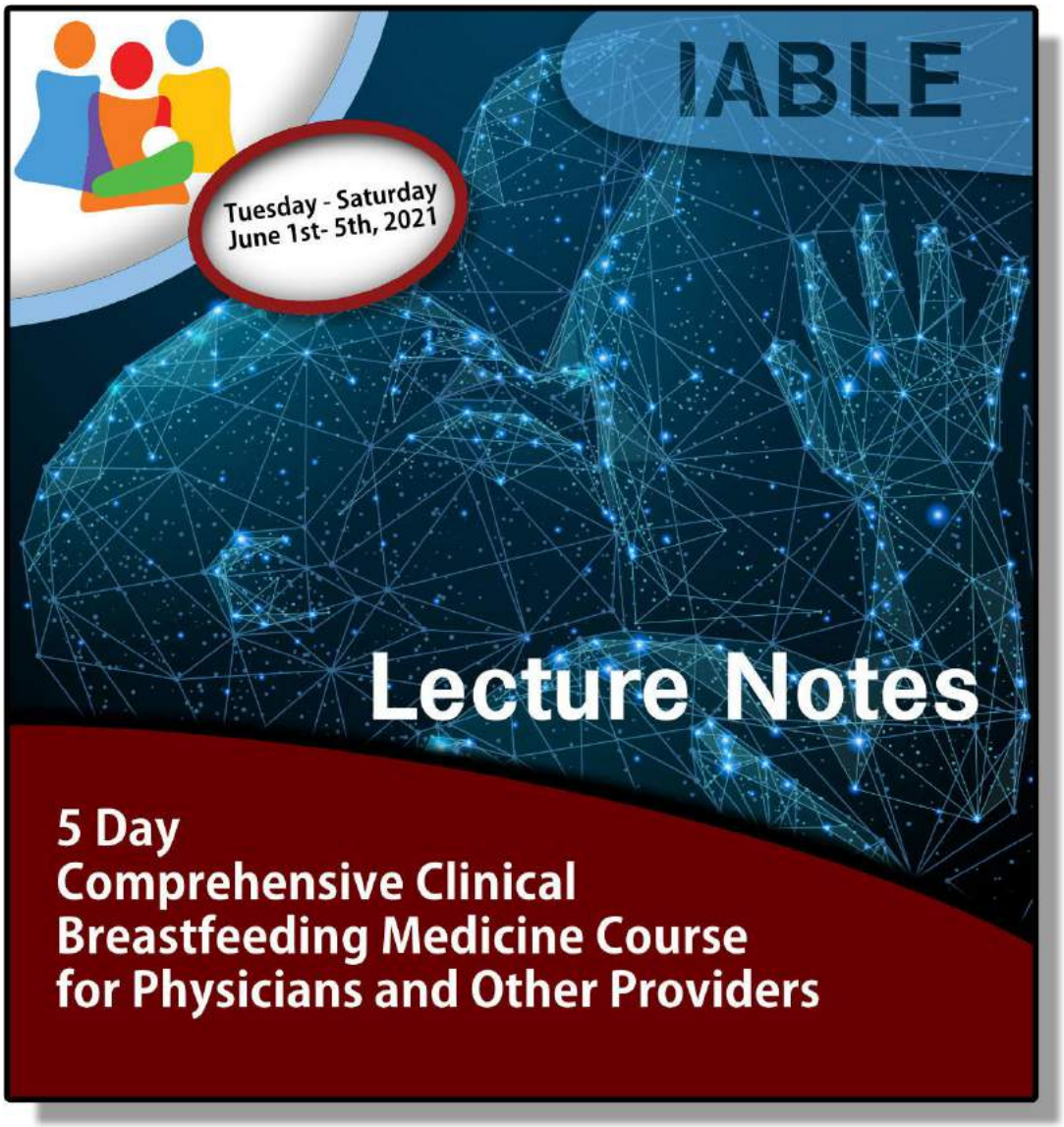
IABLE
Tuesday - Saturday
June 1st- 5th, 2021
Lecture Notes
5 Day
Comprehensive Clinical
Breastfeeding Medicine Course
for Physicians and Other Providers

The Biologic Components of Breastmilk; Infant and Maternal Risks of Not Breastfeeding

Liliana Simon, MD, IBCLC, FAAP, FABM
Pediatric Critical Care and Breastfeeding Medicine
liliana.simon@som.umaryland.edu

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

1

Conflicts of Interest

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

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Objectives

- Recite 3 components of breastmilk that provide immunologic protection from illness.
- Describe the modes of immunologic protection afforded by breastmilk

mam·mal
/ˈmaməl/
noun
plural noun: **mammals**

a warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, the secretion of milk by females for the nourishment of the young, and (typically) the birth of live young.

"In all mammalian species the reproductive cycle comprises both pregnancy and breastfeeding: in the absence of latter, none of these species, man included, could have survived".

(Bo Vahlquist, 1909-1978)

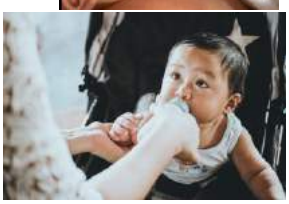




Over time we have gone from here ➡

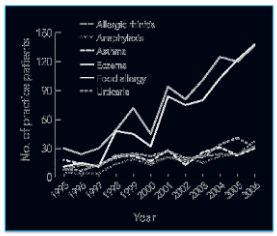
to here. ➡

So what?

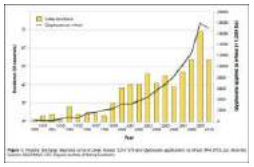



Incidence ↑

Allergies



Celiac Disease



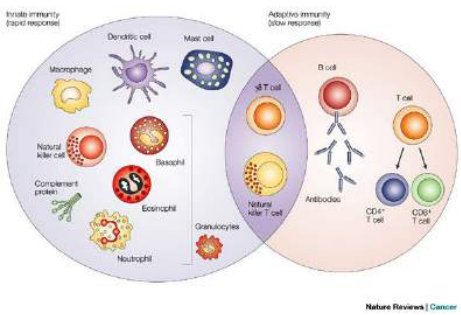
World Health Organization, American Academy of Family Physicians	• Exclusive bfeeding until 6 mo • Add solids at 6 mo • Nurse at least until 2 yrs
American Academy of Pediatrics	• Exclusive bfeeding until about 6 mo • Add solids at around 6 mo • Continue for at least 1 year or as long as desired
American College of Obstetrics and Gynecology	• Exclusive bfeeding for 6 mo • Continue for 1 year or longer

© IABLE 8

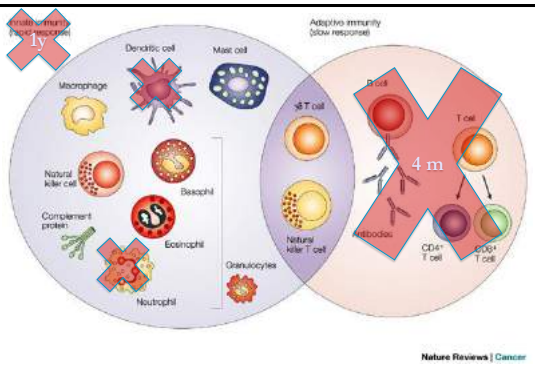
Immune System in Fetus

- Immune system of fetus is actively downregulated during pregnancy
  - Prevent "immune abortion"
- At birth – stress and hypoxia during labor and uterine contractions
  - Activates innate response

J. Nutr. September 2008 vol. 138 no. 9 1782S-1790S

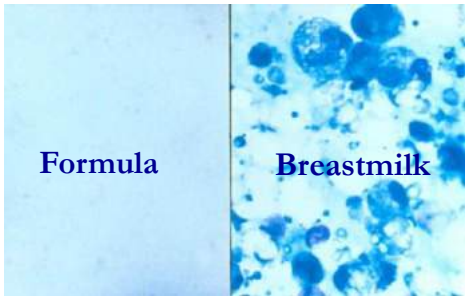


- **Innate Immunity:** physical (skin, mucosa), chemical barriers and local, non specific cells
- **Adaptive Immunity:** antigen-specific



Innate Immune system also includes physical barriers (skin, mucosa) and chemical barriers

Under the Microscope



4000 cells/cubic mm

Comparing Breastmilk and Formula = Comparing Apples and Oranges

Human Milk

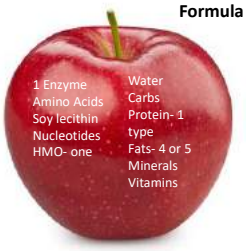
Water
Protein
Carbs
DHA/ARA
Fat
Vitamins
Minerals

PLUS:

Hormones
Antibodies
Active white cells
Enzymes
Anti-viral proteins
Antibacterial agents

++Oligosaccharides
Anti-allergy factors
Carotenoids
Protaglandins
Cytokines
Peptides
Etc!!!

Formula



1 Enzyme
Amino Acids
Soy lecithin
Nucleotides
HMO- one

Water
Carbs
Protein- 1 type
Fats- 4 or 5
Minerals
Vitamins

What are the most important immunoglobulins in breastmilk?

A. IgA
B. IgG
C. IgM
D. IgA and IgG
E. IgM and IgG
F. IgA, IgM and IgG

Rev Assoc Med Bras 2016; 62(6):584-593

Does the Colostrum Matter?

16

Stages of Human Milk

- Colostrum- More trophic than nutritional: rich in secretory IgA, lactoferrin, leukocytes, and developmental factors such as epidermal growth factor, low levels of lactose. Higher Na, Cl, Mg, lower K and Ca. High in anti-oxidants e.g. Beta carotene
- Transitional milk- from day 5 to 2 weeks, gradual decline in protein as it transitions to mature milk, lower in carotenoids, increase in water, lactose, fat
- Mature milk- after 2-3 weeks, reaches a steady state of protein, fat, lactose, bioactive factors, enzymes, antioxidants, etc.
  - After 1 year, decrease in water and carbs, higher in protein and fat
- Preterm milk- higher in protein during the first month as compared to term milk

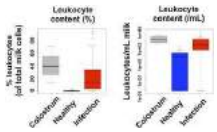
Direct Breastfeeding

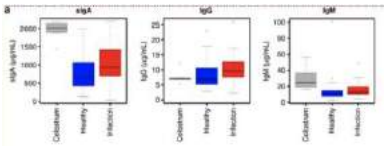
- Immune changes in milk happen when baby is sick even if mother is not sick
- Mother specifically tailors milk to her infants needs – how does this happen?

19

Retrograde Ductal Flow

Transfer of antigen, antibodies and leukocytes also TNF-alpha

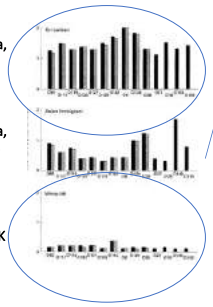




Clin Transl Immunology. 2013:2(4):e3; *Pediatr Res* 2012 Feb;71(2)220-225

E coli IgA in milk and Maternal exposure

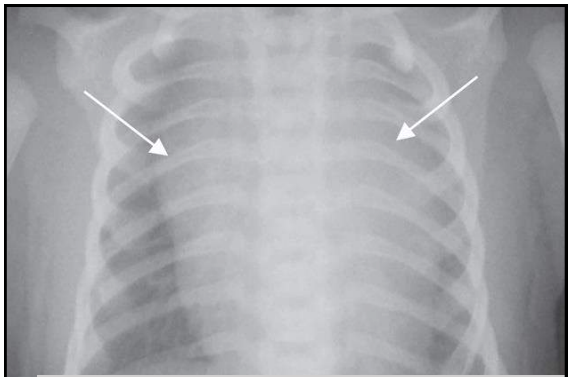
- From Sri Lanka, in Sri Lanka
- From Sri Lanka, immigrated to UK
- From UK, in UK



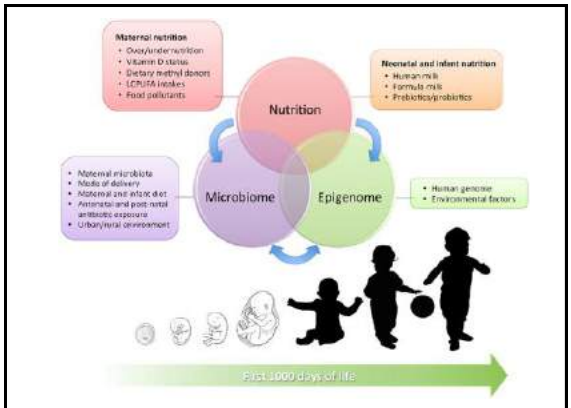
- E coli antibodies in breastmilk despite lack of exposure
- Suggest immunologic memory in maternal secretory system

Archives of Disease in Childhood 1994:71(F192-197)

Let's Look at Examples of How Human Milk Alters the Infants' Immune System and Metabolism

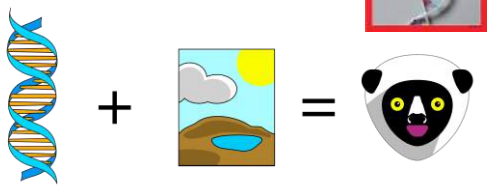


Breastmilk Factor Interleukin-7 keeps the thymus larger in breastfed infants, until weaning, improving infant immunity

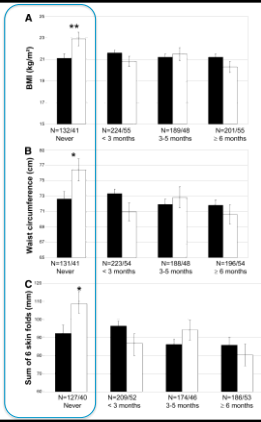


Front. Pediatr 2017 (5) article 178

Epigenetics



Genotype + Environment = Phenotype

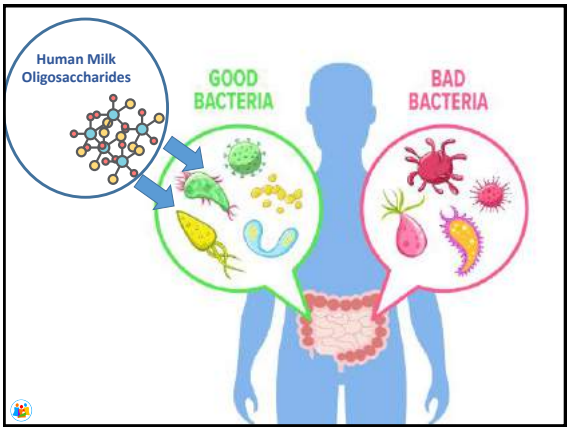


Obesity in Adolescents

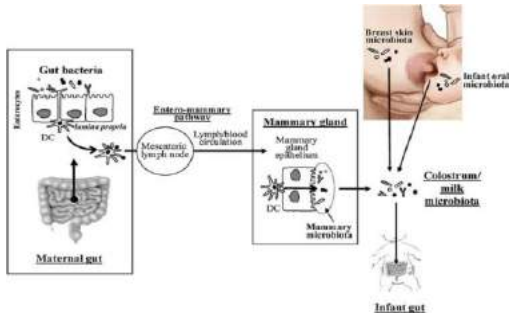
- Breastfeeding prevents obesity genes from turning on
- **Personalized medicine**

Health imprinting for life!

Diabetes Care 2010 Jan; 33(1): 190-196



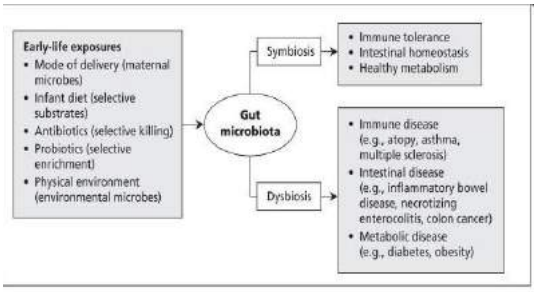
Enteromammary Circulation



800 mL/27 oz milk = **100,000 to 10,000,000 bact/day**

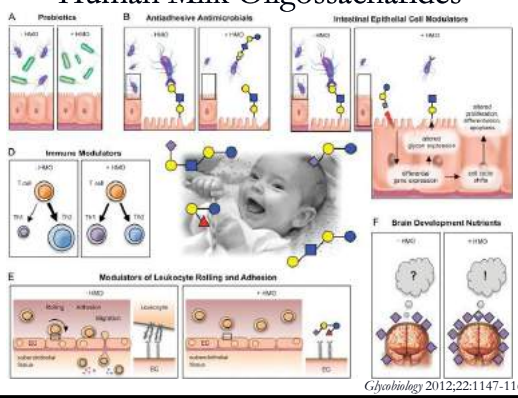
Pharmacol Research 2013,69(1):1-10

Development of the Human Microbiome



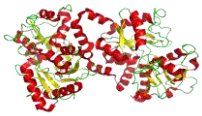
CMAJ 185,5 (2013)

Human Milk Oligossacharides



Glycobiology 2012;22:1147-1162

Lactoferrin



- Iron-binding glycoprotein
- Anti-bacterial, fungal, viral and parasite
- Modulates immune system and prevents inflammation
- Promotes brain development, bone and cartilaginous growth
- Prevents obesity (reduce insulin resistance)

Just one bottle; the push for exclusive breastfeeding.

Is it really that big of a deal?

After just one formula bottle…

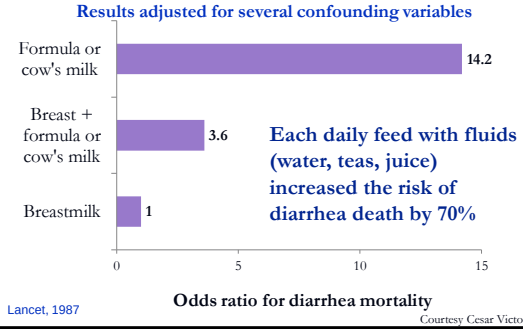
Formula exposure changes the gut microbiome, leading to microbial imbalance (dysbiosis), impaired innate immunity and aberrant development of tolerance.

**** Changes occur within 24 hours and can take weeks to change back. ****

Courtesy Dana Silver

Andersson, et al. J Immunol. 2009 Oct 1;183(7):4322-8

Evidence for Protection by BF against Infant Death from Diarrhea in Brazil



Lancet, 1987

Courtesy Cesar Victora

Data on mortality according to amount of breastfeeding in low/middle income countries. Which one is true?

A. A strong protective effect was evident and ever more significant with exclusive breastfeeding.

B. Exclusively breastfed children have only 12% the risk of death compared to non breastfed children.

C. Protection decreases by half when breastfeeding is not exclusive.

D. Protection decreases with age, but when compared with any breastfeeding, no breastfeeding was associated with twice mortality in kids 6 to 23 months.

E. All of the above

Mortality

Low / Middle Income Country

- **Never BF** vs. **Exclusive BF**: **8 x mortality**
- **Never BF** vs. **ever, any BF**
  - **<6 mo**: **4 x mortality**
  - **6-23 mo**: **2 x mortality**

Lancet 2016

If 90% of woman were able to follow the WHO recommendations and breastfed for 2 years, every year how many lives of children less than 5 years were expected to be saved?

A. ~ 225,000
B. ~ 425,000
C. ~ 625,000
D. ~ 825,000
E. ~ 1,2500,000

Lives Saved Through Breastfeeding

- If 90% of woman breastfed for 2 years

EVERY YEAR

823,000 child deaths (< 5 years of age)

20,000 breast cancer deaths

Lancet Victora et al Vol 387 January 30, 2016

Maternal Risks of Less Breastfeeding

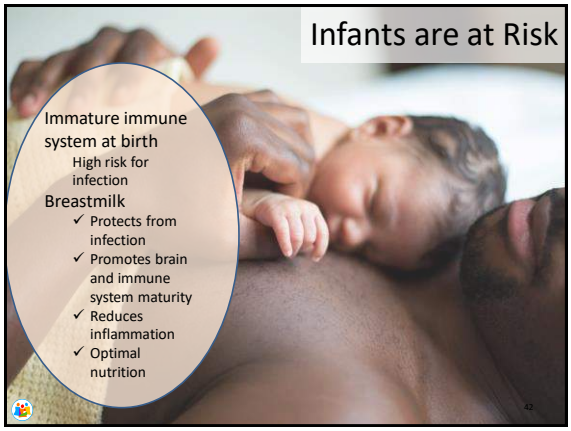
% protection by exclusive breastfeeding

- Postpartum bleeding
- Child spacing (lactation amenorrhea)
- Post partum depression
- Breast cancer ↓ **22%**
  - ↓ **6 % for every 12 months**
- Ovarian cancer ↓ **30%**
- Metabolic syndrome
- Type 2 diabetes ↓ **47%**
- Cardiovascular disease

AAP 2012, *Lancet* 2016
AJOG 2013, *JAMA Int Med* 2018

Breastfeeding Reduces Risk of Vascular Disease and Abd Fat

- Menopause transition increases abdominal obesity
  - Increased abd fat increases risk of insulin resistance
    - Increased insulin resistance => increased risk of HBP, CVA, MI
- Breastfeeding found to:
  - Lower risk of visceral fat in a dose-related manner (Asian Nurs Res 2020 Aug;14(3))
  - Lower risk of CVA in a dose-response relationship (J Am Heart Assoc 2018;7)
  - Lower risk of postmenopausal HBP (Breastfeeding Med 2018 Nov 13(9))
  - Lower risk of perimenopausal metabolic syndrome in a dose- related manner (Nutrients 2020, 12, 2691)



https://www.positivemed.com/2012/10/27/the-breastfed-baby/

Short Term Risks of Less Breastfeeding for Children
% protection by exclusive breastfeeding

- Infection ↓ 50%
  - Hospital admission ↓ 70%
- NEC ↓ 58%
- SIDS ↓ 73%
- Vaccine response

Lancet Victora January 30, 2016

Long Term Risks of Less Breastfeeding for Children
% protection by exclusive breastfeeding

- Malignancy (ALL) ↓ 35 - 50%
  - Neuroblastoma ↓ 40%
- Child Abuse ↓ 62%
- Dental malocclusion
- Metabolic
  - Obesity ↓ 26%
  - DM ↓ 30%
    - Type I ↓ 50%
- Cognition (IQ) ↑ 3-4

BMC Medicine (2021) 19:90; *Lancet* Victora January 30, 2016

Risk of Early Supplementation with Cows Milk Protein Formula

Risk of cows milk allergy higher when supplemented with cows milk based formula in the first 3 days, and then exclusively bfed

- 1.75x risk of CMA- (Meta-analysis Brit J Midwifery 20(5) 2012)
- 7x increased risk of CMA- study of 55 CMA children (Pediatr Allergy Immunol 2019 July)
- Higher risk of CMA among bfed infants if given cow milk based formula in the first 3 days vs hydrolyzed formula- Japan, 312 infants – (JAMA Pediatrics Oct 2019)

Breastfeeding, Immune Tolerance and Autoimmune Diseases

Am J Reprod Immunol. 2018;79:e12778

Environmental cost

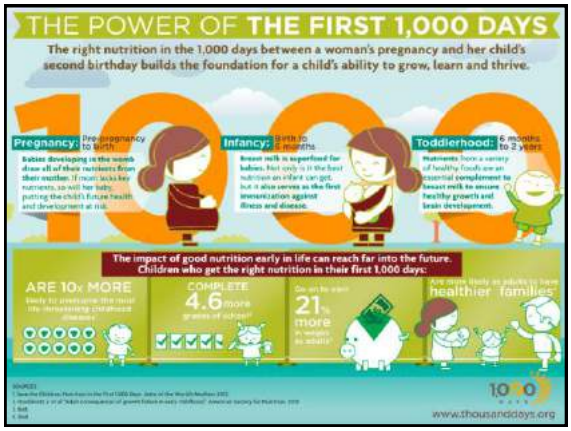
- Breastmilk is a *"natural, renewable food"* that is environmentally safe and produced and delivered to the consumer without pollution, unnecessary packaging, or waste.
- Breast milk substitutes:
  - Manufacture (energy)
  - Packaging (materials)
  - Transport and distribution (fuel)
  - Water, fuel, cleaning agents for daily preparation and use

Lancet 2016

WHAT YOU DO AND EAT IN THE FIRST 1000 DAYS, MAKES A DIFFERENCE FOR THE REST OF YOUR LIFE

What's the impact for the child? They…

A. Complete 4.6 more grades of school
B. Go on to earn 21% more in wages as adults
C. Are 10 x more likely to overcome the most life-threatening childhood diseases
D. Are more likely as adults to have healthier families
E. All of the above



Breastfeeding Disparities

- Exclusive breastfeeding at 6 months
  - World 42%
  - USA 25.6%
    - African Americans – 17.2%

Disparities in Breastfeeding: Equity Lens

- Black mothers
  - Breastfeed the least
  - Likely benefit the most
- 3 main themes emerged of AA women's experience
  - Cultural
  - Sociological
  - Health Dimensions

Gyamfi et al. Black/African American Breastfeeding Experience: Cultural, Sociological and Health Dimensions Through an Equity Lens, 2021.

Language Barriers, Cultural Barriers

- **Materials in other languages**
- **Cultural barriers**
  - **Concepts of numbers, time**
  - **Units of measure**
  - **Concept of pumping**
  - **Interactions with healthcare**
    - **How decisions are made**

Photo by Kyle Glenn on Unsplash

"We are not all in the same boat. We are all in the same storm. Some of us are on super-yatchs. Some have just one oar."

Damian Barr
Writer& Journalist

May 30, 2020

Socioecological model and social determinants of breastfeeding

Lutter, Chessa. (2012). Breast Feeding. 10.1016/B978-0-12-375083-9.00031-3.

Health impact of breastfeeding for the United States

Changing from rates of... ... to rates of	Initiation 82.5 90	Exclusive in hospital 69.7 90	3 mo exclusive 46.6 90	6 mo exclusive 24.9 90	6 mo any 56.3 90	12 mo any 33.7 90

would prevent...

Medical Costs
$2,405,023,438
($1,507,415,042 to $3,435,992,657)

Non Medical Costs
$1,093,681,596
($890,235,488 to $1,330,186,686)

Death Costs
$10,798,725,299
($1,158,363,092 to $21,568,947,064)

Maternal deaths
2,057
(-788, 5,271)

Child deaths
543
(-9, 1,161)

Usbreastfeeding.org

Conclusions

"Human breastmilk is therefore not only a perfectly adapted nutritional supply for the infant, but probably the most specific personalized medicine that he or she is likely to receive, given at a time when gene expression is being fine-tuned for life. This is an opportunity for health imprinting that should not be missed."

Cesar Victora, The Lancet, vol 387, Jan 2016

Rick Frausto, artist

Thank you!

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Pediatric Critical Care
and Breastfeeding Medicine
liliana.simon@som.umaryland.edu

Breastfeeding Policies and Demographics

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Objectives

- Recite at least 5 of the 10 Baby Friendly Hospital Initiative steps.
- Describe the purpose and 3 important directives of The International Code of Marketing of Breastmilk Substitutes.
- Describe 2 characteristics associated with increased likelihood of breastfeeding and decreased likelihood of breastfeeding.
- Explain 3 relative contraindications to breastfeeding for the infant, and 3 for the mother.

The Innocenti Declaration

https://www.unicef.org/programme/breastfeeding/innocenti.htm

- Produced at the 1990 WHO/UNICEF policymakers meeting "Breastfeeding in the 1990's" in Florence Italy
- *'As a global goal for optimal maternal and child health and nutrition, all women should be enabled to practise exclusive breastfeeding and all infants should be fed exclusively on breastmilk from birth to 4-6 months of age. Thereafter, children should continue to be breastfed, while receiving appropriate and adequate complementary foods, for up to two years of age or beyond. This child-feeding ideal is to be achieved by creating an appropriate environment of awareness and support so that women can breastfeed in this manner.'*
- Recommended that all governments develop national breastfeeding policies
  - By 1996 every country should have a 'breastfeeding coordinator' and national breastfeeding committee
- All maternity centers fully practice the 'Ten Steps to Successful Breastfeeding'
- All governments should effect the principles of the 'Code of Marketing of Breast-milk Substitutes'
- Establish legislation to protect the breastfeeding rights of working women

unicef | for every child

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unicef | for every child

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The United States Breastfeeding Committee

http://www.usbreastfeeding.org/

- Nonprofit coalition of organizations, state and local coalitions
- Mission is to drive collaborative efforts for policy and practices that create a landscape of breastfeeding
- Weekly Wire- free- excellent resources on updated policies and legislative actions, organizational events
- Constellations that bring various organizations together for collective impact

8

https://www.babyfriendlyusa.org/

9

What Do You Know as the 10 Steps of the Baby Friendly Hospital Initiative?

Photo by Camylla Battani on Unsplash

BABY-FRIENDLY HOSPITAL INITIATIVE (revised 2018)

TEN STEPS TO SUCCESSFUL BREASTFEEDING

Critical management procedures

1a. Comply fully with the *International Code of Marketing of Breast-milk Substitutes* and relevant World Health Assembly resolutions.

1b. Have a written infant feeding policy that is routinely communicated to staff and parents.

1c. Establish ongoing monitoring and data-management systems.

2. Ensure that staff have sufficient knowledge, competence and skills to support breastfeeding.

Key clinical practices

3. Discuss the importance and management of breastfeeding with pregnant women and their families.

4. Facilitate immediate and uninterrupted skin-to-skin contact and support mothers to initiate breastfeeding as soon as possible after birth.

5. Support mothers to initiate and maintain breastfeeding and manage common difficulties.

6. Do not provide breastfed newborns any food or fluids other than breast milk, unless medically indicated.

7. Enable mothers and their infants to remain together and to practice rooming-in 24 hours a day.

8. Support mothers to recognize and respond to their infants' cues for feeding.

9. Counsel mothers on the use and risks of feeding bottles, teats and pacifiers.

10. Coordinate discharge so that parents and their infants have timely access to ongoing support and care.

Photo by Jonathan Borba on Unsplash

2

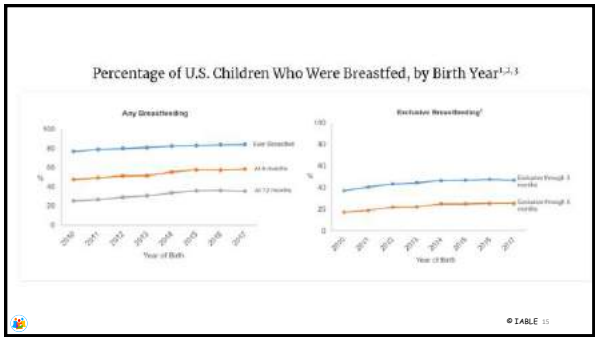
WHO, ABM, AAFP	• Exclusive bfeeding until 6 mo • Add solids at 6 mo • Nurse at least until 2 yrs
AAP	• Exclusive bfeeding until about 6 mo • Add solids at around 6 mo • Continue for at least 1 year or as long as desired
ACOG	• Exclusive bfeeding for 6 mo • Continue for 1 year or longer

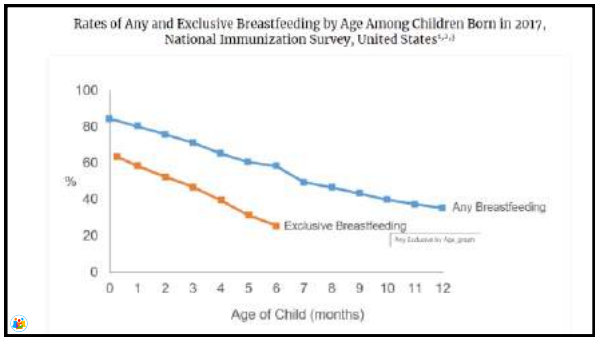
Healthy People 2020 Objectives		Target	Current Rates*
MICH**-21: Increase the proportion of infants who are breastfed.			
MICH-21.1	Ever	81.9%	83.8%
MICH-21.2	At 6 months	60.6%	57.3%
MICH-21.3	At 1 year	34.1%	36.2%
MICH-21.4	Exclusively through 3 months	46.2%	47.5%
MICH-21.5	Exclusively through 6 months	25.5%	25.4%
MICH-22: Increase the proportion of employers that have worksite lactation support programs.		38.0%	51.8%
MICH-23: Reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life.		14.2%	16.9%
MICH-24: Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies.		8.1%	26.1%

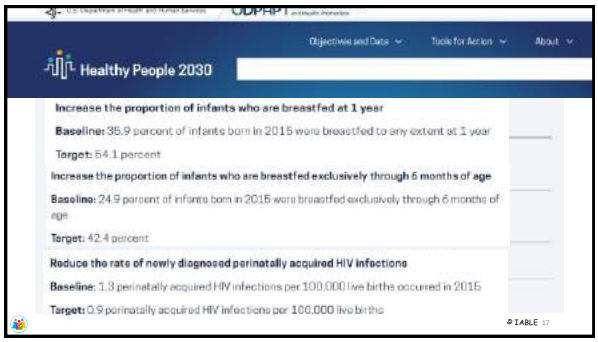
* MICH-21 and MICH-23 current rates represent babies born in 2016, National Immunization Survey 2017-2018; MICH-22 current rates represent employers providing an on-site lactation/mother's room, Society for Human Resource Management, 2019 survey; MICH-24 current rates represent babies born in Baby-Friendly Hospitals and Birth Centers designated as of June 2018, Baby-Friendly USA.

**Maternal Infant and Child Health

cdc.gov/breastfeeding/data/fact.html#







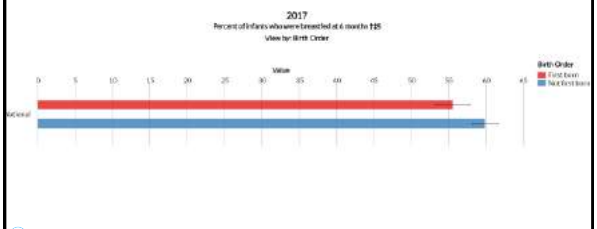
Infant Illnesses Requiring More Evaluation Before Fully Breastfeeding

- Infant galactosemia type 1
  - Type 1 is contraindicated
  - Other types may allow partial bfeeding
- Other metabolic disorders
  - Usually can partially bfeed
    - Maple syrup urine disease
    - Phenylketonuria (PKU)

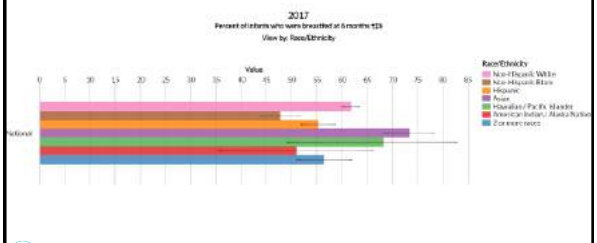
Maternal Relative Contraindications to Breastfeeding

- HIV, HTLV 1 or 2
- Herpes or shingles on nipple/breast
  - Milk fine from unaffected side
- Active, untreated TB*
- Brucellosis
- Ebola virus
- A few meds, mainly chemotherapy
- Most drugs of abuse (*expressed milk ok)

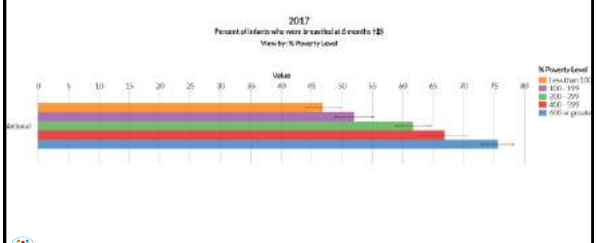
2017 Breastfeeding Rates at 6 Months by Birth Order



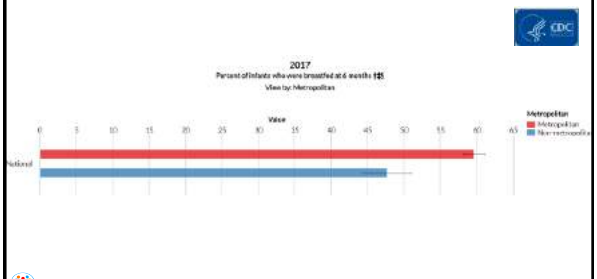
2017 Breastfeeding Rates at 6 Months by Race/Ethnicity



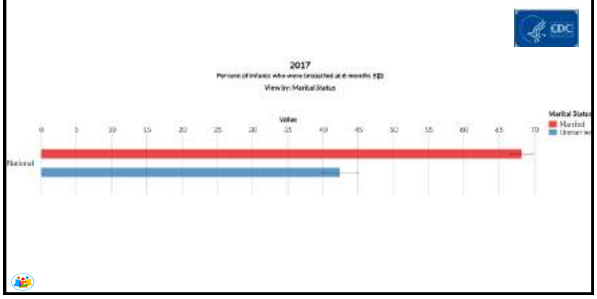
2017 Breastfeeding Rates at 6 Months by Poverty Level



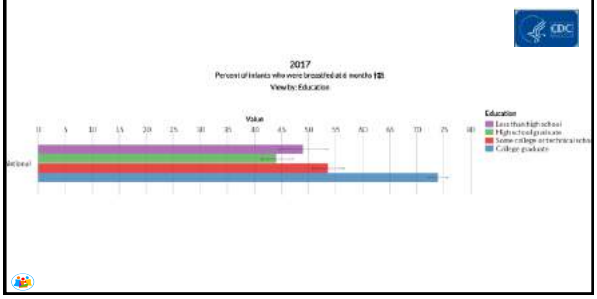
2017 Breastfeeding Rates at 6 Months by Urban/Rural Living



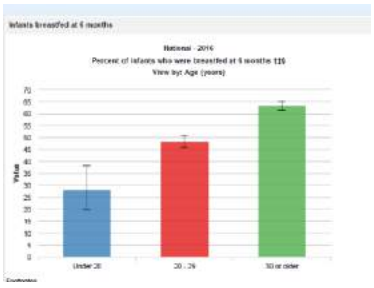
2017 Breastfeeding Rates at 6 Months by Marital Status



2017 Breastfeeding Rates at 6 Months by Education Level



2016 Breastfeeding Rates at 6 Months by Maternal Age



What Activities Would Violate the Code of Marketing for Breastmilk Substitutes?

1. A pediatric provider giving a family a book on breastfeeding that was written by a breastfeeding expert and stamped with a formula logo.
2. A pharmacy that offers free sample packets of formula.
3. A can of formula that has a picture of a smiling mother feeding her infant with a bottle.
4. Hospital staff recommending formula supplementation for an infant whose mother has an insufficient milk supply.
5. Formula companies offering a free dinner to hospital staff, with an educational program on the benefits of breastfeeding.
6. A billboard along a busy highway corridor advertising a formula having 'several proteins that are just like breastmilk'

28

Code of Marketing for Breastmilk Substitutes

- No advertising of breast-milk substitutes to families
- No free samples or supplies in the health care system.
- No promotion of products through health care facilities, including no free or low-cost formula.
- No contact between marketing personnel and mothers.
- No gifts or personal samples to health workers.
- No words or pictures idealizing artificial feeding, including pictures of infants, on the labels or product.
- Information to health workers should be scientific and factual only.
- All information on artificial feeding, including labels, should explain the benefits of breastfeeding and the costs and hazards associated with artificial feeding.
- Unsuitable products should not be promoted for babies.
- All products should be of high quality and take account of the climate and storage conditions of the country where they are used.

29IABLE

Other Helpful Policies and Guidelines

- Academy of Breastfeeding Medicine Protocols- bfmed.org
- CDC guidelines on milk storage, pump cleaning, infectious disease- cdc.gov
- Marketing of Breast-Milk Substitutes: National Implementation of the International Code Status Report 2018; WHO, UNICEF, IBFAN
- WHO guidance protecting breastfeeding as a human right 2017
- AAP Safe Sleep Recommendations 2016
- AAP Breastfeeding and Maternal HIV 2013
- American College of Radiology Appropriateness Criteria for Breast Imaging of Pregnant and Lactating Mothers 2018
- ACOG 2018 Optimizing Postpartum Care
- US Preventive Services Task Force 2016

30

Conclusions

- **There are very few contraindications to breastfeeding.**
- **Several policies and guidelines are excellent resources for creating a breastfeeding knowledgeable and supportive environment**
- **Some policies are helpful to diminish typical norms such as giving out formula gift bags.**

31

Breast Anatomy & Physiology

Katrina B. Mitchell, MD, IBCLC, PMH-C, FACS
Breast Surgical Oncologist
Lactation Consultant
Perinatal Mental Health Provider
Ridley Tree Cancer Center
at Sansum Clinic
Santa Barbara, California

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

No Disclosures

Image: Austyn Schwartzbeck

Objectives

- Describe breast gross anatomy
- Understand histologic appearance of breast
- Review changes during pregnancy and lactation
- Describe the role of prolactin and oxytocin in the function of the lactating breast
- Recognize congenital variations of breast development

Image: Mothersun and the Captain

Gross Anatomy

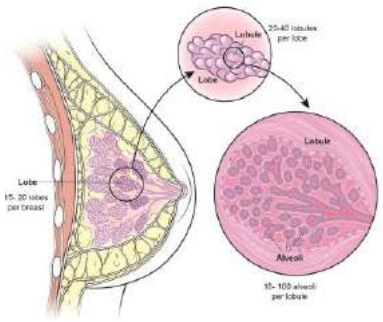
Image: Catchy D

General

- Gland existing in men and women in the 2nd to 6th intercostal cartilage, sternum to mid axillary line
- Anterior to pectoralis
- Not fully mature until pregnancy
- Mostly adipose tissue
- Fibroglandular parenchyma
  - Functional cells and surrounding connective tissue

Image: Enorasis

Structures



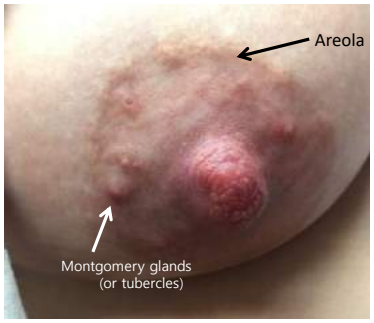
- Fibroglandular Parenchyma
  - Functional gland
    - Lobes, Lobules, Alveoli, Ducts, Myoepithelial cells
  - Connective tissue
- Fascia
- Adipose Tissue (Fat)
- Nipple Areolar Complex (NAC)
- Nerves
- Blood Vessels
- Lymphatics

Image: Tiffany DaVanzo

Nipple: No Two Look the Same!

- 9-20 orifices
- Stratified squamous epithelium last 2 mm
- Cuboidal prior to this
- Innumerable minor ducts draining into major ducts

Areola



Areola

- Smooth muscle fibers in circular pattern
  - Helps nipple become erect
- No subcutaneous fat

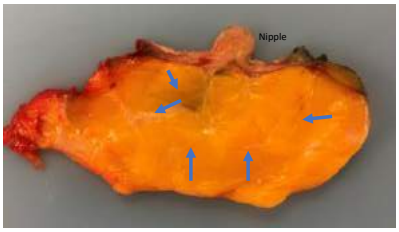
Lactiferous Sinuses

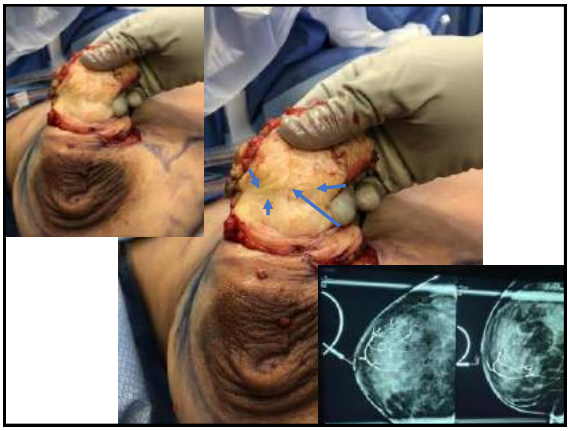
- 2 mm collecting ducts drain each breast segment
- Coalesce into 5-8 mm subareolar lactiferous sinuses
- Sinuses (9-20) drain at nipple surface
- May present as palpable mass

Nicholson BT, Harvey JA, Cohen MA Radiographics 2009, Image: Mia Zola

Retroareolar Ducts

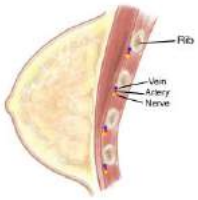
Innumerable, Interlacing Ducts

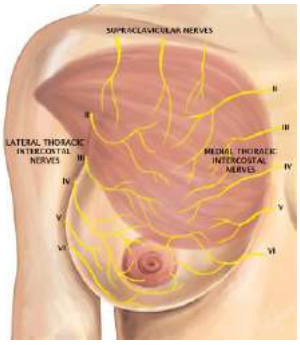




Innervation

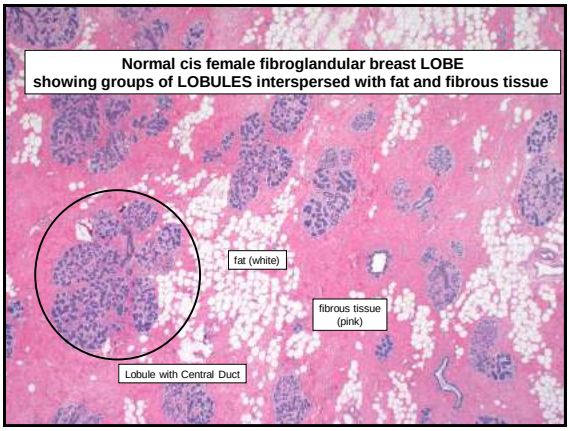
- 2nd-6th intercostal nerves
  - Lateral and anterior cutaneous branches





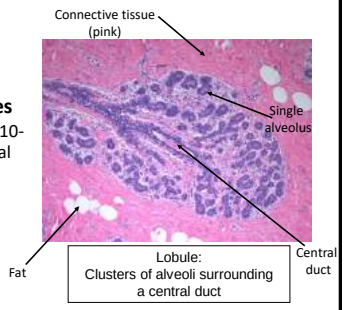
Vasculature and Lymphatics

- Vasculature
  - Perforating branches internal mammary
  - Lateral branches of posterior intercostals
  - Axillary
- Lymphatic
  - Primarily to axilla
  - Also to internal mammary

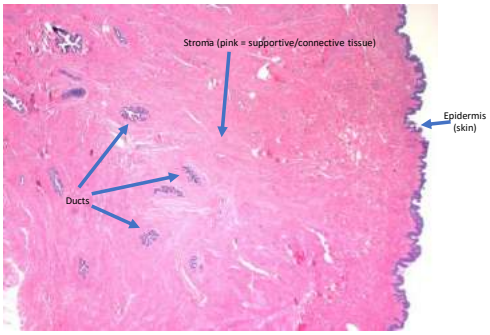


Fibroglandular Parenchyma: Lobule

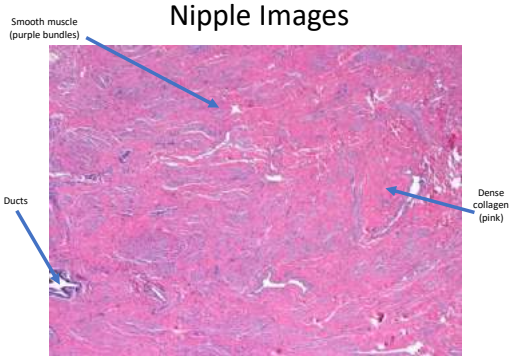
- 15-20 **Lobes** that contains 20-40 **lobules**
  - Each lobule contains 10-100 **alveoli** (functional unit that makes milk)



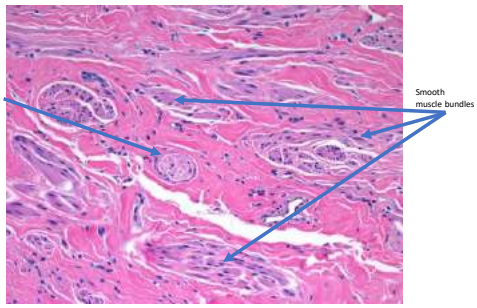
Low Power Nipple Images



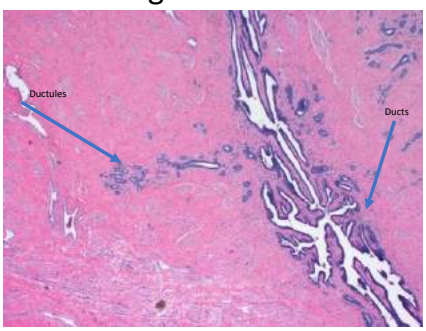
High Power (Zoomed In) Nipple Images



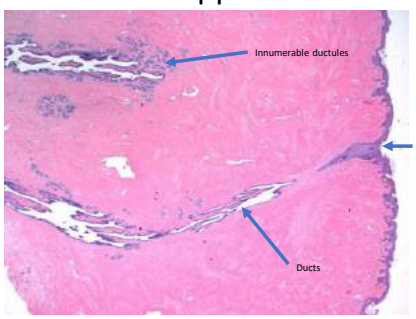
High power: Dense Collagen, Smooth Muscle, Nerves



Small Ducts Feed Into Larger Central Ducts

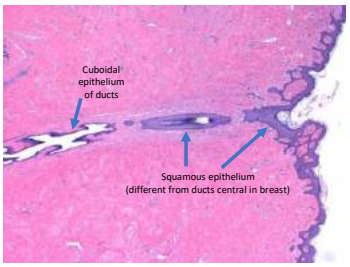


Ducts Running Up Towards Nipple Orifice

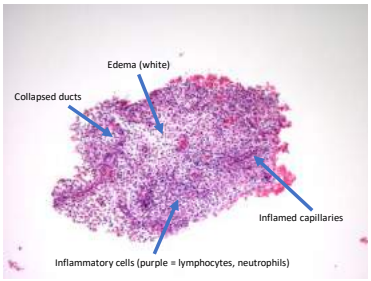


Duct Exiting Through Nipple Orifice

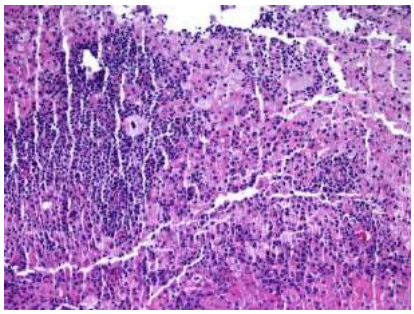
- Squamous epithelium colonizes last 1-2 mm of the duct
- Extensive squamatization = squamous metaplasia



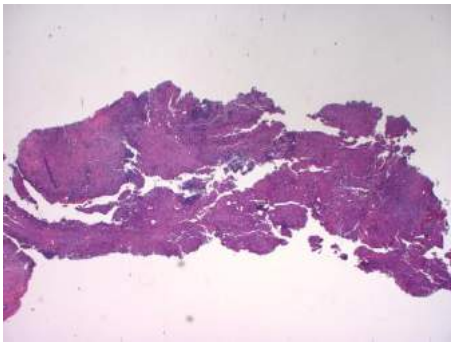
Inflammatory Cells, Edema, Inflamed Capillaries, Collapsed Ducts

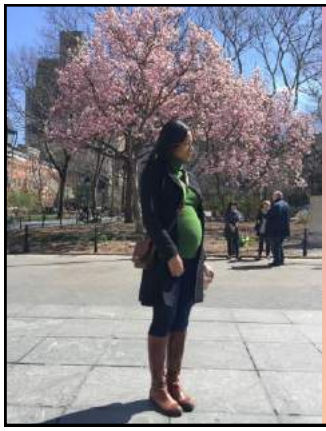


Histiocytes, Lymphocytes, Plasma Cells: Foamy Histios Ingesting Fat, Secretions



Tissue Destruction





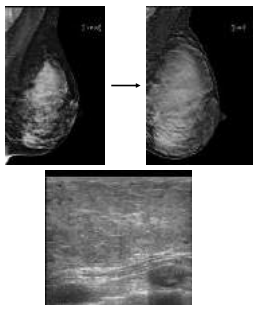
Pregnancy

Changes during Pregnancy

- 3-4 weeks pregnancy: ductal branching and lobular formation
- Most growth by 22 weeks but edema can increase after that
- Mid-pregnancy: Lactogenesis I
  - Secretory differentiation of the lobular alveolar epithelium
  - Colostrum leakage is normal
- Last trimester: further increase in lobular size due to hypertrophy of cells
- Nipple size increases due to prolactin

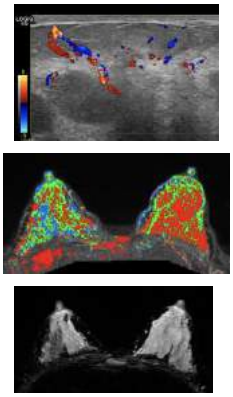
Common Radiographic Changes

- Overall marked increase in parenchymal density
- More hypoechoic on u/s during pregnancy due to decrease in fibrofatty stroma
- During lactation, more hyperechoic due to high fat content of milk



Increased Vascularity

- Both pregnancy and lactation
- Significant background enhancement on MRI
- Diffusely increased T2 signal due to increased water content



Prominent Axillary Nodes

- Common in lactation
- Benign appearance
  - Fatty Hilum

Gestational Gigantomastia

- Poorly defined incidence and likely a spectrum of enlargement
- Unknown etiology
  - (? Hormonal factors)
- Extreme cases can cause skin ulceration and parenchymal necrosis
  - Large growth does NOT always = large milk production (in fact, sometimes the opposite – the growth is often edema)
- Treat with lymphatic massage, breast support, image if asymmetric or focal mass to rule out inflammatory breast cancer

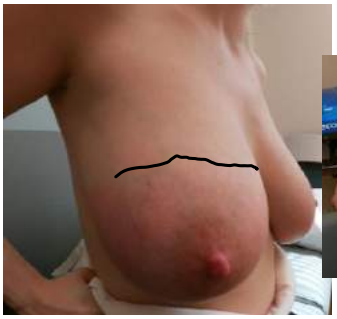
Mangla J Midwife Health 2017, Photos: Karen Palmer

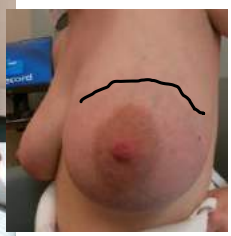
Right Gestational Gigantomastia in Left Breast Cancer Survivor

Dependent Edema

- If symmetric, bilateral
  - Reassurance
  - Supportive bra
  - PT
  - Massage
- Asymmetrical, not resolving
  - Punch biopsy and imaging

Images: Stacy Carter, MD





Images: Casey Rosen-Carole, MD

Physiology

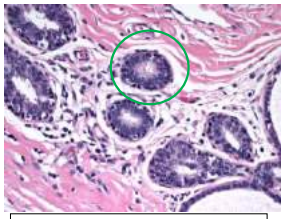
Lactogenesis

- Lactogenesis II
  - Onset of copious milk production, usually 30-120 hours postpartum
    - Results from fall in progesterone after delivery and prolactin response to suckling
- Lactogenesis III
  - Maintenance of established lactation; autocrine control from continued removal of milk from breast

Neville et al J Nutr 2001

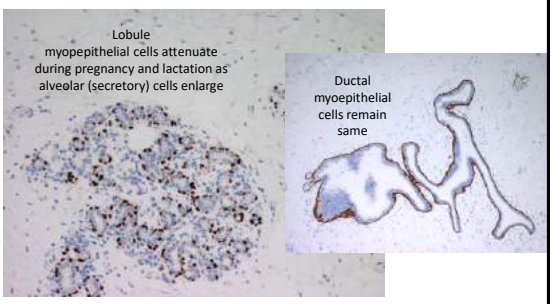
Fibroglandular Parenchyma: Alveoli

- Alveoli
  - Cuboidal epithelium
    - Synthesizes protein and lipid components of milk
  - Myoepithelial cells

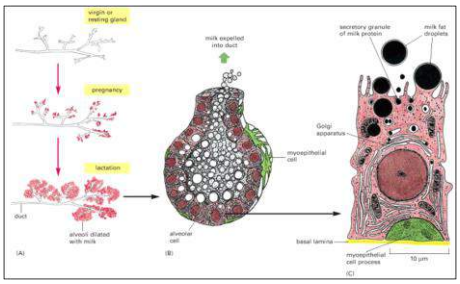


Individual alveoli (gland) composed of inner (luminal) cells and outer (myoepithelial) cells

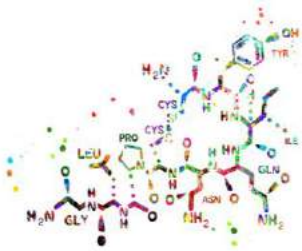
Fibroglandular Parenchyma: Myoepithelial Cells (Brown)



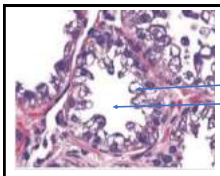
Functional Unit



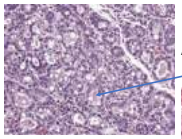
Many Hormones Affect Development of Functional Breast



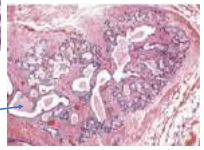
- Estrogen
- Progesterone
- Parathyroid Hormone Related Protein
- Prolactin
- Human Placental Lactogen
- Insulin-Like Growth Factor
- Insulin
- Fibroblast Growth Factor
- Thyroid Hormone
- Growth Hormone



Mid-Pregnancy:
Acinar cells have vacuolated cytoplasm, no secretions in lumen



Lactation:
Acini are expanded with secretions



Weaning:
Massive apoptosis, old secretions

Breast Pathology, 2nd Edition 2017

Prolactin

- Influences maternal behavior
- Increases throughout pregnancy
  - Important for development of tissue AND production of milk
- Released by the anterior pituitary gland
- Diurnal pattern (highest at 3:00 a.m.)

Prolactin

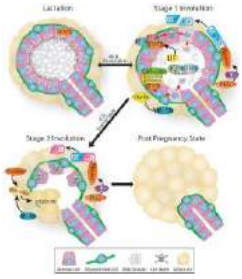
- Requires **nipple stimulation**
- Prolactin level ≠ Amount of milk
- Increasing prolactin won't increase milk without milk removal
- The prolactin in milk may participate in neuroendocrine and immune maturation for infant

Oxytocin

- The "Love Hormone"
- Released by posterior pituitary
- Produces letdown sensation
  - +/- tingly sensation
- Lowers blood pressure, causes mild sedation, improves pain tolerance

"REMOVE IT OR LOSE IT!"

- Effective, frequent removal of breastmilk is essential
- Feedback Inhibitor(s) of Lactation (FILs) slow production and trigger cell death
  - Limited/reversible cell death after 48 hours
  - Irreversible cell death and remodeling in 8 days



Wiley Interdiscip Rev Dev Biol. 2012 Jul-Aug;1(4):533-57.

Congenital Variations

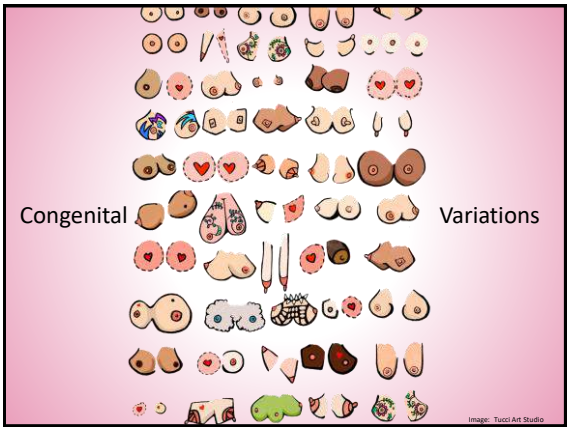


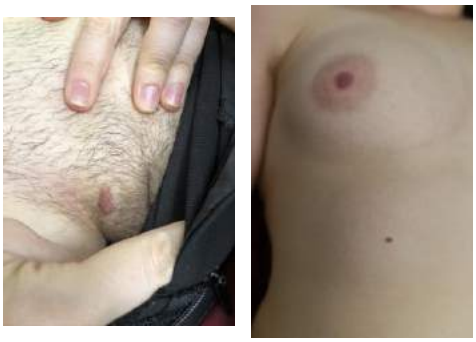
Image: Tucci Art Studio

Accessory or Supernumerary Nipple

- 5% of the population
- Left > right
- Male > female
- "Polythelia" = areola plus nipple
  - Areola may not have nipple but every nipple does have areola

Schmidt Eur J Ped 1998

Not Everything is an Accessory Nipple!

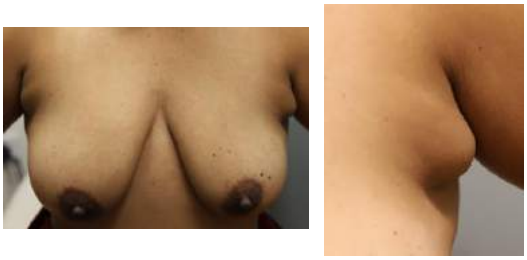


Axillary Breast Tissue

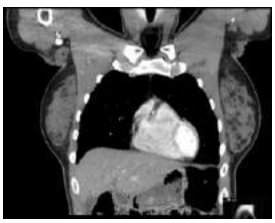
- Approximately 1% of the population, higher in Asian and Native American
- Reassurance, usually no need to image
- If imaged, will show normal fibroglandular ectopic breast tissue
- Treat if symptomatic with mastitis protocol

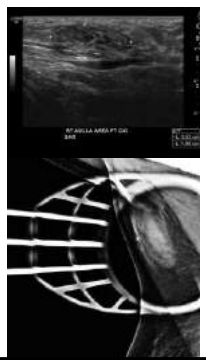
Marshall MB et al Surg Onc 1996

Axillary Breast Tissue



Benign Glandular Tissue with Lactational Change





Tubular Breast Deformity

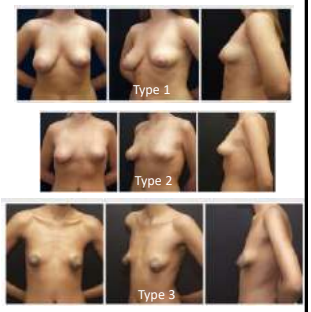
Type	Base	Inframammary Fold	Skin Envelope	Breast Volume	Ptosis	Areola
I	Minor constriction	Normal laterally, minor elevation medially	Sufficient	Minimal deficiency, no deficiency, or hypertrophy	Mild, moderate, or severe	Enlargement
II	Moderate constriction	Medial and lateral elevation	Inferior insufficiency	Moderate deficiency	None or mild	Normal, mild, or moderate herniation
III	Severe constriction	Elevation of entire fold, or fold absence	Global insufficiency	Severe deficiency	Mild/moderate	Severe herniation

- Congenital breast anomaly that becomes apparent at puberty and greatly impacts lactation
- Wide variety of presentations

Kolker and Collins PRS 2015

Tubular Breast Deformity

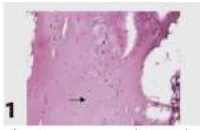
- Asymmetry is hallmark
- Breast base constriction, parenchymal hypoplasia, inferior breast skin deformity, superior malposition of IMF, areolar herniation
- Usually lack of breast growth and postpartum engorgement



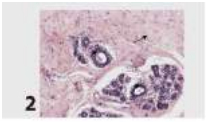
Kolker and Collins PRS 2015

Tubular Breast Deformity

- Large concentrations of collagen and elastic fibers on the constructive ring of the superficial fascia as well as the glandular structure



Fibrotic tissue surrounding areola



Glandular tissue replaced by fibrosis

Zholtikov APS 2019

Shape/Morphology NOT size

Poland Syndrome

- Unilateral anomaly of pectoralis muscles, breast nipple, axillary fold, subcutaneous tissue, ribs, and upper limb
- Wide phenotype variability
- TBN classification
  - Thorax, breast, nipple areolar complex

Romanini et al PRS 2016

Poland Syndrome

- Most common anomaly in women T1B1N2; 68% right side rather than left side (similar to male)

Table 2. TBN Classification of Thoracic Anomalies in Poland Syndrome

	Anomaly
T	Thoracic
T1	Hypoplasia or aplasia of pectoralis muscles and soft tissue
T2	T1 and sternal deformity, pectus excavatum and/or carinatum
T3	T2 and rib aplasia
T4	$T1_1$, T2, and T3 (muscle, sternum, and rib defect)
B	Breast
B1	Breast hypoplasia
B2	Breast aplasia
N	Nipple-areola complex
N1	NAC hypoplasia with dislocation of <2 cm
N2	NAC hypoplasia with dislocation of >2 cm
N3	Absent NAC

NAC, nipple-areola complex.

Romanini et al PRS 2016

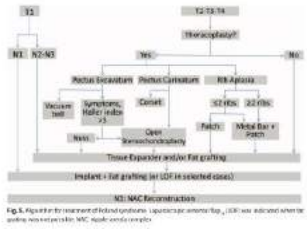


Fig. 7. Postoperative result in the T3B1N2 patient in Figure 2c after fat grafting, reconstruction in two steps, and contralateral mastopexy.

Romanini et al PRS 2016

Nipple "Inversions"

← Pregnant

Postpartum
(often "inversion" is connective tissue that releases once baby latches) →

Park HS, Yoon CH, Kim HJ Aesthetic Plast Surg 1999

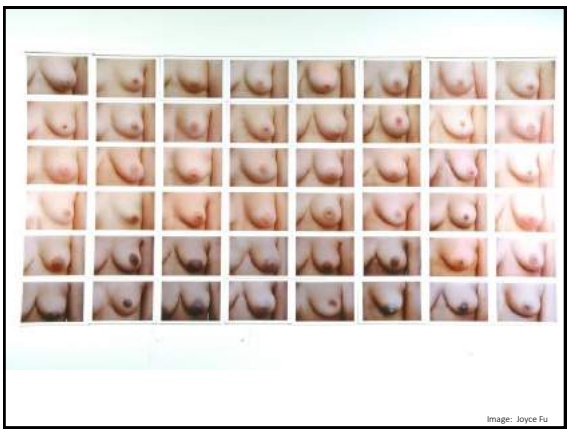


Image: Joyce Fu

Nipple Inversion

- 3-10% of the population
- Congenital
  - Connective tissue tethering, failure of the lactiferous sinuses to lengthen, failure of growth of mesenchyme
- Acquired
  - Surgery, malignancy

Gould DJ et al Aesthetic Surg J 2015
Park HS, Yoon CH, Kim HJ Aesthetic Plast Surg 1999

Pathologic Inversion/Fixation

Take Home Points

- The breast is a complex gland and not as simple as you think it is!
- Was NEVER MEANT TO BE MASSAGED!
- Edema and gigantomastia should be managed with lymphatic massage
- Nipples have erectile tissue and "inversions" often release on own
- Congenital anomalies: Prenatal counseling, close support postpartum

Examining the Breastfeeding Dyad
Latch and Positioning

Anne Eglash MD, IBCLC, FABM
Kathy Leeper MD, IBCLC, FABM

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

Conflicts of Interest

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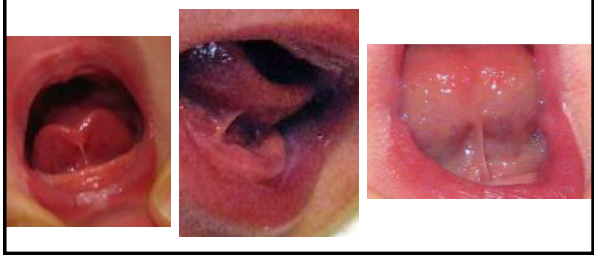
Objectives

- Describe the infant exam pertaining to breastfeeding.
- Describe how to do a breast exam.
- Instruct on proper latch and positioning.
- Identify nutritive vs nonnutritive sucking.
- Explain how to collect a breastmilk culture.

Infant Exam Pertaining to Breastfeeding

- General
  - Baby's naked wt
  - Jaundice
  - Baby's tone & hydration & alertness
- Head
  - Cephalohematoma
  - Facial asymmetry
  - Recessed chin
  - Eye movement- malalignment, nystagmus
  - Nasal congestion/mouth breathing
- Neck
  - Torticollis
  - Clavicle fracture
- Oral and oromotor
  - Observe tongue lift
  - Look and feel under tongue
  - Suck exam- "snap back", cupping, shoving, "chewing"
  - Cleft or submucosal cleft palate

Tongue Placement



Part 1 Martinelli Tool
Best = 0
Worst = 12

Part 1 Martinelli Tool
Best = 0
Worst = 12

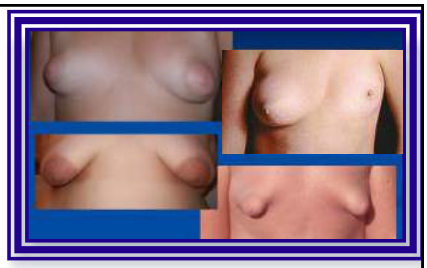
Look and feel under the tongue

Suck Exam:
"snap back", cupping, shoving, "chewing", submucosal cleft palate

Exam of Lactating Parent

- Nipple/areolar exam
  - Nipple lesions
  - Inverted/flat/protuberant nipples
  - Color (vasospasm)
- Breast shape/contour/size
- Breast fullness
- NAC/breast tenderness
- Breast masses/induration/edema
- Lymphadenopathy

Shape Matters More Than Size



Importance Of Positioning

- Deep Latch
- Maternal Comfort
- Effective Milk Transfer

Sitting in Lap Facing Mom; Mom is using a C-Hold

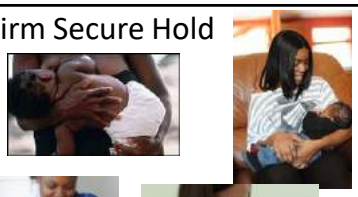
Semi-Reclined (laid back) Positioning

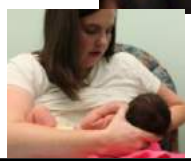
Global Health Media

Positioning Tips for Optimal Latch

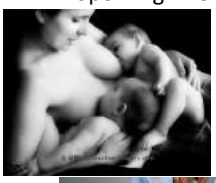
- Firm, Secure Hold
- Proper Alignment
- Maternal Comfort and Support
- Mouth Wide Open
- Nose to Breast

Firm Secure Hold



Proper Alignment



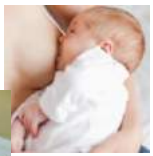

Maternal Comfort and Support




Mouth Open Wide




Nose to Breast


Asymmetric Latch

Handout available at IABLE website: "Helping your baby latch well"

What is a Feeding?

- The baby latches on and nurses
  - Transfer of milk
- Easy to fool everyone
  - Some infants sleep at the breast
- Proof is in the weight gain

Teach Parents to Understand a Feeding
Nutritive vs Non-nutritive Feeding

- Nutritive feeding transfers milk
  - Swallows are seen/heard
  - Slower (~1 suck per second), rhythmic
  - Wider jaw excursions
- Non-nutritive
  - Faster
  - Smaller jaw excursions
  - NO swallowing

Best Feedings Include Swallows!!

Awake and Effective Infant at the Breast

Sleepy Infant at the Breast

Young Infant at the Breast

Step 4- Watch for Signs of Satiation

Sit with Parents to Teach Nutritive and Non-Nutritive Sucking

- Watch the infant feed on the first breast, and point out swallows
- As the infant relaxes, and there have been NO swallows for 3-4 minutes, switch infant to the other breast. No need to wait for the infant to unlatch on their own
- Point out swallows on the second side
- Once swallows are done for 3-4 minutes on the second side, OK to take infant off the breast
- If infant is still hungry, start the process over on the first, then the second breast
- Nursing on both sides twice is called Switch Nursing

Thoughts on Latch?

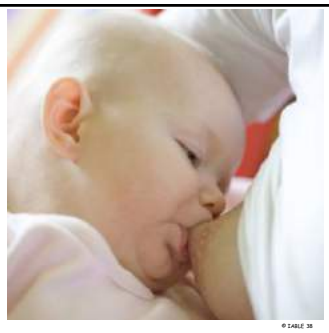
Thoughts on Latch?

Thoughts on Latch?

Thoughts on Latch?

Thoughts on Latch?

Thoughts on Latch?



Collecting a Breastmilk Culture

- Wearing gloves, clean nipple/areolar region
  - Alcohol or sterile saline
- Keeping gloved fingers out of collection field
  - Express 1-3 tsp of milk into sterile container
- Clean off alcohol
- Send specimen for a body fluid culture
  - Wound culture won't identify coag neg staph

Conclusions

- An organized approach to infant exam including the head, neck, tone, and oromotor skills helps to identify underlying problems that contribute to breastfeeding difficulties.
- A nipple/areolar and breast exam is warranted in cases of low milk production, breast pain or other breast symptoms.
- Latch and positioning are key to comfortable, atraumatic, and effective feeding at the breast.
- Parents greatly benefit from instruction on non-nutritive vs nutritive sucking.
- A breastmilk culture should be collected and processed as a body fluid, not a wound.

The Immediate Postpartum Period

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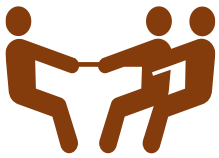
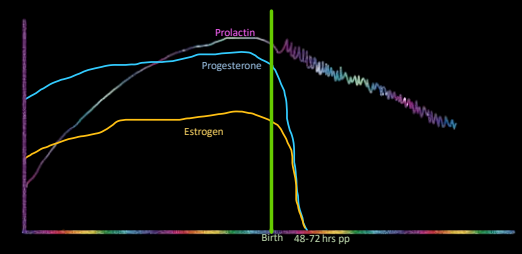


Objectives

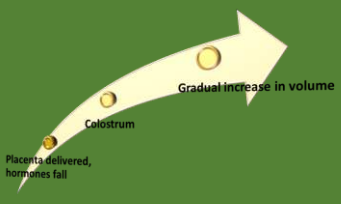
- Describe the physiologic triggers that lead to secretory activation.
- Identify 3 key hospital routines that enable breastfeeding within the first hour after birth
- Name 2 reasons why a newborn breastfeeding baby might have exaggerated jaundice
- Identify 2 ways to support breastfeeding when a newborn has not yet latched by the time of hospital discharge

Hormones Before and After Birth



Lactation Depends on Drop in Estrogen/Progesterone and Sustained Elevated Prolactin Over Time

Lactogenesis II (Secretory Activation) After Birth



Tips For Breastfeeding - Early Postpartum

- Limit pain meds near the end of labor
- Skin-skin right after birth
- Encourage rooming-in
- Breastfeeding education
  - Limit pacifier use early PP
  - Staff observes feeds q shift
- No anti-lactation drugs
- Teach manual expression, early & often

AAP Pediatrics 138(3) Sept 2016

7

Early Skin-to-Skin Contact AAP 2016

- Cardioresp stabilization
- Decreased pain in newborn
- Improved growth
- Improved autonomic, GI, and neurobehavioral adaptation
- Improved thermoregulation
- Prevents hypoglycemia
- Decreased Infant crying
- Increased maternal affectionate love/touch
- Decreased pp hemorrhage
- Decreased maternal cortisol and depression
- More organized breastfeeding
- Increased BF exclusivity & duration rates

AAP Pediatrics 138(3) Sept 2016

COMPONENTS OF SAFE POSITIONING FOR THE NEWBORN WHILE SKIN-TO-SKIN

- Infant's face can be seen
- Infant's head is in "sniffing" position
- Infant's nose and mouth are not covered
- Infant's head is turned to one side
- Infant's neck is straight, not bent
- Infant's shoulders and chest face mother
- Infant's legs are flexed
- Infant's back is covered with blankets
- Mother-infant dyad is monitored continuously by staff in the delivery environ and regularly on the postpartum unit
- When mother wants to sleep, infant is placed in bassinet or with another support person who is awake and alert

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10

Sudden Unexpected Postnatal Collapse (SUPC)

- CDC- Healthy infants born at > 35 weeks, APGAR at 10 min >6, who collapse suddenly and unexpectedly within the first postnatal week
- 2.6-19/100,000 live births
  - 36% in the first 2 hours of life
  - 29% between 2-24 hours of life
  - 24% between 24-72 hrs
  - 9% days 4-7
- Associated with
  - Unsafe skin-to-skin practices
    - Airway obstruction
      - Exhausted mother with inadequate supervision
      - Maternal mobile phone use

J Ped 2018;196:104-8 & Early Human Development 126 (2018) 28-31

Fostering Self-Led Latch

- STS awakens infant feeding reflex- can facilitate self-led latching
- "1st feed in 1st hour"
- Organizes 'route' to feeding
  - Search->feel->roots
  - Baby finds the nipple/areola
  - Baby attempts to latch

12

Colostrum

Early colostrum feeds are small

First 24 hrs
2-10ml/feed

24-48 hrs
5-15ml/feed

Small, freq feeds are appropriate for newborn size

- Every 1-3 hr feeds are expected
  - 8-12 times/24 hours
  - May seem like snacking!

15

Key Points for Success in the First Few Days Postpartum

- Feedings 10-12 times a day
  - –All sucking at the breast
- Frequent, effective feeding crucial to securing the milk supply
- Focus on baby, not visitors
- No pacifiers or supplements unless medically indicated
- Cracked, bleeding nipples not normal
- Teach manual expression & deep latch/correct position early and often

Evidence for Rooming In

- Improved patient satisfaction
- Decreased risk of abductions/switches
- Decreased infant abandonment
- Empowerment to parents
- Increased frequency of breastfeeding
- Decreased hyperbilirubinemia
- Increased likelihood of nursing up to 6 months

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18

Early Pacifier Use Meta-Analysis

- Pooled effect of the association between pacifier use and Exclusive breastfeeding interruption= 2.48 OR (95% CI = 2.16-2.85)
- Might be a marker for *breastfeeding problems*

Matern Child Nutr July 2017

19

When Are Pacifiers OK for Non-ICU infants?

- Baby is latching & nursing well
- Back to birth weight
- Good weight gain
- Painful procedures or separations when mom cannot be present

Frequent Feeding

Complete Emptying

Secretory Activation (30-120 hours)

Decreased Frequency

Engorgement

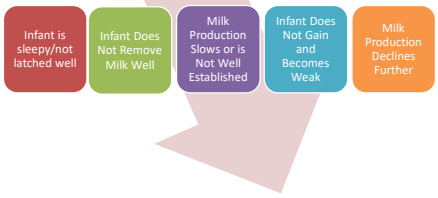
Poor milk transfer

21

The Positive Trend in Milk Removal with Feeding

22

The Negative Trend when Insufficient Milk is Removed During Feeding



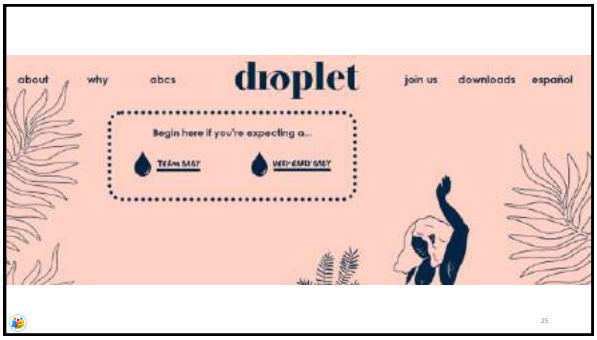
23

Back Up Plan: Hand Expression

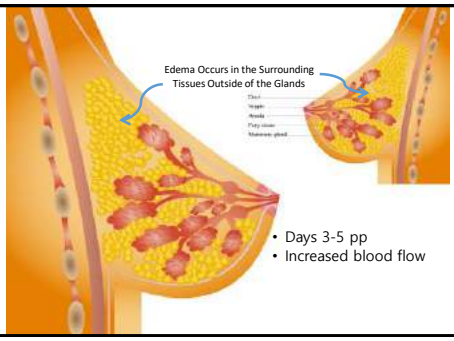
- The first week postpartum
- Engorgement
- Separation/can't latch
- Sore nipples
- Low milk supply – need more stimulation to produce milk
- No pump available

Manual Expression Video

24



Engorgement



- Days 3-5 pp
- Increased blood flow

Effects of Engorgement

- Harder to latch
  - Reduced milk transfer and infant intake of breastmilk
- Breast discomfort
  - Reduces milk flow
- Sore nipples
  - Reduced BF frequency
  - Increases risk of infection
- Reduction in milk supply
  - Can lead to supplementation

Engorgement Management

- Optimize latch
  - Sandwich the breast
  - Asymmetric Latch
- Reverse Pressure Softening
- Lymphatic massage
- Heat to promote flow before feeding
- Ice/cool compresses while supine after feeding

Neonatal Jaundice in Breastfed Infants

- Physiologic
- Breastfed babies- 3-6x more likely to have high TSB compared to formula fed babies
- 30-40% of bfed babies
  - T bili >5 at 3-4 weeks

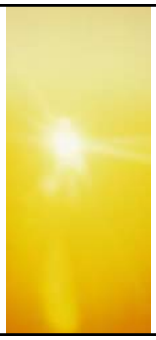
Pediatrics 2014;134:e340–e345

Jaundice Related to Breastfeeding

- Lack-of-adequate breastfeeding jaundice
  - Decreased glucose in gut
    - Glucose induces UGT 1A1
  - Increased reabsorption of unconjugated bili from the gut
- Breastmilk jaundice
  - Adequate intake of calories
  - Prolonged jaundice
  - Polymorphism of UGT1A1

LPI at Risk for Kernicterus

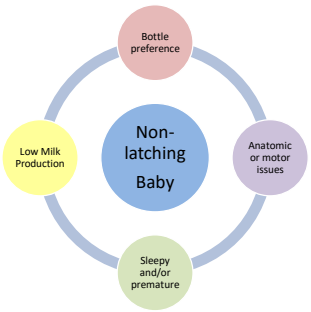
- Late preterm Infants (LPI)
  - Immature & weak S&S patterns
    - Starvation jaundice
  - Liver immaturity
  - Weak blood brain barrier
- Bili stays elevated longer, & reaches higher mean levels than in term infants
- Bili production exceeds protein binding
  - Higher risk of extravasation into extravasc spaces, e.g. brain
- Routinely supplement LPI until proven effective nursers



No Latch in the Hospital

- Variable nursing day 1
- Improved nursing skills by day 2
- Hand-express colostrum every 2-3 hours on day 1 if no latch
  - Avoid a nipple shield
  - Supplement with colostrum
  - Keep baby skin-skin

Source: United States Breastfeeding Committee



Sleepy/LPI/Premature Infant

- Falls asleep at the breast
- Sluggish suck/swallow reflex
- Often needs supplementation until nursing improves

Bottle Preference

- Babies become imprinted

'come to recognize (another animal, person, or thing) as a parent or other object of habitual trust'

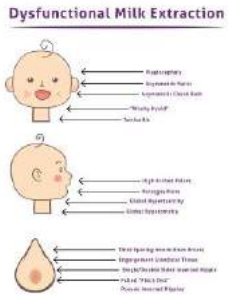
- A bottle has
  - firm stimulus to palate
  - immediate and low resistance milk flow

Low Milk Production

- Low production means low colostrum.
  - Infants refuse to latch after the first or second feeding
- Often has been given bottles or a finger feeder.
- Supplementer at the breast helps.

Anatomic and Motor Problems

- Tongue Tie
- Torticollis
- Pain
- Hyper/Hypotonia
- Flat or inverted nipples
- ENGORGEMENT



When No Latch by Discharge

- Manual expression/pumping q3 hours
- Skin-skin
  - Infant-led latch
- Infant feeding
  - Spoon Feeding
  - Finger feeding
  - Cup feeding
  - Bottle feeding
- Try to avoid nipple shield
- Encourage hope
  - Not everyone crawls at 9 mo or walks at a year!

Medical Indications for Supplement

- Hypoglycemia
- Dehydration
- Delayed lactogenesis
  - Day 5: >10% weight loss
- Meconium on Day 5
- Severe hyperbilirubinemia
- Baby not latching
- LPI/SGA infants
- Known maternal insufficient supply
  - E.g. breast reduction or insufficient glandular tissue

Academy of Breastfeeding Med Protocol #3 bfmed.org

40

Spoon Feeding

- Hand express into spoon
- Continue skin to skin
- No harm to hand express pc and offer colostrum
- Routinely hand express/spoon pc for:
  - Sleepy
  - LPI
  - SGA

41

Finger Feeding

Pros

- Avoids using a bottle
- Good for small volumes
- Active participation

Cons

- Difficult with larger volumes
- Needs coordination
- Aspiration
- Cleaning
- Accessibility

Click for Video

Help Parent Maintain Lactation During Separation

- Initiate milk expression within 2 hrs pp
- Hands- on pumping
- Skin-to-skin when able
- Early licking at breast
  - Even if not able to fully nurse

Conclusions

- Skin to Skin and rooming-In are key steps in successful breastfeeding initiation.
- Every mother should be shown early & frequently how to do hand expression of milk.
- If supplementation is needed, pay attention to volume given & mode of supplementation
- Mother's milk supply should be protected when infants do not latch well in the first few days of life.

44

Milk Expression

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- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
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3

Conflict of Interest

Objectives

- Explain to a parent how to perform manual expression.
- Understand basic principles of operating breast pumps.
- Counsel parents on proper breast shield size.
- Explain key techniques of breastmilk expression and milk storage.
- Identify problems that can occur among parents who exclusive pump milk.

Manual Expression of the Breast

Ideal Situations for Manual Expression for the Term Infant

- The first week postpartum
- Engorgement
- Low milk production
- Before latching to soften areola
- Infrequent need
- Preference
- Cultural Norm

Manual Expression Video

Advantages to Manual Expression	Advantages to Pump Expression
Hands are easily available	Expression might be faster
Only parts to wash are hands	Improved comfort if manual expression hurts
Can be done anywhere, no need for electricity	Can be done hands free if using an electric pump
Costs nothing	Easier for people with physical limitations
Increases milk production and fat beyond pumping	Increases milk supply
Reduced risk of nipple trauma	
No associated noise	

Manual Breast Pumps

- No electricity used
- Vacuum is created by squeezing a handle or lever
- Most are single sided
- The individual has control over duration of each cycle and frequency of cycles

Using a Hand Pump

The Haakaa Milk Collector

- Soft, silicone
- Apply to the breast after squeezing
- Draws milk during a letdown
- Use on the other breast when pumping/nursing on one side
  - Only use if infant won't nurse from that breast or is done on that side
    - No stealing from the infant!
- May be traumatic due to high negative pressure and wide opening

Battery or Electric Powered Breast Pumps

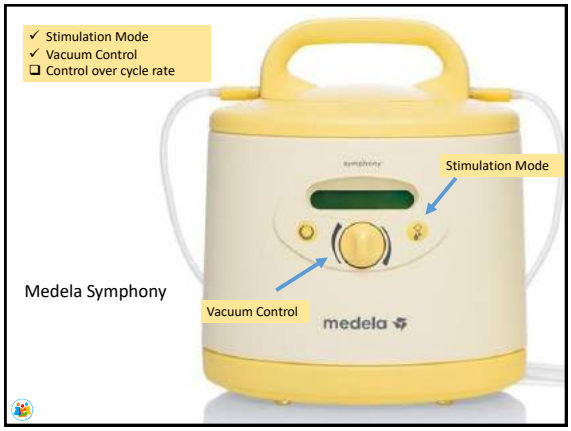
Easier than a clothes washing machine!

Proper use imperative to protect milk production

Proper fit needed to prevent injury!

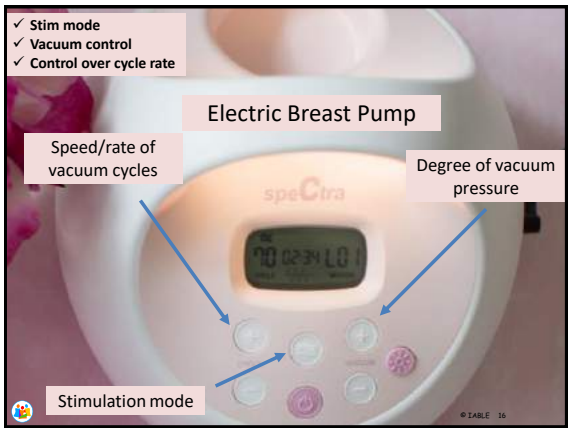
Control Options for Electric or Battery Operated Breast Pumps

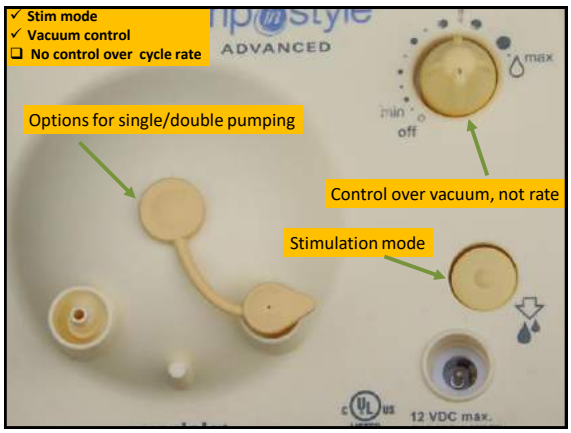
- Stimulation/massage mode
  - Stimulates let down w/fast, light suction
  - Not all pumps
  - Some pumps automatically start on them, others don't
- Amount of vacuum (suction)
  - Most if not all pumps allow vacuum control
  - Ideal vacuum at -150 to -200mmHg during expression mode
- Rate of cycles
  - Some allow fast vs slow rate of pumping
- Single or double pumping

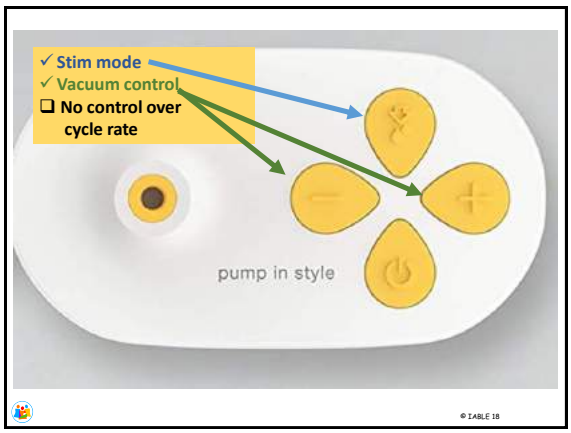

✓ Stimulation Mode
✓ Vacuum Control
❑ Control over cycle rate
Stimulation Mode
Medela Symphony
Vacuum Control
medela


❑Stimulation Mode
✓Vacuum Control
✓Control over cycle rate
Ameda
32
CPM
speed
76%
suction
03:47
timer
PLATINUM


Ameda Elite
CYCLES
VACUUM
MIN
MAX
MIN
MAX
OFF
❑Stimulation Mode
✓Vacuum Control
✓Control over cycle rate

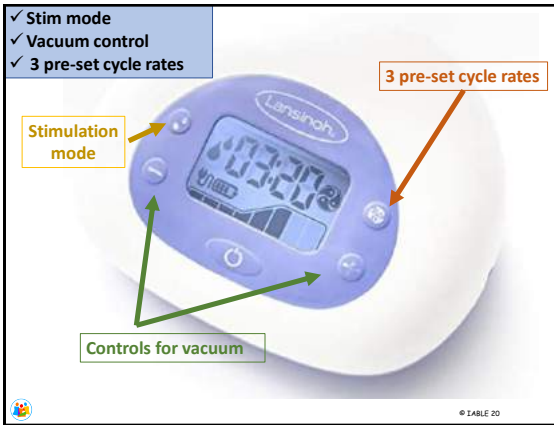

✓ Stim mode
✓ Vacuum control
✓ Control over cycle rate
Electric Breast Pump
Speed/rate of vacuum cycles
Degree of vacuum pressure
Stimulation mode

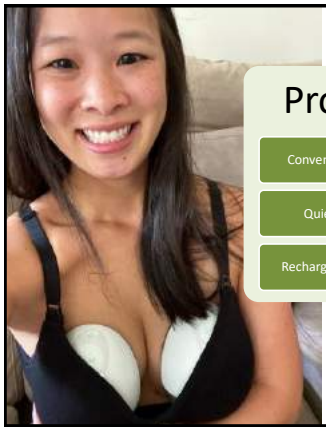

✓ Stim mode
✓ Vacuum control
❑ No control over cycle rate
ADVANCED
max
min
off
Options for single/double pumping
Control over vacuum, not rate
Stimulation mode
12 VDC max.


✓ Stim mode
✓ Vacuum control
❑ No control over cycle rate
pump in style

❑ No Stim mode
✓ Vacuum control
✓ Control over cycle rate

✓ Stim mode
✓ Vacuum control
✓ 3 pre-set cycle rates





Wearable Pumps

Pros	Cons
Convenient	Can spill
Quiet	Limited flange sizes
Rechargeable	Limited volume
	Expensive

✓ Stim mode
✓ Vaccuum control
❑ No control over cycle rate

What About Pump Parts?

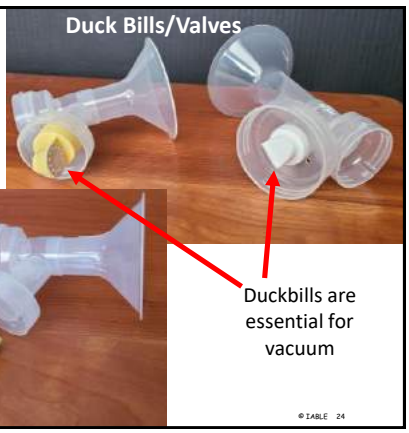
Duckbills/Valves

Filters/Backflow Protectors

Flanges/Breast Shields

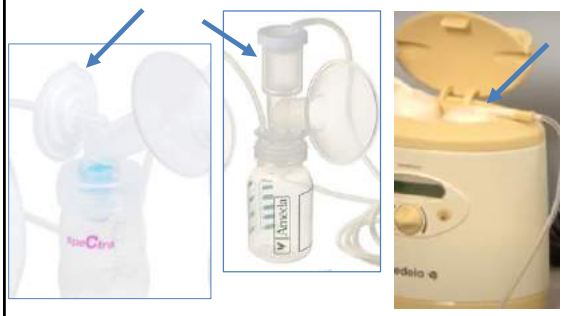
Duck Bills/Valves

Must be Cleaned well, INTACT, and in PLACE



Duckbills are essential for vacuum

Backflow Protectors/Filters
Prevent Milk From Entering Pump/Tubing (Closed System)

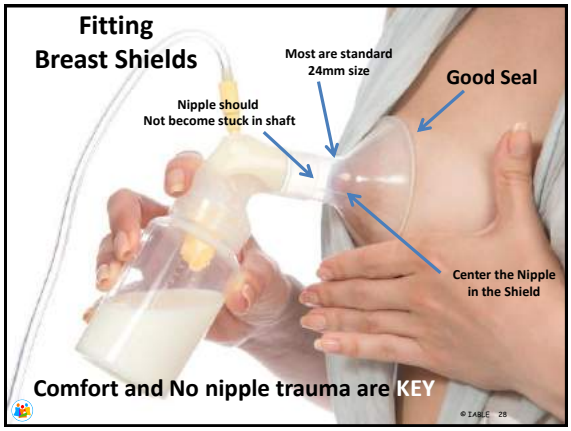


Setting Up a Symphony Pump

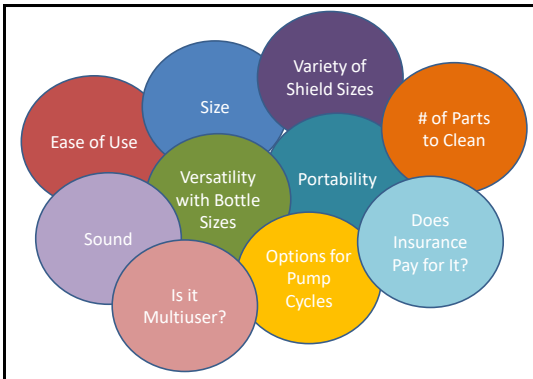
Symphony Plus Program Card

- Card has 2 pump programs
  - Initiation Program PLUS Maintain Program
- Start with Initiation program
  - Turn on pump and press Let-Down button
    - Should see 'Initiate' running
    - Use until 20 ml/pump, or thru day 5
- Switch to Maintain program
  - Turn on pump and don't push Let-Down
    - Within 10 sec will see 'Maintain' running

Fitting Breast Shields



Factor	Suggestion
Lowest cost	Manual pump
Intermittent use for a stay-at-home parent who plans to mainly nurse	Manual pump
Primary need is to increase milk production	Double electric pump
Baby is separated from Parent; NICU	Consider renting a hospital grade electric pump*
Parent is back to work	Double electric pump
Parent bottle feeds many feedings/day	Double electric pump
No access to an electrical outlet	Manual or battery operated pump
Easy to transport	Lightweight pump in its own carrying case



Factors to Consider When Choosing a Pump

Steps When Using a Pump

- Wash hands with soap and water
  - Usually no need to wash breast
  - Use clean pump parts
- Assemble pump parts
- Find a comfortable place to pump

© IABLE 31

Hands Free Pumping

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Other Pumping Tips

- Start w/low vacuum or stimulation phase
  - Gradually increase to comfortable & ideal vacuum
- Manual expression during or after pumping as needed
  - With ideal pump use, ME should not be needed

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Single Sided or Double Sided pumping?

In general, double pumping results in an extra milk ejection and more milk expressed for time spent over single pumping


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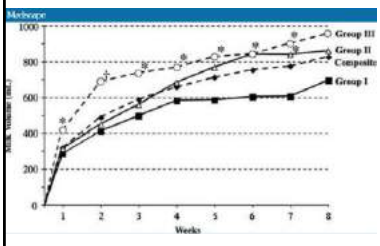
Combining hand techniques *with electric pumping increases milk production in mothers of preterm infants. J Perinatol* 2009



Grp 1= **2 x/day** n=15
Grp 2= **2-5 x/day** n=18
Grp 3= **>5 x/day** n=16

**Mean daily pumping for Day 1-14 = 6x in all groups*

Mean daily volumes (MDV) of expressed milk over the course of the 8-week study of three groups as defined by frequency of hand expression during ***the first three postpartum days***. Statistical comparisons using analysis of variance were performed only between Groups I, II and III. *P*<0.05 *vs Group I, vs Groups I and II. (Morton J, et al)

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Promoting a Letdown

'Experience' the baby
- Photos/video
- Article of clothing/blanket
- Audio of the baby

- Massage/tickle breasts
- Rub nipples
- Warm packs

Get Comfy!
- Music
- Eat/drink
- Distract
- Feel safe

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Freq/Duration of Pumping

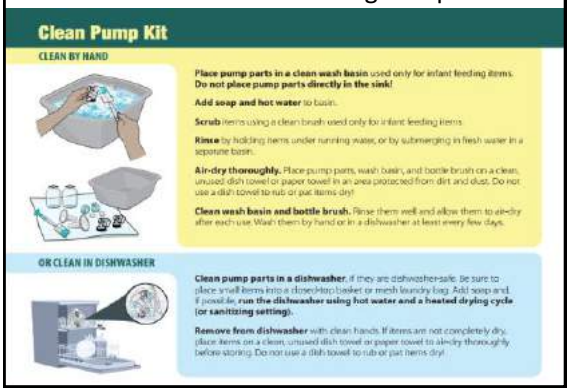
- Pump every 3 hours with no more than a 5 hour break at night
- Average duration = 12-20 minutes
  - Pump until empty, unless overproduction
- Average session = 2-3 let-downs
- High production
  - limit volume expressed

Expressing Breastmilk for a Premie

- Most important determinant of exclusivity and duration of breastfeeding is VOLUME of milk produced
- Maximize milk production while minimizing minutes of expression
  - Optimal frequency is 8-10 expressions in 24 hours
  - Customize for each individual
    - High storage capacity- can pump less often
- Night time expression is important to maintain prolactin level
  - Duration of night time break depends on storage capacity
- Hands on pumping may improve milk production

CPQCC.org Nutritional Support of the VLBW Toolkit 2018

CDC Guidelines for Cleaning Pump Parts

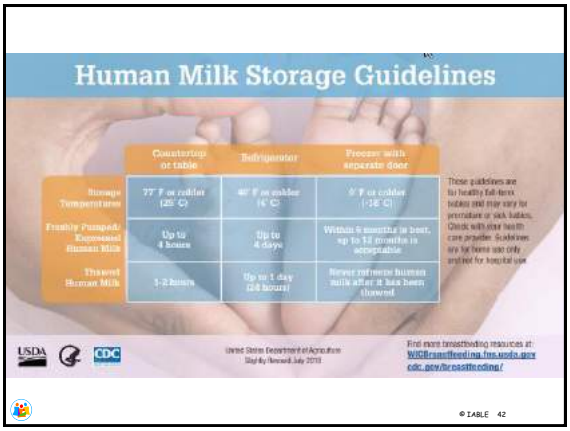


CDC Guidelines for Sanitizing Once a Day For Infants Who are Premature, Ill, or < 3 months

- Boil for 5 minutes, remove with tong
- Steam in a microwave bag or plug-in steam system
- Dishwasher on sanitize cycle
- Bleach
  - 1 tsp of bleach in 16 cups of water
    - Submerge completely and soak for 2 minutes
  - Do not rinse, to avoid re-contamination
    - Bleach will break down as it dries and is safe
  - Dry on a clean paper towel or unused dish towel

Milk Storage Containers

- Hard plastic bottles
  - BPA- free
- Glass bottles
- BM storage bags
  - Protect with added bag
  - Avoid food-grade freezer bags
- Wash bottles in hot soapy water or dishwasher



Additional Principles of Human Milk Storage

- Fresh is best!
- Freeze in 2-4 oz volumes
- New milk (chilled) can be added to older milk
- Leave room in container when freezing
- Write date and baby's name before freezing

Using Expressed Milk

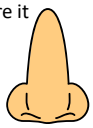
- Fresh
  - Heat in warm water
- Frozen
  - Defrost in a warm water bath or overnight in refrigerator
  - Use within 24 hours after thawed
  - Use within a few hours after it is warmed
- Never reheat in a microwave!!

Toss or Donate Stored Milk?

- Reasons to not use stored milk:
  - Baby is allergic to a substance in parent's milk, e.g. food or medication
- Milk can be donated
- Very rare need to toss milk from a yeast or bacterial infection

All Stored Breastmilk has a Smell

- Due to an enzyme lipase breaking up the fat in the milk.
  - Not due to excessive lipase
  - Keep the bottle/bag airtight to decrease odor
- The longer it is stored in frig or freezer, the more it smells
  - Fresh milk is the least smelly
- Scalding milk is NOT recommended
  - Scalding destroys milk properties
- Most babies don't care about the smell
  - We eat stinky foods- cheese, fish, eggs, cooked broccoli/cauliflower



Colored Milk Do Not Toss!!

- Medications
  - Rifamycin (e.g. rifampin) – pink
  - Iron – green
  - Minocycline- black
  - Propofol-blue/green
- Blood
  - 'Rusty pipe'- brown/red
- Serratia marcescens
  - Produces a pink pigment, will coat pump parts
- Foods
  - Kelp, algae, spirulina- green
- Food & med dyes
  - Candy
  - Pill coatings

Bfmed 13(3) 2018

The Pump Won't Work! The Basics

Ensure Pump is charged/plugged in

Check for Break in Seal

Dial to Adequate Vacuum!

If single pumping, close other port

Trouble Shooting Problems Among People Exclusive Pumping

- Nipple/Breast Pain
- Low Milk Production
- Over Production
- Slow Flow
- Recurrent Plugging

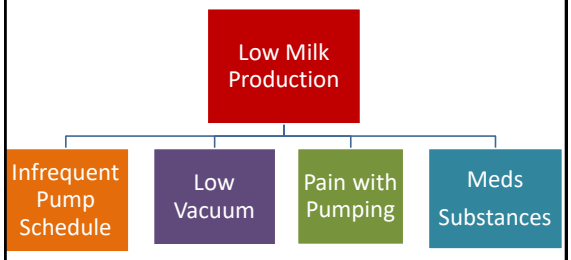
Nipple/Breast Pain

Ill-Fitting Flanges
- If too big, areola/breast tissue is drawn into shaft
- If too small, nipple is squeezed by shaft
- Solution => evaluate size

Vacuum too high
- No need to go beyond -150 to -200mm Hg
- Insufficient vacuum limits milk flow
- Don't blame vacuum until ensuring flange fit

Nipple Vasospasm
- Nipple turns purple during pumping, pain throughout
- Check flange fit and proper vacuum
- Refer for treatment

Still Pain? Evaluate for Breast Infection/Dermatitis/Nipple Lesions!



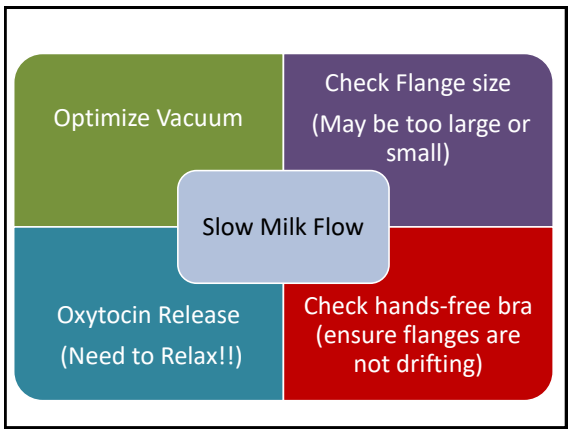
Management of Over-Production

Stop galactogogues

Reduce frequency of pumping
- Gradually!

Decrease volume taken out during milk expression
- Gradually!

If difficulty decreasing production, refer to lactation specialist



Conclusions

- Manual expression early postpartum helps to express colostrum.
- Manual expression may help to increase fat in expressed breastmilk.
- Understanding basic principles of operating breast pumps allows healthcare providers to teach a parent how to use any pump.
- Parents need guidance on proper breast shield size.
- Parents need counseling on techniques on breastmilk expression and milk storage.
- Several problems can occur with milk expression, such as low production, high production, vasospasm, infections and trauma.

Challenging Cases for the Immediate Postpartum Period

Anne Eglash MD, IBCLC, FABM

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Conflict of Interest

Objectives

- Describe how to manage the infant who stops nursing early postpartum
- Explain optimal breastfeeding management of a late preterm infant early postpartum.
- Outline a feeding plan for a mother with a history of breast reduction

The Infant Who Stops Latching

- Carol is a 35 yo G1P1 who you are seeing in the hospital on day 2, 3/17/21 at 8 am. Carol is concerned re latch.
  - Baby Ray is born at 4 pm on 3/15/21, at 39 3/7 weeks NSVD, BW 7 lb 15 oz (3600 g).
  - He nursed immediately postpartum after being placed skin to skin. He nursed frequently from 11 pm 3/15 to 3 am 3/16. The nurses said he was a champ.
  - When he woke up at 7 am 3/16, he was frantic, and had more trouble nursing. He would not stay latched, popped on and off, seemed frustrated.
  - By noon on 3/16 he was refusing to breastfeed, so the nurses recommended bottle feeding and pumping.
  - Since mid-day 3/16, he is brought to the breast every 2-3 hours but he screams. He is then given 15-20 ml of formula, and Carol pumps.
  - When you see her on day 2, she is only pumping drops and she does not feel that her breasts have changed yet. She wonders if she should try a nipple shield.

What is the Differential Diagnosis?

Maternal Issues

- Low milk production, hence little colostrum
- Delay in lactation

Infant Issues

- Difficulty with milk extraction
  - Positioning/latch issue
  - Oral restriction
  - Sleepiness
  - Inability to create a vacuum
  - Oro-boobular disproportion
  - Low tone
  - High tone/tight jaw
  - Torticollis

What Else do You Want to Know in the History?

Maternal

Low milk production
- Infertility
- Medications during pregnancy
- Breast changes in pregnancy
- History of breast surgery
- Meds/birth control/placenta postpartum

Infant

Sleepy infant behavior
- Meds given postpartum

What Would You Look for On Exam?

- Mother
  - Breast exam
    - Breast shape/size
    - Nipple size/shape
- Infant
  - Tone- low or high
  - Oral exam
    - Submucosal cleft/cleft
    - Tongue tie
  - Nasal congestion

Breastfeeding Exam

- Positioning
- Latch
- Infant behavior at the breast
  - Sleeping
  - Agitation
  - Preferring 1 side

More Details on the Dyad

- History on Mom
  - Healthy with no signif PMH
  - No history of infertility
  - No history of breast surgery
  - Did not increase bra size in pregnancy, and doesn't recall breast growth/aching. + leaked colostrum at 37 weeks
  - Only medication has been PNV during pregnancy and postpartum
- Exam of Dyad
  - Breasts are somewhat widely spaced with nipples pointing down bilat
  - The baby's mouth is normal, no TT
  - The baby's tone is normal, but he is frantic and hungry
  - Mom holds him appropriately for latch, but he is mad at the breast

What Are Your Management Suggestions?

- Skin to skin when the baby is in a calm alert state
- Hand express with pumping every 3 hours
- Avoid a nipple shield
- Supplementation
  - Try supplementing at the breast when he is calm and alert using a feeding tube
  - If using a bottle, pace the bottle feeds

The Late Preterm

- Jazmyn is a 28 yo G2P2 mother who gave birth to her daughter Chloe at 35 5/7 weeks gestation, BW 6 lb 2 oz (2778g). The baby is now 20 hours old.
- Jazmyn expresses concern that the staff keeps asking her to supplement with formula after nursing, and she does not feel that this is necessary.
- Jazmyn nursed her first child, who was born at 39 weeks 5 years ago, for 14 months and never gave formula. She recalls having a 'good' milk production.

What Do You Want to Ask Jazmyn (or Find Out in the Chart)?

- Pregnancy History
  - Anything change in her health since her last infant
    - Anything that would increase risk of insufficient production compared to her first infant?
- Any complications of the birth
  - Blood loss/manual removal of the placenta
- How has the infant been nursing
  - Does the infant wake herself up to feed?
  - Does she hear sucks and swallows?
  - Does she seem content after nursing?
  - Have they been giving the supplement after nursing as suggested by the nurses?
  - Is she expressing any colostrum after feeding?

What Will You Look for On Exam?

- Breast exam
  - Do breasts appear normal in size/contour
  - Are nipples too large for the infant's mouth
- Infant exam
  - Check for barriers to successful nursing
  - Oral restriction
  - Sleepiness
  - Inability to create a vacuum
  - Oro-boobular disproportion
  - Low tone
  - High tone/tight jaw
  - Torticollis

Describe How to Engage in Shared Decision Making with Jazmyn

- Educate on risks of late preterms
  - Greater risk of weight loss, hypothermia, hyperbili
  - Infant may be weak
- Explore reasons for concern for supplementation
  - Does not want to give formula
  - Does not want to give a bottle
- Discuss options for supplementation
  - Expressed colostrum
    - Spoon, cup, finger feeding
    - If a strong feeder, use a supplementer
    - Donor milk

Jazmyn decides that she is going to nurse the baby on both sides, working to keep her awake, and then offer a supplement if Chloe shows feeding cues. She wants to leave today. What will your follow up plans be?

- Educate on close follow up postpartum
  - See in 24 hours
- Counsel on consideration of a home scale
- Encourage offering expressed colostrum after nursing via alternative feeding method
  - Review early feeding cues- crying is a late sign
  - Discuss that late preterms are sleepy and need to be woken for feedings
    - If need to be woken for feedings, the infant may not show strong feeding cues if still hungry after feeding

The Mother with a Breast Reduction

- Lexis is a 26 yo G1P1 who gave birth to Clifford at 38 5/7 weeks, BW 7 lb 13 oz (3543g) via NSVD, no complications.
- You are seeing the dyad at 6 hours postpartum. The baby nursed immediately postpartum, and a few more times since then.
- Lexis told her RN that she had a breast reduction at age 16, and reports being told that because it was such a long time ago, no worries, just breastfeed.
- Lexis wants to be as successful as possible with breastfeeding.

What Maternal History Would You Like?

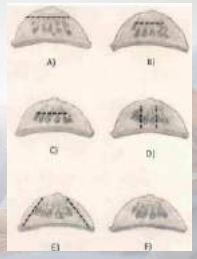
- General health history
  - Insulin resistance
  - Infertility
  - Prolactin lowering meds
  - Habits- tobacco, alcohol
- Prenatal
  - Any breast growth in pregnancy?
  - Any other risks for low production?
    - Meds during pregnancy
    - Gestational DM

More Details

- Lexis is healthy
  - It took her a year to become pregnant
  - H/o regular menses
  - No known history of insulin resistance. Pre-pregnancy BMI of 36
  - She believes her breasts were a little achy, but with a little growth, but she is not sure.

What Do You Tell Her About the Risks of Breast Reduction?

- **Systematic review of 51 studies on breast reduction**
  - **4% likelihood of 'success' with no preservation of NAC with subareolar parenchyma**
  - **75% 'success' with partial preservation**
  - **100% 'success' with full preservation**



'success' had a variable definition in studies- any vs exclusive

Kraut RY, Brown E. et al PLoS ONE 12(10): e0186591 Oct 2019

Photo by Philippe Spitalier on Unsplash

What is Your Recommended Feeding Plan?

- Breastfeeding bilaterally
- Hand express pc in the first 24-48 hours, then pump after feeding for the first few days.
- Watch weight daily, and follow infant feeding cues
- If infant is significantly unsettled after nursing, supplement with an alternative feeding method vs bottle
  - Shared decision making on supplementation method

Conclusions

- If an infant stops latching early postpartum, fully evaluate mother and infant for risks of low production, and infant oromotor issues.
- Late preterm infants often need supplementation early postpartum
- If high risk for low milk production, watch infant feeding cues and weight carefully, hand express after nursing to maximize stimulation, and offer supplement via alternative feeding methods.

Breast Masses, Imaging, and Abscess Management During Lactation

Katrina B. Mitchell, MD, IBCLC, PMH-C, FACS
Breast Surgical Oncologist
Lactation Consultant
Perinatal Mental Health Provider
Ridley Tree Cancer Center
at Sansum Clinic
Santa Barbara, California

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
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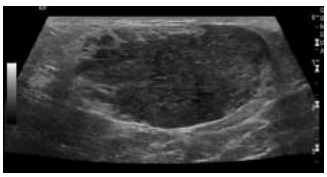
Conflict of Interest

3

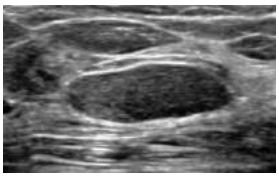
Overview:
Conditions Stimulated by Lactation

- Lactating adenoma
- Emergence of prominent accessory breast tissue
- Prominent lymph nodes
- Other benign changes



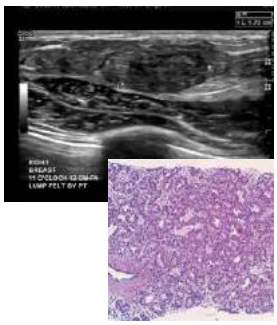
Overview:
Benign Masses *Not Specific T*o Lactation … *But Can Concurrently Present*

- Unique characteristics and management strategies
  - Idiopathic granulomatous mastitis
  - Fibroadenoma
  - Hamartoma
  - High-risk benign
  - Mondor's disease
  - Nipple masses



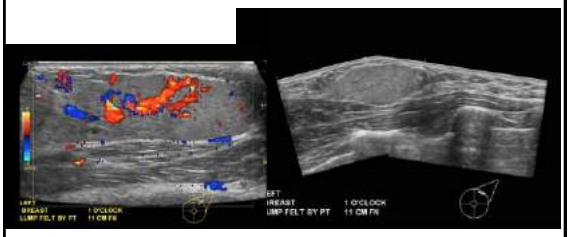
Lactating Adenoma

- Dense lactational tissue most common axillary tail and UOQ
  - Likely a result of hormonal stimulation
- Usually regress spontaneously with weaning
- Close f/u w/ imaging and exam, +/- biopsy



Nebreda et al J Hum Lact 2016

Lactating Adenoma



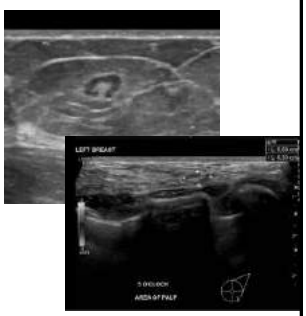
Axillary Breast Tissue

- Approximately 1% of the population, higher in Asian and Native American
- Reassurance, usually no need to image
- If imaged, will show normal fibroglandular ectopic breast tissue
- Treat if symptomatic with mastitis protocol

Marshall MB et al Surg Onc 1996

Intramammary Lymph Nodes

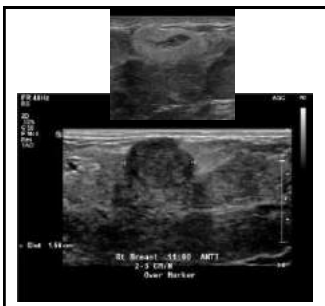
- May present as palpable mass, may be more prominent due to bacterial exchange between baby and mother's breast
- Reassurance if no worrisome exam or radiographic findings
- Core needle biopsy if typical imaging features not demonstrated (e.g. loss of fatty hilum)

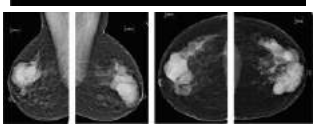


Vijan SS et al Surgery 2009

Prominent Axillary Nodes

- Common in lactation
- Benign appearance





Fat Necrosis

- Results from trauma to breast
- Can have non-specific or worrisome appearance on imaging and exam (firm, irregular)
- Prove diagnosis with core needle biopsy and no further intervention

Kerridge WD Rad Res Prac 2015

Non-Lactation Specific

Idiopathic Granulomatous Mastitis

- Need to control symptoms of disease while protecting breastfeeding
- Prednisone orally decreases supply
- Cannot breastfeed after intralesional injection kenalog

Freeman et al Am J Surg 2017

Presentation
- pain, mass, old fistulae
- 40 ml/1ml Kenalog with 3ml 1% lidocaine injected
- mom instructed on weaning left breast

Three weeks
- Decreased pain, mass
- New spontaneous fistula

Six weeks
- Fistula closed

Weaned Left, Feeding Right (at six weeks f/u)

9 and 12 Weeks (no injection at six weeks)

Breastfeeding protective? Unknown.

- Patient was breastfed herself x 2 years; then breastfed two children x 2 years each

- Right breast IGM (mass only, resolved after two years)
- Left breast mass/fistula one year later

44 year old 4 months After Weaning

One Year Later, No Interventions (Flared Around Election 2020)

Hidradenitis Suppurativa

- Inflammatory disease of hair follicles in axilla, groin with fistuale and abscess formation
  - Smokers, obesity
- Rx PRN drainage, intralesional steroids
- Like IGM, control symptoms of disease while protecting breastfeeding
  - Cannot breastfeed after intralesional injection kenalog

Hs-foundation.org

Risk Lesions

- Lesions in the breast that are not cancer but increase the future risk of cancer
  - E.g. Radial scars/complex sclerosing lesions, atypical ductal hyperplasia, LCIS

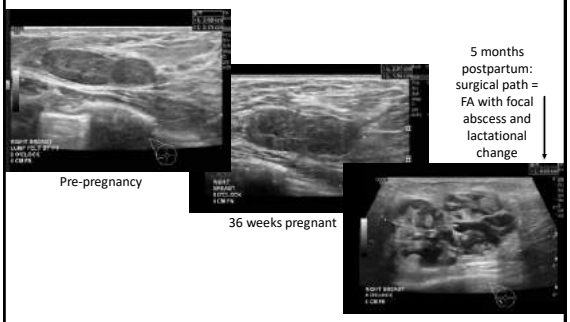
1.5 cm irregular hypoechoic mass, CNB: CSL

Gao et al Radiology 2018

Risk lesions

- Excisional biopsy under local while pregnant
- Florid nodular sclerosing adenosis with focal sclerosis, myoepithelial hyperplasia

Fibroadenoma Evolution



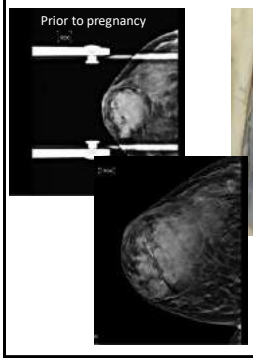
Pre-pregnancy

36 weeks pregnant

5 months postpartum: surgical path = FA with focal abscess and lactational change

Yan BY et al Histopath 2016

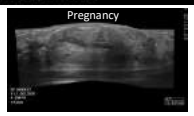
Hamartoma



- Poorly defined, rare benign breast neoplasm
- Lobular breast tissue involving fibrocystic and adipose tissues

Sevin et al Clinics 2014

Hamartoma



Biopsy during lactation:
milk coursing through lesion

Resection at 12 Months Postpartum

Closure With Nipple Eversion

Gross Pathology:
Breastmilk Throughout Lesion

2 Weeks Post-Op:
No Fistula or Other Complications

5.5 Weeks Post-Op: One-Time Drainage That Resolved Spontaneously

Periductal Mastitis
Three Weeks Postpartum

Mondor's Disease (Superficial Thrombophlebitis)

- Most often secondary to trauma
- Painful
- Superficial cord or mass just under skin
- Rx moist heat, NSAIDs, therapeutic ultrasound
- Image if any question of deeper lesion or no history of trauma

Whitaker-Worth et al J Am Acad Derm 2000

Nipple Masses

Nipple Adenoma

- Benign proliferative process of lactiferous ducts
  - Also known as EAN (erosive adenomatosis of the nipple, nipple papillomatosis, papillary adenoma of nipple)
- Can mimic Paget's
- Presents with nipple nodule, nipple erosion, nipple discharge

Lee and Boughey Breast J 2016

S/p Subtotal Adenoma Excision
Three Months Prior to Pregnancy

39 weeks pregnant

3 months postpartum
using nipple shields

Syringomatous Adenoma

- Rare benign neoplasm
- Can infiltrate/ proliferate and be locally destructive
- Tx: excise

Oo and Xiao Arch Pathol Lab Med 2009
Photos: Angela Berg, MD

Pyogenic Granuloma

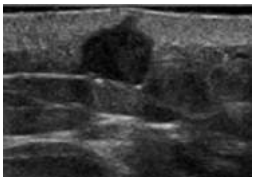
- Benign vascular tumor of skin/mucous membranes
- Can grow rapidly, often pedunculated
- Relationship to trauma and possibly HSV/HPV
- Tx: laser, excision with coagulation

Wollina et al Mac J Med Sci 2017
Photos: Karen Bodnar, MD, IBCLC

Breast Cancer Recurrence

Sebaceous Cyst

- Most often midline or inframammary fold, but can occur anywhere on breast/nipple-areolar complex
- Ultrasound appearance of simple cyst with tracking to skin



Wynne E and Louis A Rad Case Rep 2011

Sebaceous Cyst

- May present infected
  - Warm compress, antibiotic, incision and drainage
- Other specialties may counsel patient that cyst will drain spontaneously during breastfeeding, but surgical excision gold standard for resolution (ideally pre-pregnancy)

Sebaceous Cyst: Pregancy and Postpartum Rupture

Images: Kathy Leeper, MD, IBCLC

Hyperkeratosis

- Thickening of stratum corneum (outer layer skin) usually with abnormal quality of keratin
- Tx
  - Calcitrene (synthetic derivative of Vitamin D, calcitriol)
  - Keratolytic moisturizer (urea or lactic acid)
  - Laser definitive

Goldstein JA and Gurge RM J Drugs and Derm 2008

Areola Leiomyoma

- Benign tumor comprised of smooth muscle
  - Most common in uterus (fibroids)
- Extremely rare in the breast but occurs on areola due to presence of smooth muscle
- Treatment is excision, recurrence is rare

Sampaio et al Radio Bras 2016

Simple Cysts

Skin Tags (Squamous Papilloma): May Grow in Pregnancy

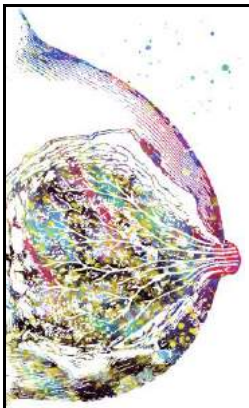
- Can present issue with latch, become traumatized
- Excise sharply
  - One interrupted 6.0 prolene closure or dermabond (skin glue)
    - Remove suture at 3-5 days
- Counsel for keloid, ductal orifice obstruction

Dermabond Closure

Viral Warts (Verruca Vulgaris)

- Benign papillomas that arise from infection of epidermal or mucosal cells with HPV
- May clear spontaneously
- Excise if large and will interfere with latch or to rule out rare malignant transformation
- Salicylic acid, cryotherapy, laser

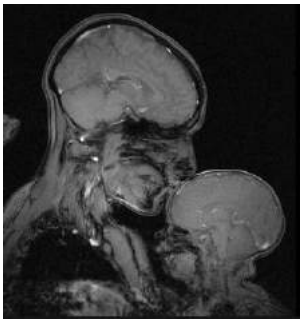
Lynch et al BMJ 2014



Accessory Nipples, Accessory Breast Tissue, Lactiferous Sinuses and Montgomery Glands … See Anatomy Lecture

Take Home Points

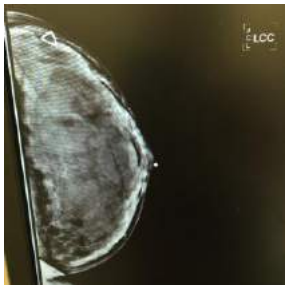
- A wide variety of masses can present in lactating patients
  - Masses may be related to pregnancy/lactation
    - e.g. lactating adenoma
  - Or may be unrelated and simultaneously occur during pregnancy/lactation
    - e.g. fibroadenoma
- Individualized care is warranted
- Always image and biopsy any concerning mass for diagnosis/treatment purposes



Breast Imaging During Lactation

Image: Rebecca Saxe, MIT/Smithsonian

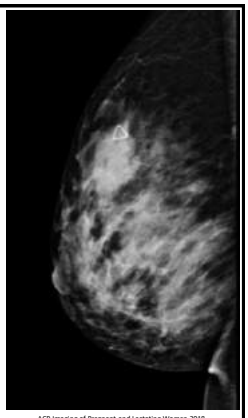
Order These Studies …



- Breast ultrasound
  AND
- Mammogram versus DBT (digital breast tomosynthesis, or "3D mammogram")
  - 3-5 mGy radiation
  - Equivalent to the average background radiation incurred over 2 months

ACR Imaging of Pregnant and Lactating Women 2018, Hendrick et al AJR Am J Roent 2010

Cancer on Mammo/Ultrasound



ACR Imaging of Pregnant and Lactating Women 2018

Remove Milk Prior to Imaging

- Reduces parenchymal density resulting from retained milk
- Patient should bring baby or pump to imaging appointment
- Do not need to "pump to empty"
  - Will potentiate hyperlactation, mastitis, fistula formation

ACR Imaging of Pregnant and Lactating Women 2018

Biopsies are Safe and Effective

- Milk fistula rate exceedingly low, < 2% risk if managed appropriately
- **Feed NORMALLY after, do NOT pump to empty**
- Even with development of fistula, will close with simple interventions

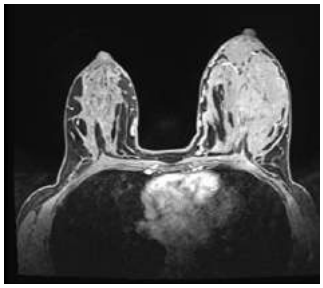
Johnson and Mitchell, in publication The Breast

After a Biopsy or Drainage, Feed Normally!!

- Pumping to empty breast stimulates hyperlactation, potentiates trauma, and WILL form a fistula and/or hypertrophic granulation tissue if continued

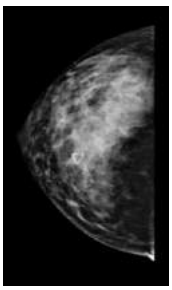
MRI for Extent of Disease

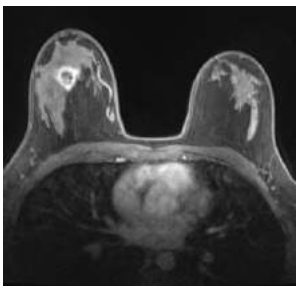
- Safe in lactation, NOT in pregnancy due to gadolinium
- Increased background parenchymal enhancement due to physiologic hypervascularity and diffusely increased T2 signal from milk
- Despite this, multiple reports document accuracy in setting of lactation



Vashi et al AJR 2013, Sabate et al Radiographics 2007, Espinosa et al Radiology 2005, Oh et al Br J Radiology 2017

MRI May Demonstrate Mammographically Occult Lesions



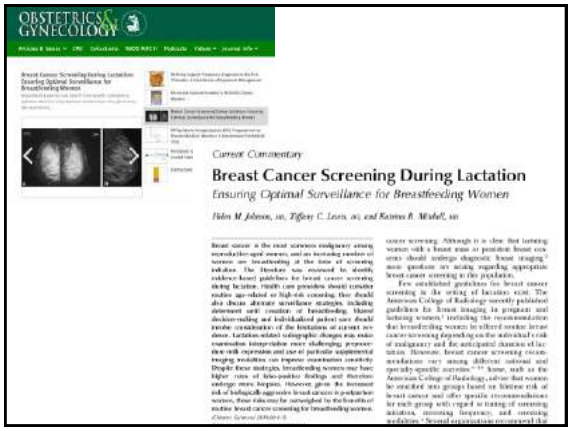


ACR Contrast Media 2012, Talele et al Breast Journal 2003

Screening? YES!

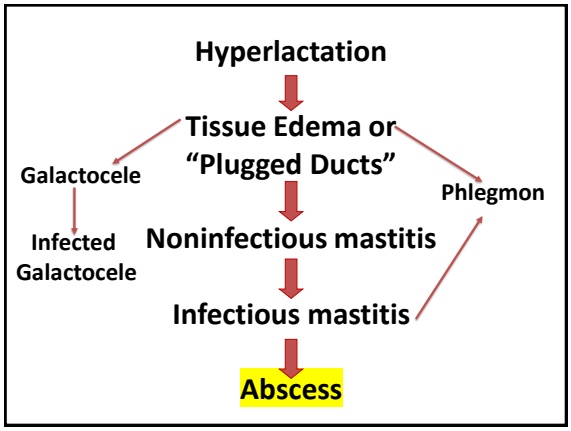
- Screening MMG or DBT +/- ultrasound
  - Under age 30 and high risk
  - 30-39 intermediate to high risk
  - 40 and over average risk
- Consider MRI in high risk lactating (not pregnant) patients on case-by-case basis

ACR Imaging of Pregnant and Lactating Women 2018



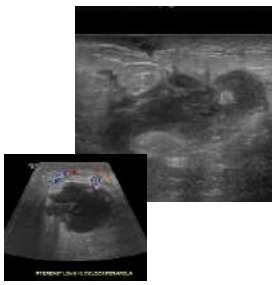
Take Home Points

- Mammogram, ultrasound, and MRI safe and effective in breastfeeding
- Biopsy safe
- Do not avoid any recommended imaging or intervention because of lactation
- Feed normally at breast, no pump and dump



Abscess

- Often peri/retroareolar due to covergence of ducts, stasis
- Risk Factors: Hyperlactation, pumping, massage, nipple shields, untreated mastitsi
- May have absence of systemic findings
- Evaluation
  - Physical exam
  - +/- ultrasound



Cottrell et al J Diag Med Sono 2016

Mastitis can Progress To Retroareolar Abscess If Untreated

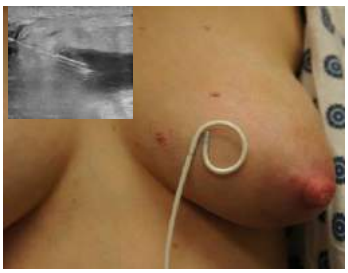
Abscess treatment: Past -> Surgical Incision and Drainage

Images: Laura Tauritz Bakker

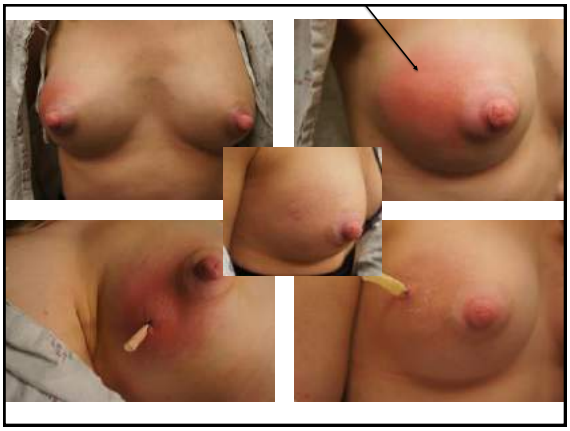
Abscess Treatment: Past -> Surgical Incision and Drainage

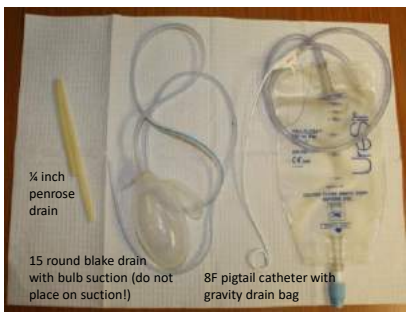
Abscess Treatment: Present

- Interventional radiology (IR)w/ 8F catheter
- 11 blade stab incision/penrose drain placement in clinic



Eryilmaz et al The Breast 2005, Giess et al J Clin Ultrasound 2014 , Christiansen et al Br J Rad 2005





Drain to gravity, NOT suction

American Society of Breast Surgeons Annual Meeting 2021 "How I Do It" Video Session

Abscess treatment: Feed Normally, Including Affected Breast

Abscess Treatment:
Timely Management and Encouragement!

DUMP THE PUMP:

Nature Made a Breastfeeding Dyad – NOT a Triad

- Complications often result from oversupply stimulated by excessive pumping
- Pumping can stimulate production without adequately emptying
- Adds stress to mom
- Rx: if medically possible -> baby on breast, hand express, use pump as **last** intervention

SACK THE PACK

- Adds stress to mom and provider
- Lactating breast not meant to granulate like other areas of body
- May promote persistent fistula

What Happens When You Pack?

- Packing is soaked immediately with milk
- Persistent fistula
- Excessive granulation

Images: Ellen Nepilly

Milk Fistula

- Rare complication: 1.3% incidence in lactating cohort
- Communication between duct and skin
  - Spontaneous versus complication of biopsy or drainage
- Management
  - **Feed physiologically and encourage drainage via nipple**
    - Lactating breast very vascular, wants to heal itself if managed properly
  - **MUST address underlying factors that led to abscess**
    - Hyperlactation, excessive pumping, nipple shield use, mastitis with resistant organism

Johnson and Mitchell, ACS 2019, Dominici et al Breast Dis 2010, Larsen and Valente Breast J 2016

Milk Fistula
in area of pump trauma

Everything closes eventually with appropriate management (2.5 weeks s/p drain)

Take Home Points

- Very small incision/short duration drain placement likely preferable for definitive drainage than aspiration alone
- Do not using packing tape in a lactating breast
- Pumping worsens obstruction by not physiologically removing milk but stimulating production/hyperlactation

Hyperlactation

Lauren Hanley, MD, IBCLC, FACOG, FABM

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Conflict of Interest

Objectives

- Describe 2 infant symptoms and 2 maternal symptoms of hyperlactation.
- Describe 2 behavioral management strategies that can be employed to decrease the milk supply.
- Describe 2 substances that can decrease the milk supply.

Terms of Interest

- Hyperlactation
- Hypergalactia
- Oversupply
- Overactive/Foorceful let down (may go hand in hand)
- Engorgement
- Gigantomastia

Hyperlactation = Oversupply

- Production of milk in excess of volume required for normal growth
- HIGH RATE of production as well as volume
- No defined clinical criteria or operational definition
  - No set of number of “oz per day” or weight gain criteria
- Dx is made through maternal and infant history, signs/symptoms and documenting infant growth
  - Infant is usually larger than avg (but may be spitting up so not always)

Hyperlactation

- Vicious cycle of rapid production of low fat milk
- hungry baby drinks more
- more rapid emptying and increased rate of production
- causing even thinner milk, unsatisfied baby

*Sometimes the first milk can look like water

Overactive letdown reflex

- Spray of milk is brisk and voluminous
- Overwhelming to baby
- Often pulls off, chokes, arches, sputters
- May clamp down on nipple
  - This may cause trauma to the nipple

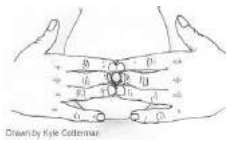
Separate entity from Oversupply but often seen together

Engorgement

- Swelling and distension of the breasts
- Usually in the early days of initiation of lactation
- Caused by vascular dilation as well as the arrival of the early milk
- Newton 1951: alveolar distension from milk leading to compression of surrounding ducts
- Subsequently leads to secondary vascular and lymphatic compression
- Edema vs. Engorgement

Types of Engorgement

- Primary
  - Onset of Lactogenesis II
  - Usually 3-5d post delivery
  - Can be 1-2 days later for C/S
  - Interstitial edema
  - Due to decreased progesterone levels after placental delivery
  - IFPS 2008: 36% w/in 1st 2 weeks
- Secondary
  - Mismatch between production and extraction
  - Supply > amount removed
  - Causes:
    - Excessive pumping
    - Medications
    - Spreading out feeding intervals (intentional or unintentional)
    - Infant illness
    - Difficult latch



Gigantomastia

- Excessive breast growth
- May be spontaneous, during puberty or pregnancy
- Connective tissue d/o /hormonal/genetic components
- Symptoms may include mastalgia, ulceration/infection, posture problems, back pain and chronic traction injury to 4th/5th/6th intercostal nerves with resultant loss of nipple sensation.
- Associated with decreased fetal growth, if it occurs during pregnancy
- Incidence about 1:28,000

Figure 1: Patient with gestational gigantomastia at 37 weeks (initial presentation)
Case Reports in Obstet and Gyn 2015

Symptoms and Signs in Baby

- Struggle during initial let-down with gasping, choking, fussiness
- Rapid weight gain
- Excessive gas and explosive/green stools
- Usually refuses second breast
- Baby may refuse to nurse on breast with larger supply

Symptoms and Signs in Mother

- Breast fullness
  - Needs to pump to relieve
- Chronic tender breasts
- Heavy, brisk letdown (Often)
- Sore nipples
  - Baby pinches nipples
    - Leads to cracks, fissures, vasospasm, persistent pain
- Freq plugged ducts
- Freq mastitis
- Mothers may or may not recognize excessive milk production
  - High storage capacity prevents feeling too full

Etiology of Hyperlactation

- Self-induced hyperlactation
  - Patients worry re low supply
    - Routine pumping after nursing, ie to stash milk for work or to donate
    - Routine use of galactagogues even in setting of sufficient or even robust milk supply
    - Exclusive pumpers
    - Direct feeding very often, or feeding others' babies
- Iatrogenic: medical advice, medications
- Idiopathic: high rates with no clear etiology
- Anatomic
  - Large storage capacity so do not feel full

Management of Hyperlactation

- What type of hyperlac is it?
- Treatment based on cause
- Behavioral Strategies
  - Block feeding but soften opposite side PRN
  - Decrease/stop pumping
  - Incorporate more massage into feeding to help increase fat content (before and during)
- Medication/Herbal Supplement Use

Block Feeding

- Feed from 1 breast for a 3-hr block of time, ie all feeds from noon to 3pm are from the Left, 3 to 6pm from the Right, do not need to do overnight.
- The full breast engages local autocrine regulatory mechanisms to decrease overall production
- Usually see a noticeable drop in supply by 36 hrs
- If resting side is too full/painful: pump minimally to comfort, Hand Express, or use Haakaa
- Do not try more than 4 hour blocks
- Excessive drop?- nurse from both sides to bring up again

Reduce or Eliminate Pumping

- Coach moms
  - This can be tough
- Gradually reduce pumping times/volumes over days-weeks
  - Just stopping not safe
  - Increased risk of clogging or mastitis
  - Pump to soften rather than pump to empty

Herbal/Foods to Manage Hyperlactation

- Sage
  - Tea-1-3g dried leaves steeped in cup of hot water
  - Take 1 dose, watch for response, repeat every 6-12 hours as needed
  - Sage drops, 20 drops
- Jasmine flowers
  - Applied topically may reduce prolactin levels
- Chasteberry
  - may reduce prolactin, phytoest and phyptoprog activity
- Parsley
  - Eat in large quantities in food preparation
- Peppermint oil
  - applied topically
  - Toxic in high doses and should be kept away from the nipple area and nursing baby
- These may cause nausea, vomiting, GI sxs or other adverse reactions.

Pseudoephedrine

- Decongestant
  - stimulates alpha- and beta- receptors, causing vasoconstriction
- Unclear mechanism in decreasing milk supply
  - ? slight decrease in prolactin levels (13%)
- 24% drop in milk production after single 60mg dose

Dosing

Start with 30mg and assess effects
Repeat in 8-12 hrs as needed
If 30mg not effective, increase to 60mg
Do not prescribe regularly, ONLY as needed, watch closely

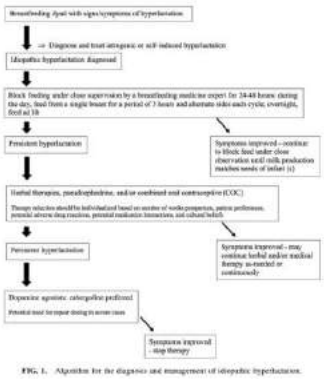
Br J Clin Pharmacol 2003; 56: 18-24.

Estrogen Usually Drops Supply

- Estrogen-containing OCPS
  - Start with once daily dosing for a week
  - Typical drop in supply by day 5-7
  - If milk supply begins to rise again later, can re-dose for another week, or stay on it
- Close monitoring due to varying responses

Bromocriptine and Cabergoline

- Strong dopamine agonists
  - Dopamine = Prolactin Inhibitory Factor
- Cabergoline has fewer side effects
  - Cabergoline 0.25mg po ONCE, and observe effect over 1-2 days
  - Dose every 3-5 days
  - Be careful what you ask for!
- Use as VERY last resort!
  - Also useful for fetal demise or other reasons to abruptly wean



Conclusions

- Hyperlactation may lead to breastfeeding problems for infants and mothers
- Excessive pumping early postpartum is a common cause of hyperlactation
- Block feeding can be an effective behavioral strategy to decrease milk production
- There are several substances that a mother can take to reduce the milk supply: use them judiciously—may decrease too much!

Thank you!

Breast and Nipple Pain in Breastfeeding

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No Disclosures

Medical illustrations by Kelly Rosso, MD
Personal photos provided by patients with consent
Clinical photos by consent

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

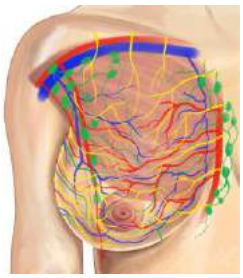
IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

Overview

- Why so common?
- Pain during pregnancy
- Pain early postpartum
- Later pain differential diagnosis
  - Treatment varies based on etiology of pain
- Additional considerations

Breast and Nipple Pain During Lactation - Why?

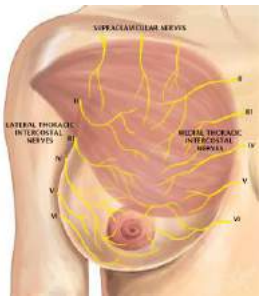
- The lactating breast is an extremely complex organ
- Complex innervation
- Highly vascular
- Congested lymphatics
- Myoepithelial cells



Berens et al 2016, Kristensen et al 2018

Innervation and Engorgement Pain

- Deep breast pain radiates to nipple areolar complex (NAC) and NAC pain radiates to deep breast pain
- The NAC is part of the breast, not a separate entity
  - Engorgement can be painful due to nerve traction



Berens et al 2016, Kristensen et al 2018

Pain During Pregnancy

- Glandular growth, stromal edema
- Nipple size increases due to prolactin
- For all other details of breast change during pregnancy, see Anatomy Lecture ☺

Early Postpartum

The Early Postpartum Pain Cycle

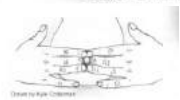
- Engorgement leads to ……..

Engorgement Leads To …

- Latch and positioning issues, which lead to ….
- Lots of other issues (trauma, vasospasm, more pain, etc)
- But let's address engorgement, latch, positioning first

Engorgement Management

- Reduce edema
  - Reverse Pressure Softening (RPS) and prior to latch
  - Remove a small amount of milk before latch
    - Hand pump NOT electric pump (aggressive pumping will worsen engorgement)
- Positioning
  - On back or side
- Heat/ice for comfort
- Lymphatic massage ad lib
- SUPPORTIVE BRA



Cotterman JHL 2004

Consider PT Interventions

- Lymphatic massage
- K-tape
- Therapeutic ultrasound

Lymphatic Massage

- Technique
  - Ten small circles above clavicle near neck
  - Ten small circles in axilla
  - Continue with light touch massage from nipple towards clavicle, axilla
  - "Very gentle touch/traction of skin - "like petting a cat"
- Lifts skin so excess fluid/swelling in breast can drain more easily to lymph nodes
- Start during pregnancy if experiencing painful rapid breast growth, and use as needed postpartum for engorgement

Additional Notes about Engorgement

- Engorgement is largely tissue edema and NOT obstructed milk – mastitis early on very uncommon, usually starts around 2-3 weeks

ABM Protocol #20

Larger breasts = challenging latch

Large nipples = Even More Challenging Latch (may need to EP until baby bigger)

*If not recognized early, these are babies who lose weight from not being able to transfer milk, are diagnosed with tongue tie, mom has persistent nipple trauma/pain

Large Breast Augmentation a Particular Challenge

- Attenuation of parenchyma, pressure necrosis
- Damage to ducts/glandular tissue
- Nerve traction/stretch

Michalopoulos Breast J 2007; Mofid et al PRS 2006, Spear et al PRS 1995, Jones et al PRS 2018

Breast Augmentation

- Capsular contracture (foreign body reaction, graded I-IV)
  - Most common complication
  - 50% will have by 10 years
- Pain, difficulty with latch from inelasticity
  - "Water balloon" effect of trying to latch – babies clamp and try to stay on but slip off, become shallow
- General difficulty with latch from size alone
- Chronic biofilm and chronic inflammation

Michalopoulos Breast J 2007; Mofid et al PRS 2006, Spear et al PRS 1995, Jones et al PRS 2018, Hegden et al Arch Plast Surg 2015

What To Do? POSITION WELL

- POSITION IS THE KEY TO A "GOOD LATCH"!
- "Belly button to belly button"
  - Nose, belly button, knees in one line or shoulder, ear, hip
  - Baby in neutral, relaxed position with its belly touching mom
- Bring baby to mom, not mom to baby
  - Mom stool or pillow
  - Even better, lying on back or side

Positioning Types

Cradle hold

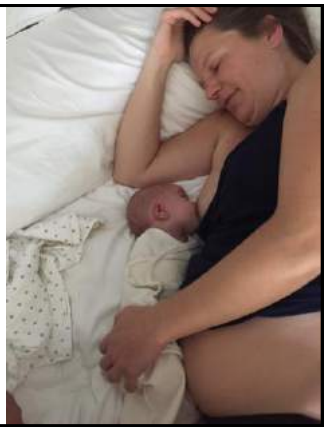
Side Lying: Nature's BEST Breastfeeding Position!

Image: Tom Potter Photography

Side Lying (One Version)

Another Side Lying Position

- **Great for large breasts and hyperlactation/ heavy flow**
- **Always adjust position prior to providing a nipple shield!**



Laid Back or "Biological Nursing" With Mom on Back, Baby on Belly

- Mom must be on back to start – baby will still clamp against flow if you latch first, then partially lie back!

NICU Cross cradle

- Left hand "C-hold" sandwiching NAC for latch
- Right arm holding baby

Latch goals

- Nose close to mom's skin
- Wide open asymmetric latch
- Lips well flanged
- Tongue extends past lip

Latching: Quatro Anos

If Engorgement Persists, Latch Trauma Persists = Tissue Trauma

Pumping …

Pump Trauma

Pump Trauma: Fissure at 11:00

Pump trauma

Be wary of TOO SMALL FLANGES and lubricants like coconut oil – can allow moms to turn up suction to dangerously high levels

Trauma Treatment

- Lubricated, moist/closed healing environment
  - Think general surgery burns, wound care
- Do not "air dry" or soak in Epsom salt
  - Will macerate skin, further preclude healing
- Hydrogel pads, balm without lanolin (lanolin allergenic), medihoney (though baby may reject taste), polymem, mepilex
  - Be mindful of coconut allergy in other products
  - Your hospital may be able to stock mepilex
- PRN 0.1% triamcinolone for severe injury/pain
  - Avoid APNO ("all purpose nipple ointment" from compounding pharmacies)
    - Also has antifungal and antibacterial that is not needed and potentiates allergy; relief in this compound is generally from the steroid

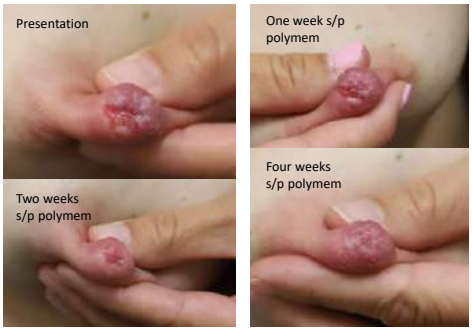
Berens et al ABM Protocol #26

Pump Trauma Treatment

- Avoid nipple shells: cause nipple areolar complex edema, worsen trauma due to inability to deep latch

Invaginations: Evert to Assess for Trauma

Chronic Fissure 14 Month PP



Nipple Piercing Hematoma

- Moist heat for spontaneous drainage
- NSAID for pain
- Aspirate/stab incision if large

The Other End of the Spectrum: Low milk supply

- Baby struggling, long feeds
- Mom pumping for 40 mins to an hour (or more)
- Moms nipples hurt not from baby clamping/pushing back against heavy flow as in hyperlactation, but from baby working too hard at breast or pulling on/off with disinterest/frustration
- Mom may have been given nipple shield
  - Nipple shields will stop high flow; may also stimulate babies in low flow situations to stay on the breast or reduce pain from protracted, ineffective feedings
  - I.e. nipple shield use may be a marker for high/low supply and not just a "latch" issue

Treatment for Low Supply and Pain

- SNS at breast with supplement
- Use galactagogues
- Decrease pumping time
- Latch baby when breasts more full (e.g. mornings)

Early Tissue Trauma -> Vasospasm

Vasospasm

- Cutaneous vasoconstriction of nipple that causes pain
  - White->blue->red
  - Can occur for long periods of time
  - May report "hard nipples," nipples sensitive to clothes/touch
- Triggered by cold (hot shower to cold room), suck, pressure (pump)
- Pain usually worse after baby de-latches; may radiate throughout breast
- If persistent, can cause nipple ischemia -> trauma -> worsening pain

Berens et al ABM Protocol # 26

Vasospasm/Raynaud's of Nipple

- Rx: HEAT at all times
  - wool pads, hand warmers, old wood sweater
- Wound care for secondary trauma as needed
- Nifedipine for severe cases
  - Verapamil if low blood pressure
- Address over-pumping, baby feeding for long periods of time if low supply, etc

Other etiologies

- Persistent hyperlactation
- Dermatitis
- Nipple blebs
- Mastitis/plugging/ abscess
- Subacute mastitis
- Viral infections (shingles/herpes)
- PMADs/functional pain
- Pregnancy
- Baby issues

Hyperlactation or "Oversupply"

- No defined criteria but generally more milk produced than baby needs
  - Average baby 500ml-1000ml
  - Breastfed baby does not increase volume over time the way formula fed babies do
- Iatrogenic or idiopathic

ABM protocol #33

Symptoms

- Maternal
  - Pain
  - Nipple trauma
  - Plugging
  - Mastitis
  - Abscess
- Infant
  - Supranormal weight gain
  - Struggles, fusses, pulls back, clamps, may be diagnosed with tongue tie
    - May develop breast aversion after tongue tie procedure if loses ability to clamp/stop flow
  - Explosive stools
  - Refuses second breast

ABM Clinical Protocol #32: Management of Hyperlactation

BFMed Protocol

Management

- Behavioral
  - **Feed in laid back or side lying position**
  - Block feeding
    - Feed only one breast x 3 hours, then alternate
  - Eliminate unnecessary pumping
    - No pumping first three weeks unless mom separated from baby
    - Only hand express or hand pump to comfort
- Sage, peppermint
- Sudafed
- Estrogen containing OCP (only after six weeks due to thromboembolism risk)
- Cabergoline PRN
  - Dopamine agonist also used with pituitary tumors

BF Med Protocol

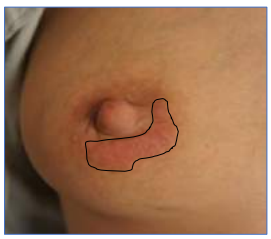
Dermatitis

- Often history of eczema, allergic tendency
- Symptoms
  - Itchy and/or painful nipple, areola
  - Cracks, scabs
  - Erythematous
  - May have oozing of open areas
- Assess allergies
  - Baby medication or food
  - Laundry detergent
  - Breast pad material
  - New nursing bra
  - Pump parts
  - Nipple crème, topical abx
- Tx
  - Remove allergen
  - 0.1% triamcinolone

Berens et al ABM Protocol # 26, photo: Pamela Berens

ALWAYS ask what baby has eaten

- Well-defined, scaly plaque x 2-3 weeks with 14-month baby nursing
- Mom allergic to bananas
- Also common with antibiotics



Contact dermatitis

- Ask **what baby has touched or ingested**
  - E.g. antibiotics mom to which mom may be allergic

Berens et al ABM Protocol # 26

Contact dermatitis

New nursing bra dermatitis (also check nursing pads)

Dermatitis

Presentation

Three months later with some recurrence after cessation of steroid

Dermatitis

Dermatitis + ???

PLOS ONE

RESEARCH ARTICLE

Mammary candidiasis: A medical condition without scientific evidence?

Esther Jiménez[☯], Rebeca Arroyo[☯], Nivia Cárdenas[☯], María Marín[1], Pilar Serrano[2], Leonides Fernández[1], Juan M. Rodríguez[1]*

1 Dpt. Nutrition, Food Science and Food Technology, Complutense University of Madrid, Madrid, Spain, 2 Unidades Endocrinología y Nutrición. Hospital Virgen del Rocío. Seville. Spain

Many physicians, midwives and lactation consultants still believe that yeasts (particularly *Candida* spp.) play an important role as an agent of nipple and breast pain despite the absolute absence of scientific proofs to establish such association. In this context, the objective

lected from the participating women. Results showed that the role played by yeasts in breast and nipple pain is, if any, marginal. In contrast, our results strongly support that coagulase-negative staphylococci and streptococci (mainly from the mitis and salivarius groups) are the agents responsible for such cases. As a consequence, and following the recommendations of the US Library of Medicine for the nomenclature of infectious diseases, the term "mammary candidiasis" or "nipple thrush" should be avoided when referring to such condition and replaced b "subacute mastitis".

Candida

- IMF, axilla

Nipple Bleb ("milk blister") – NOT Yeast

- Painful inflammatory lesion on surface of nipple orifice; can be large or small, multiple or single

Mitchell and Johnson, Journal Mammary Biology 2020

Nipple Blebs can be Obvious

Or Nipple Blebs Can Be Subtle

Patient With "Cracked Painful Nipple" (Bleb) 5 Months PP

Multiple Blebs and Early Mastitis in Setting of Hyperlactation

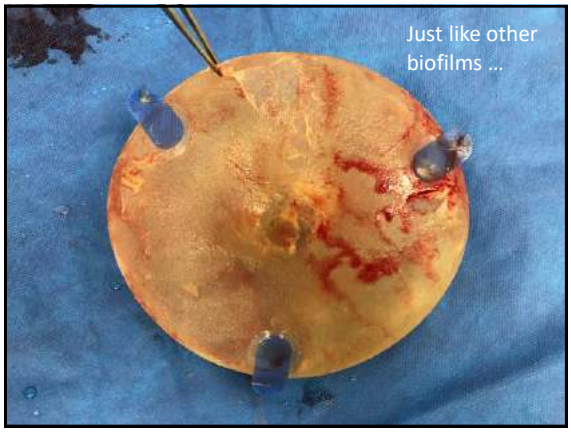
Bleb Ductal Obstruction and Tissue Edema

Aggressive Massage

Subacute Mastitis (Bacterial Dysbiosis)

- Imbalance of natural breast flora akin to vaginal yeast infection or bacterial vaginosis
- May have history of previously treated acute mastitis, hyperlacation
- Nipples/latch can be very tender and have scabbing, blebs, biofilm; underlying breast pain and plugging

Eglash et al JHL 2006, Milk Mob 2015



Subacute Mastitis Treatment

- Breastmilk culture
- Empiric treatment
  - Azithromycin 500 mg QD x 4 weeks
    - Intracellular action on lactocytes
- Sunflower lecithin to reduce plugging
- Treat hyperlactation
- Probiotic

Eglash et al J Human Lact 2006, Milk Mob 2015

Exclusive Pumping: Microbiome Alteration?

Breast Milk Is Teeming With Bacteria — That's Good for the Baby

Breast-fed milk may nourish a baby's microbiome in ways that bottled breast milk can't.

Breast milk that is pumped and delivered by bottle is generally better than formula, Dr. Azad said. But she had some additional news that some working mothers may find unsettling: Pumped breast milk may not deliver the benefits of the sugars that arrive in breast milk straight from the source.

Dr. Azad and her colleagues studied 393 Canadian mother-infant pairs and found that pumped breast milk seems to be richer in some harmful bacteria, and has few bifidobacteria. Many variables can affect the quality of pumped breast milk, including the type of pump, how the milk is stored and the cleanliness of the bottles and nipples. Dr. Azad's work suggests that direct contact between the mother's breast and the baby's mouth is important: When a baby nurses, some denizens of its oral microbiome may traverse back into the mother's breast.

In other words, the benefits of breast-feeding may derive from myriad factors, including the many microbiomes in the mother's body — in the breast milk and on the skin of the breast — and in the baby's mouth and gut.

"I don't want the message to be that expressed human milk is bad," Dr. Bremer said. "It's that there are other factors involved. When you disrupt that experience of baby sucking on the mom's breast, what do you lose? Or what's gained by that process? The science is more ripe now to start delving into those questions."

Cell Host & Microbe

Composition and Variation of the Human Milk Microbiota Are Influenced by Maternal and Early-Life Factors

Summary

Breastmilk contains a complex community of bacteria that may help seed the infant gut microbiota. The composition and determinants of milk microbiota are poorly understood. Among 393 mother-infant dyads from the CHILD cohort, we found that milk microbiota at 3–4 months postpartum was dominated by inversely correlated Proteobacteria and Firmicutes, and exhibited discrete compositional patterns. Milk microbiota composition and diversity were associated with maternal factors (BMI, parity, and mode of delivery), breastfeeding practices, and other milk components in a sex-specific manner. Causal modeling identified mode of breastfeeding as a key determinant of milk microbiota composition. Specifically, providing pumped breastmilk was consistently associated with multiple microbiota parameters including enrichment of potential pathogens and depletion of bifidobacteria. Further, these data support the retrograde inoculation hypothesis, whereby the infant oral cavity impacts the milk microbiota. Collectively, these results identify features and determinants of human milk microbiota composition, with potential implications for infant health and development.

Herpes and Shingles

- Shingles
  - Can spread like chicken pox
- Herpes simplex
  - Can cause herpes in infant
  - Often given to moms from nursing toddlers
- Treatment
  - Avoid contact on that breast
  - Keep covered until lesions scab over
  - Express and discard on affected breast
  - Nurse on contralateral breast
  - Antiviral medications are safe

Shingles

Photo: Anne Eglash, MD

Herpes

Photos: Anne Eglash, MD and Pamela Berens, MD

Hyperlactation

↓

Edema ("Plugged Ducts")

Galactocele → Infected galactocele

↓

Noninfectious mastitis

↓

Infectious mastitis

↓

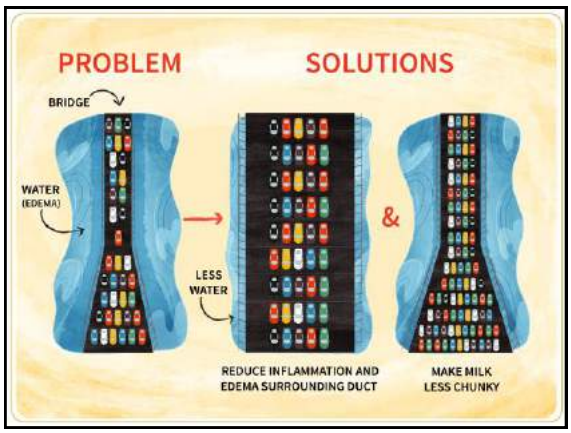
Abscess

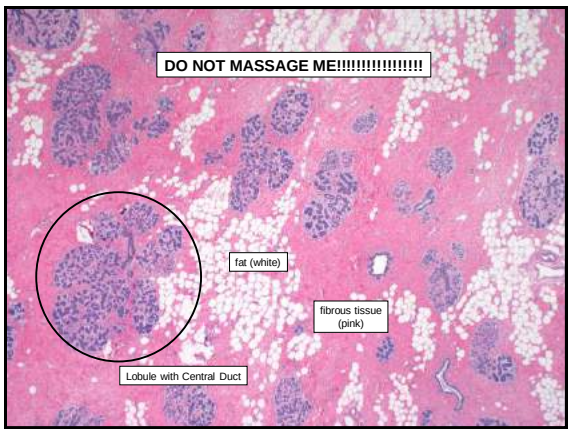
Phlegmon

Tissue Edema "AKA Plugged Duct"

- Tender, full area; minimal erythema, no fever or systemic signs
- Risk factors
  - Pumping, nipple shields, hyperlactation, subacute mastitis
- Treatment
  - Breastfeed, eliminate pump, ice, ibuprofen, TUS
  - Sunflower lecithin 10 grams daily; poke root (phytolocca) for acute plug
  - IMAGE if persistent

Witt et al 2016, Berens et al ABM Protocol #26, Eglash, Newman, breastfeedinginc.ca

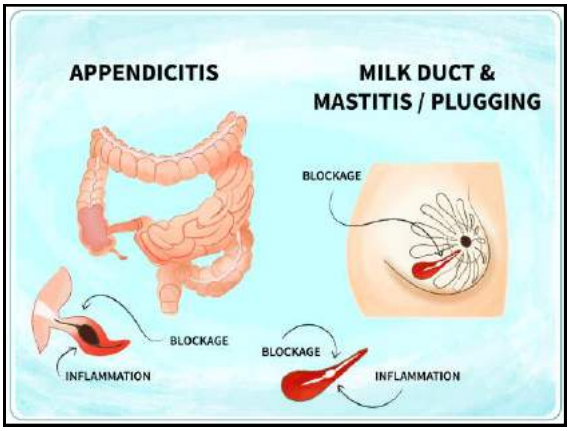




Therapeutic Ultrasound

- Therapeutic ultrasound
  - Thermal and nonthermal effects, including acceleration of metabolic rate, reduction of pain, increased circulation
  - 5-6.5 mins treatment sessions in one study ranged from 1-7 with resolution within one week for most patients
  - Method
    - Frequency 1mHz, intensity 2.0 W/cm2
    - 5-6.5 mins for area 2-3x the head of the probe

Cameron 2013, Cooper and Kowalsky 2015



Mastitis

- Sudden onset erythema, often fever/flu-like symptoms, tachycardia
  - Lactating breast highly metabolically active
- Overall incidence 9-20%
  - 8-19% recurrent
  - 5-10% abscess formation
- Risk factors
  - < 3 months pp, hyperlactation, pumping, nipple shields, massage

ABM protocol #4, Hamosh and Goldman Human Lactation 2, NEJM April 2003, Foxman et al Am J Epi 2002

Mastitis Treatment and Important Points

- Address predisposing factors
  - Hyperlactation, pumping, nipple shields, massage
- Ice/ibuprofen for early mastitis
- Antibiotics if persistent > 24 hours or significant presenting erythema
- **CONTINUE BREASTFEEDING normally**
  - **Do not overfeed affected side**
- **No need to pump and dump**
  - Pumping will worsen mastitis, as it does not empty as well as baby latch
- **All antibiotics are safe in breastfeeding**

Breastfeeding Mastitis Algorithm for ER and Urgent Care

Breastfeeding Mastitis

If concerned for abscess, order diagnostic ultrasound.
In obvious abscess, clinical diagnosis may be made ->
(Erythema, induration, skin attenuation, failure to improve w/ antibiotics)

Ultrasound Without Abscess

- Dicloxacillin 500mg QID
- If history of MRSA: Clindamycin 300mg QID or TMP/Sulfa DS BID
- Note: Keflex has poor penetration in lactating breast tissue
- OTC probiotics may also help
- Follow up with breast surgery

Questions?
Call Dr. Katrina Mitchell
Cell: (646) 709-6048

Abscess

- 11 blade stab incision with penrose drain placement, as aspiration may require repeat procedures for loculated collection and sticky milk
- If >5cm consider IR consult for pigtail placement if undrained by above method
- Oral antibiotics as above; no IV antibiotics or hospital admission unless severe sepsis
- Bacterial culture, narrow antibiotics based on results

Phlegmon

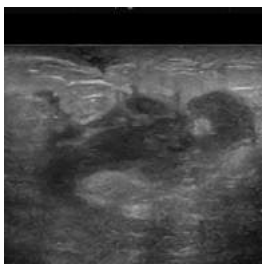
- Oral antibiotics as above; may need prolonged treatment until clinical resolution
- Repeat ultrasound in one week if no clinical improvement
- Drainage if abscess develops
- Follow up with breast surgery, ultrasound 1-2 months after clinical resolution to r/o underlying mass

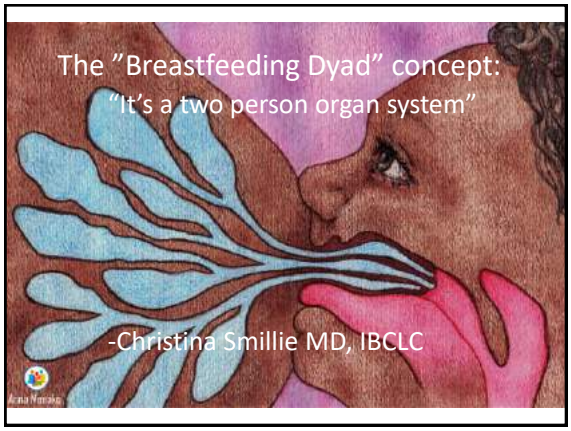
Additional Information

- Ice, Ibuprofen alternating with acetaminophen q2 hours for tissue inflammation
- NO MASSAGE: worsens tissue edema and injury
- Breastfeed from affected side, but do not overfeed
- Antibiotics are safe; no need to pump and dump
- Physiologic nursing: avoid pumping
- Treat hyperlactation: no "pumping to empty," no milk production in excess of baby's intake
- No nipple shields: non-physiologic milk removal

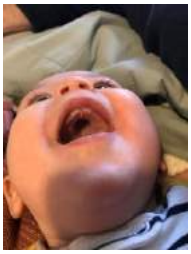
Abscess

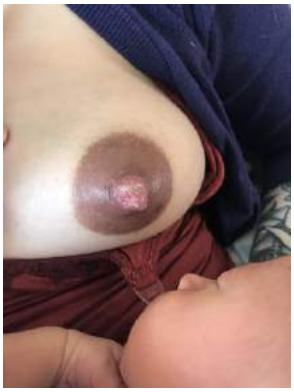
- Painful!! Refer breast mass, abscess lecture!





Address Infant Issues





Blair, DeCarvalho, Oliveira, Centuori

Torticollis

- PT/craniosacral therapy

Pregnancy & Menses

- Can cause new pain/sensitivity

Biting

- Calm phrase: "no biting" or "you must be done"
- Remove baby from breast
- Often, babies were clamping already -> but mom just starts to notice because of bites

Infant Bite Wound with Fibrinous Exudate – Needs DEBRIDEMENT

PMADs (Perinatal Mood and Anxiety Disorders)

- Most common complication of pregnancy and childbirth
- Affects at least 20% of women and 1/10 partners
- Breastfeeding complications increase risk
- Expression is often in functional pain, obsessive pumping

JAMA 2019; ABM Protocol #18

Breast and Nipple Functional Pain

- If all else ruled out, consider functional pain as well as address possibility of depression/anxiety
  - Particularly stress associated with exclusive pumping
- Pharm approaches for functional pain
  - SSRIs
  - Cetirizine 10mg QD
  - Propranolol 20-80mg BID-TID (??!)
  - ? Neurontin (case report documents 600 mg TID?!! For back pain)

Kristensen et al 2016, Muddana et al 2018

Take Home Points

- No pumping to empty or supraphysiologic milk production
- Do NOT MASSAGE THE BREAST
- Dermatitis is very common, it's not yeast!
- Early mastitis often resolves with ice, ibuprofen, not overfeeding
- Consider PMADs with persistent pain

Nipple and Breast Pain Cases

Katrina B. Mitchell, MD, IBCLC, PMH-C, FACS
Breast Surgical Oncologist
Lactation Consultant
Perinatal Mental Health Provider
Ridley Tree Cancer Center
at Sansum Clinic
Santa Barbara, California

Image: Enorasis

Case One

- 27 yo G3P3 gave birth to her 2nd infant at 28 weeks gestation
  - Pregnancy remarkable only for PROM
- Baby went to the NICU
  - Began pumping with manual expression within 1 hour pp, 45ml first expression
  - She reported a h/o hyperlactation with her first two infants, second > first
  - Advised to express every three hours
  - At one week, expressing 65 oz each day, 7 pumps a day
- Advised to decrease amount she was expressing, but pumping less volume or less often led to plugs and blebs
  - She kept opening the blebs with sterile needles to drain her breasts well
- You see her at 5 weeks pp
  - She complains of left nipple pain and a deep dull aching in the left lateral breast. Pain is worse with pumping on the left
  - Right side is not very uncomfortable
  - Her left nipple is pale at times, but that is not associated with the pain

Case One

- PMH
  - H/o depression and anxiety
  - No breast surgery
- Meds:
  - PNV, vitamin D, fish oil, probiotic, and lecithin 1200mg bid
- Past breastfeeding history
  - Nursed first for 9 months, second for 19 months
  - Had frequent mastitis with each, and a high supply
- SH
  - Works as a hair dresser, has her own chair, back to work part time at 3 weeks, nonsmoker, lives with two other kids and partner

Image: Ben Blennerhassett

Case One Exam

- The left nipple areolar complex (NAC) is tender on manual expression
- Left breast is tender throughout
- Right breast and NAC WNL
- No masses bilaterally, but both breasts feel full
- Both nipples are purple when she is pumping bilaterally
- You notice a glob of stringy milk in one of her bottles after pumping

What is your differential diagnosis? What would you do about her pain?

Image: BittenByErmines

Differential Diagnosis

- Hyperlactation?
- Vasospasm?
- Pump trauma?
- Bacterial infection?
- PMADs?
  - History of depression anxiety
  - Pre-term birth
  - NICU

Management

- TREAT HYPERLACTATION
  - Pump ONLY what baby needs
- Make sure pump flanges and settings area optimal
  - Size of flanges
  - Pump settings
  - Watch to be sure that hands free positioning remains effective
- Breastmilk culture if fails to resolve once hyperlactation treated

Case Two: HPI

- G2P2 mother calls because her nipples are painful for the last 6 weeks
  - Infant is 14 months
  - No breastfeeding problems before now
  - She nursed her first for 2 years without problems
- She went on vacation to the beach with her family
  - Toddler developed a URI and breastfed incessantly all night x 2 nights. Toddler may have had ear infection
  - Her nipples became very painful
  - She saw an LC who told her to use vinegar washes for candida
  - She didn't improve, so saw her PCP.
    - Told to use clotrimazole, which felt good to put on but didn't help the pain
- Now she has cracks and bleeding from the nipples

Image: Victoria Strukovskaya

PMH and PE

- PMH
  - Healthy
  - Environmental allergies
  - H/o eczema when she was teenager, not since then
  - Allergic to PCN
- SH: at-home mother, does not smoke
- Physical Exam
  - Erythematous, flaking and cracked nipple areolar complex
  - No masses or tenderness on breast exam

What is your differential diagnosis? What would you do about her pain?

Image: BittenByErmines

Differential Diagnosis

- Dermatitis?
  - Irritant/Chemical
  - Allergic
- Candida?
- Secondary bacterial infection?

Image: Sangga Rima Roman Selia

Management

- Identify irritants/contact allergens
  - Like what?
- Topical steroids for dermatitis
  - Medium strength such as 0.1% Triamcinolone for the first week, then BID
    - Gradually wean off over time
    - Watch for recurrence

Case Three

- G2P2 mother who is seeing you at 10 weeks postpartum due to recurrent mastitis
  - Normal pregnancy and delivery at 40 weeks
  - Milk was in by 36 hours, and she felt full frequently
  - Initial pain and scabbing on nipples, healed by two weeks
- "Mastitis" episodes
  - Right breast at 7 days pp, with fever, chills, breast redness
    - Resolved in 2 days with dicloxacillin 500mg QID for 10 days
  - Two days after finishing the antibiotic, she felt that the left breast was warm, red, and she had a fever one night
    - She nursed more frequently and pumped after nursing on the left and the symptoms went away.
  - At 4 weeks postpartum, she developed symptoms of left breast mastitis again, but the symptoms didn't go away by 24 hours
    - Received another dicloxacillin rx
  - At 7 weeks postpartum she had another mastitis on the right side
    - PCP started clindamycin 300mg three times a day and told her to see you

She is now in your office.
What else do you want to know in her HPI/PMH/SH?
Previous breastfeeding history?
What will you look for on physical exam of the dyad? Any labs ?

Image: BittenByErmines

Information Gathering

- HPI
  - Does she have a high supply?
    - How do we ask this question to determine this?
  - Pain with latch?
  - Ongoing pain in her breasts after feeding?
  - Breast tenderness?
  - Recurrent plugs?
  - Stringy milk?
  - Feeding/pumping schedule
    - Problems with pump emptying?
  - Anything that she thinks could have lead to the mastitis?
  - Ill infant?
- PMH
  - Allergies and current meds
- Previous breastfeeding history
- Social History
  - Back to work, type of work, support at home, EtOH, tobacco

Image: Simon Secci

Physical Exam

- Breast Exam
  - Consider breastmilk culture
- Infant
  - Weight
  - Head/neck
  - Oral exam
  - Tone
- Feeding Exam
  - Position
  - Latch
  - Behavior at Breast
  - Nipples after feeding
  - Check pump flange, pressures

History

- She is healthy, on no meds, no drug allergies
- She nurses from one side over night and in the morning, and by evening she nurses from both sides
- She has some latch pain bilaterally, especially when the breasts are full, no deep pain after feeding.
- The baby has an irregular feeding schedule at night, will sleep from 5-10 hours, depending on the night. She only gets up to feed if the baby is up at night.
- She feels pretty full at night when the baby sleeps for 10 hours
- She has intermittent plugs, ~ every 7-8 days, not sure if they have preceded the mastitis episodes
- She is using the same pump she had with her first baby, and no concerns about it

Exam

- Breast exam
  - Both nipples and breasts appear normal, non-tender on exam
- Infant
  - The infant's exam is unremarkable, with excellent growth, staying on his growth curve
  - He has a posterior ligament present, with excellent tongue extension, elevation, and lateral movement
- Feeding
  - A somewhat shallow latch that you correct with side lying position and asymmetric latch technique in cross cradle
  - Normal suck/swallow sequence with comfortable flaring and tongue extension, no clicking
  - Nipple looks round and elongated after nursing

Image: Onur Binay

What would you advise?

Image: BittenByErmines

Management

- May need to decrease milk production, but first step is no additional pumping
- Feed on demand, reassurance that with higher production, may experience transient engorgement – this is NOT dangerous and must have some fullness to send feedback inhibition to breast
- Pain management with ice, heat, oral anti-inflammatory
- Organic lecithin 5-10 grams daily
- CALL FOR PHYSICAL EXAM/evaluation IF EXPERIENCING "ACUTE MASTITIS"
- Routine follow up for mom and infant in two weeks
- If TRUE recurrent episodes, consider staphyloccocinum 30X

Image: Raychan

Low Milk Production

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

Conflicts of Interest

Objectives

- List 2 reasons for insufficient breast development during pregnancy
- Describe 2 reasons why a woman may have absence of lactation postpartum
- Recite 3 reasons for low milk production postpartum that are not due to abnormal prenatal breast development
- Identify 2 behavioral means of increasing milk production
- Describe 2 indications for using herbs or prescription medications to increase milk production

I wonder if I have enough milk?! Feedings are so short now…

Low Milk Production—Real or Perceived?

Perceived Low Milk Production

- Normal development and functional breast tissue
- Frequent nursing with a marginal supply
- Fussy baby
  - Pain, High Supply, Growth Spurt, Other
- Sleepy, Snacker
- High Suck Need
- Normal postpartum breast changes
- Parental expectations
- Comparing pumped volumes to others

Perceived vs Real Milk Production

- Weigh the Infant
  - Gaining Well
    - Evaluate To Identify Cause of Infant Sx
  - Not Gaining Well
    - Insufficient Milk Transfer (plenty of milk expressed after feeding)
    - Low Milk Production

True Low Milk Production…



Incidence of Low Production?

1. The third variety of lactation met with is the defective. A natural scantiness of secretion, not due to want, occupation, constitutional debility, advanced age, etc., constitutes 30 per cent. at least of all cases.

INFANT FEEDING

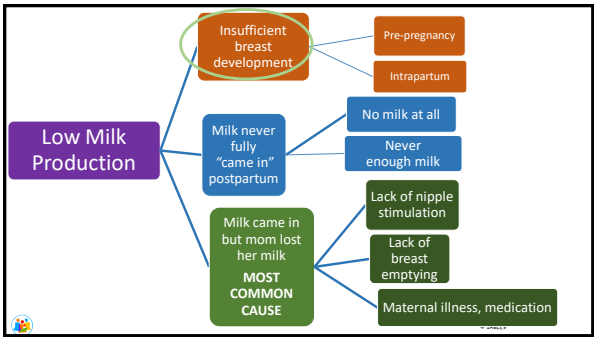
1879

ITS INFLUENCE ON LIFE

BY

C. H. F. ROUTH, M.D., M.R.C.P.I.

FELLOW OF UNIVERSITY COLLEGE, LONDON; OF THE MEDICAL, MEDICO-CHIRURGICAL, AND OBSTETRICAL SOCIETIES; CORRESPONDING MEMBER OF THE ROYAL ACADEMY OF MADRID AND PESTH, AND THE GYNÆCOLOGICAL SOCIETY OF BOSTON; SENIOR PHYSICIAN TO THE SAMARITAN HOSPITAL FOR WOMEN AND CHILDREN, ETC., ETC.



Hypoplasia = Inadequate Pubertal Development
Hypoplasia Typically Associated with Insufficient Glandular Dvpt During Pregnancy

"Insufficient Glandular Tissue" - Pre-Pregnancy

- Overall breast size can be normal
  - –May appear hypoplastic or can have normal contours
- Little tissue to develop
  - –Genetic defect
    - •Poland Syndrome
    - •Scalp-Ear-Nipple Syndrome
  - –Embryologic vascular compromise (unilateral)
  - –Later trauma to breast bud
    - •chest surgery, chest burn
  - –??Environmental toxins – endocrine disruptors

Endocrine-Disrupting Chemicals and Mammary Gland Development Mainly Mice Studies

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) found to disrupt mammary gland development and lactation in mice

Phthalates may impair mammary gland development thru estrogen mechanisms

Mice exposed to BPA in utero, perinatally and as juveniles had increased terminal buds and enhanced numbers of alveoli

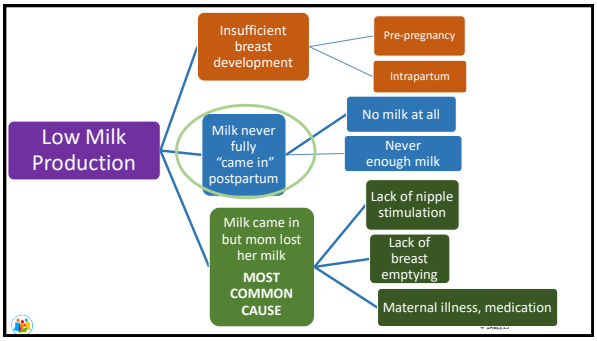
Curr Opin Endocrinol Diabetes Obesity 2020, 27

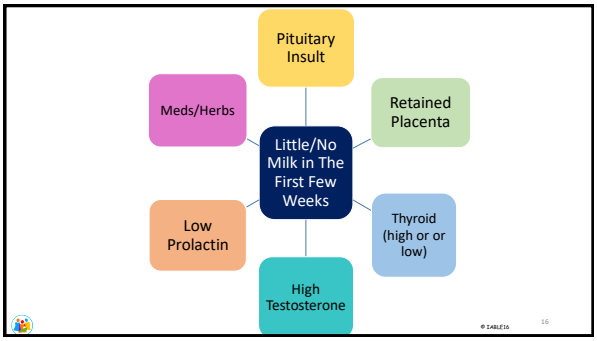
Insufficient Glandular Tissue Development Due to Procedures

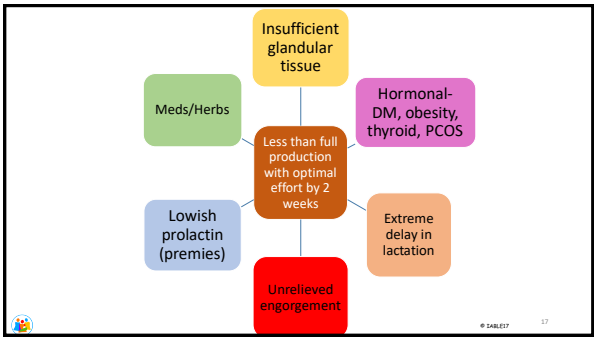
- Breast Surgery
  - Reduction, large lumpectomy
    - –Assume low production
  - Augmentation
    - –What was the REASON for surgery?
- Breast/chest radiation
  - No milk from an irradiated breast

Lack of Full Potential Growth in Pregnancy

- High Androgen States
  - –Obesity
  - –Polycystic Ovarian Syndrome
  - –Diabetes
  - –Pre-eclampsia
- Insulin resistance
- Idiopathic
- Age
- Infertility







Absent or Insufficient Secretory Activation

Medical Evaluation

- Pituitary function
  - cortisol, TSH, PRL
- Thyroid function
- Prolactin (10 min after nursing/pumping)
- Testosterone
- HCG/Ultrasound??

Maternal Illness

- Severe illness soon after delivery can delay lactation
  - –Sepsis
  - –Surgery
  - –Pre-eclampsia
- Febrile illness & fluid loss may slow production
- Illness often associated with less frequent milk removal

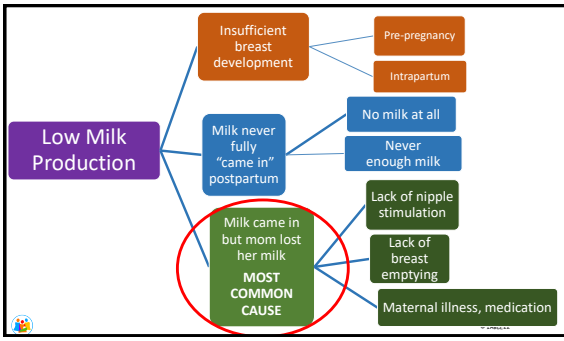
What Can Delay Secretory Activation?

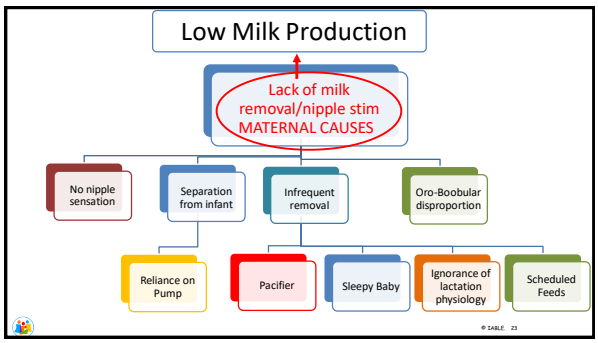
- Primiparity
- Maternal stress (Increased cortisol)
- Pre-eclampsia/mag infusion
- Gestational diabetes
- Obesity
- Cesarean birth
- Peripheral edema
- >30 yrs

Diabet Med 33, 17-24, 2016; Am J Clin Nutr 2010

Substances That Can Inhibit Secretory Activation

- Bromocriptine, cabergoline
- Aripiprazole
- Decongestants
- LARC
  - –Etonogestrel
  - –Progesterone IUD placed within 10 min pp





No Nipple Sensation +/- Scarring

- Breast reduction
- Breast "lift"
- Sensation usually returns with time
- Excessive scarring can make latch difficult or impossible
  - Usually improves over time with pumping to stretch tissue
- Nipple shield

Separation From Infant

- Exclusive pumping
  - –Insufficient milk removal
    - •Flange fit
    - •Pump settings
    - •Frequency

Infrequent Removal - Pacifiers

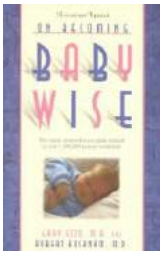
- OK when infant is :
  - –Feeding well
  - –Gaining well
  - –Wakes up on their own to cue for feeding

Insufficient Removal - Sleepy Baby

- Idiopathic term infants
- Late preterm/early term
- Mat/infant medications

The 'Non-Ad Lib' Culture

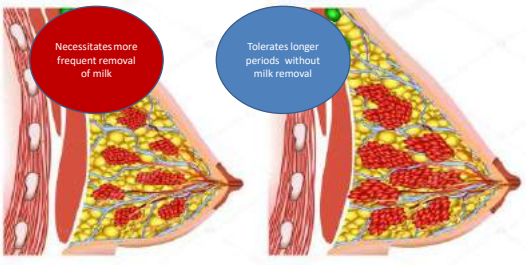
- Bottle-feeding culture
  - – My baby should not need to eat so often
- Parents are overwhelmed
  - – Want to schedule the baby
- Parents compare their situation to others
  - – Lactating individuals vary with milk production and infants vary with feeding frequency
  - – Belief that good parenting means that infant sleeps all night
- Don't spoil the baby
- Sleep training



Oro-Boobular Disproportion

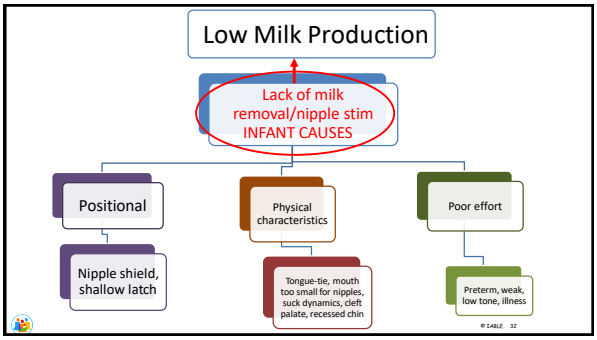
- Nipple is large relative to infant mouth size
- Most often with late preterms, SGA infant + large nipples
- Treatment is tincture of time
  - Don't use a nipple shield

Storage Capacity



Substances that May Decrease Milk Production

- Bromocriptine, cabergoline
- Estrogen-containing birth control pills
- Progesterone- long and short acting
- Decongestants- pseudoephedrine
- High dose steroids
- Epinephrine
- Frequent use of sedating antihistamines
- Aripiprazole
- High dose SSRI
- Enalapril
- Nicotine
- Alcohol
- Herbal teas/supplements
- Placenta encapsulation



Supplementation

- With what?
  - –Mom's own milk > Donor human milk > Formula
- How much?
  - –Average reported intakes by term bfed infants:
    - < 24 hrs: 2–10 ml
    - 24–48 hrs: 5–15 ml
    - 48–72 hrs: 15–30 ml
    - 72–96 hrs: 30–60 ml
  - –Follow feeding cues and weights

Supplementation

- Choose a method with caregiver(s)

Exercise and Moderate Weight Loss

- No data on effect of weight loss on milk production, unless mother is undernourished
  - Slow, 1lb/½ kg per week likely fine
  - Stay well hydrated
- Moderate exercise not shown to decrease production
- Lactic acid in breastmilk not shown to deter nursing or affect baby

Breastfeeding Med 15(6) 2020

First Steps to Increase Milk Production

- Maximize nipple stim/breast emptying
  - 8 times a day
    - No more than a 5 hr break at night
    - Nursing usually more effective than pumping
    - Add hand expression to pumping if needed
- Avoid meds that decrease production
- Address stress
- Sufficient calories if undernourished

Common Plant Based Galactogogues

- Stinging Nettle
- Ginger
- Garlic
- Basil
- Fenugreek
- Fennel
- Anise
- Blessed Thistle
- Milk Thistle
- Marshmallow root
- Goats Rue
- Moringa Leaf
- Shatavari
- Torbangun
- Black Seed
- Turmeric
- Dill
- Alfalfa

37

Common Foods Believed to Increase Supply Based on Culture, Little Research

- Herbs and Spices
  - Garlic, ginger, basil, onions, caraway, anise, coriander, dill, cumin
- Hops
- Chamomile, marshmallow
- Green Leafy Vegetables and sprouts
- Grains- oats, quinoa, barley, rice
- Nuts and nut butters
- Brewers yeast

Mother-food.com

Plant-Based Galactogogues that Decrease Blood Sugar/Improve Insulin Sensitivity

- Black Seed
- Fenugreek
- Fennel
- Shatavari
- Goats rue
- Milk Thistle (Silymarin)
- Turmeric
- Ginger
- Dill
- Garlic
- Coriander
- Cumin
- Alfalfa

Galactogogues that are Phytoestrogens

- Fennel
- Fenugreek (and increases testosterone)
- Shatavari
- Milk Thistle (Silymarin)
- Hops
- Alfalfa

Fenugreek

Trigonella foenum-graecum

- Phytoestrogen
- Improves insulin sensitivity
- Considered possibly safe by the FDA in medicinal amounts
- Dose- 500mg-610mg caps of crushed seeds, 2-3 caps 3x/day
- Evidence is mixed

Lactmed/Toxnet Dec 2018;Breastfeeding Med 13(10) 2018
Breastfeeding Med 13(5) 2018

41

Fenugreek

Trigonella foenum-graecum

- Possible side effects
  - Infant flatus/abd pain
  - Maple syrup odor for infant and mother
  - Drop in blood sugar if at risk
  - Legume, cross reacts with peanuts in allergic people
  - Liver toxicity has been reported
  - May interact with warfarin
  - Exacerbate asthma
  - Decrease cholesterol

Lactmed, Toxnet 2018

42

Goats Rue
Galega officinalis

- Unclear mechanism of action
- Metformin derived from this
- Improves insulin sensitivity
- Slow increase in volumes
- A few poorly designed trials showing effectiveness
  - Most studies were in combination with other herbs
- Clinically may increase glandular tissue
- Risks- hypoglycemia, anti-coagulant effect

Shatavari- Asparagus Racemosus (Wild Asparagus)

- Root is the active, safe part of plant
- Long hx of use in India
- Side effects- headache, slight risk of a decrease in milk supply
- Interacts with Lithium
- Dose is 800mg-1000mg 3x/day
- Studies show mixed results

Moringa=Malunggay

- Used, grown and consumed in tropics
- Leaf portion increases milk supply
- Dose is 500mg-1000mg 3x/day
- Might raise PRL level
- GI upset common for parent and child

Torbangun- Coleus Amboinicus Lour

- Indonesian new mothers consume torbangun leaves in soup after birth for 1 month, with chicken or catfish
- Grown in the garden of the pregnant mother
- Harvested by friends/family after birth
- No limitations on frequency of eating the soup- NO safety info
- Possibly increases lactocytes along with milk excretion
  - Increased milk excretion in cows and goats

Metoclopramide

- Increases prolactin levels
  - Dopamine antagonist
- S/E- fatigue, dizziness, depression, seizures, tremors, tics, tardive dyskinesia'
- Low relative infant dose =4.4%
- Contraindications- psychiatric disorders, seizures, risk of serotonin syndrome with other serotonin agents
- Dose = 5-10mg 3-4x/day
- At most can double milk volume
- Limit duration of use
- Follow women closely for neurologic side effects

Ann Pharmacotherapy Oct 2012 46; 1392

Domperidone

- Increases prolactin levels
  - Dopamine antagonist
- Rare neurologic side effects
- Studies show effectiveness in NICU population
- Dose at 10mg 3-4 times a day
  - Relative infant dose 0.04%
- Contraindications- Long QT
- Side effects-abdominal cramps, rash, itching, prolonged QT
- Rx interactions- antifungals, erythromycin, anticholinergics, lithium
- Not FDA approved, not available in USA

Ann Pharmacotherapy Oct 2012 46; 1392
Breastfeeding Med Nov 2020

Considerations in Galactogogue Use

- Response depends on one's ability to make milk
  - People with high production will have a greater response
- Studies done on those with no risk factors for low production don't apply to women who have risk factors
- Certain herbs/meds are a better fit for some vs others
- Research is generally low quality. Best evidence is cultural experience
- No data on how long herbs take to be effective

Herbal Combinations

- Many different brands
- Clinically may be less effective
  - Less of each herb
- Most effective for good milk producers who need a boost

Herbs Within Combinations

- Alfalfa- may lower blood sugar, may stimulate immune system, do not take with warfarin.
- Anise- data in animals and theoretical concern about drug interactions with Tylenol, Valium, Prozac, imipramine, Versed, and may decrease blood sugar.
- Ashwaganda root- may stimulate thyroid. Do not take during pregnancy.
- Black seed/Black cumin- may interact with many drugs. (Lowers blood pressure, sedatives, may increase effect of diuretics, may stimulate or suppress immune function)

Herbs Within Combinations

- Blessed thistle- Likely safe. Related to ragweed. May increase stomach acid. Do not take during pregnancy.
- Caraway seed- Likely safe, no information on lactation. Animal research indicates it may decrease blood sugar, may inhibit Cytochrome P450, may decrease Lithium excretion, may have a sedative effect.
- Dill seed- Likely safe in "food" amounts; may decrease blood sugar and interfere with Lithium excretion.
- Fennel- Likely safe. May decrease levels of Cipro, increase levels of fluconazole, cimetidine, ranitidine, diltiazem, verapamil, prednisone, erythromycin, propulsid, allegra via inhibiting Cytochrome P450.

Herbs Within Combinations

- Marshmallow Root- Likely safe. May decrease blood sugar and interfere with Lithium excretion.
- Milk thistle- Likely safe. May lower blood sugar, May interfere with clearance of Tylenol and Lamictal. May increase levels of fluconazole, cimetidine, ranitidine, , diltiazem, verapamil, prednisone, erythromycin, allegra. Do not take if on warfarin.
- Nettle- Possibly safe. May decrease blood sugar, may lower blood pressure, may cause sedation, may increase lithium levels and may interfere with blood thinners.
- Saw Palmetto- Likely safe. Thought to have antiandrogenic, antiproliferative, and anti-inflammatory effects. May decrease clotting. Dizziness, headache, and gastrointestinal complaints such as nausea, vomiting, constipation, and diarrhea are the most frequently reported adverse effects.

Reasons to NOT Use Galactogogues

- Not as substitutes for optimal nursing/pumping
  - Back to work and pumping less
- Increasing breast volume without drainage:
  - Increased risk of plugs/mastitis
- Situations of NO milk or minimal drops 1-2 weeks after birth
  - Expensive and not effective
  - Do the work-up!!

When to Consider Galactogogues

- Relactating
  - Ramping up dwindling or lost production
- Induced lactation
  - Adoption, surrogate
- Pump reliance
  - Premies
  - Late preterm
  - Infants are not nursing
- Insufficient glandular tissue- but no evidence (professional opinion)

Conclusions

- Low milk production can be associated with prenatal, intrapartum, and/or postpartum issues.
- Low milk production can occasionally be the first sign of a maternal medical problem.
- Galactogogues do not take the place of frequent, effective feeding and/or pumping.
- Galactogogues are only effective in the setting of frequent, thorough breast emptying.

Cases of Low Milk Supply

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1

- Conflict of Interest to disclose- None
- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and a completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required

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OBJECTIVES

- Discuss causes of low milk supply in various stages of lactation
- Describe work-up of lactation failure
- List priorities when faced with triple feeding

Jill and baby Dillan

- You are seeing a dyad on day 4 pp (95 hours)
- Mom is a 27 y/o G1P1
  - Married, works as a dietitian part time
  - Took a prenatal class
  - Her mother and older sister breastfed and live in town
- Baby boy Dillan was born via SVD at 39 weeks
  - +Epidural
  - Labored for 12 hours; +vacuum extractor
  - Birthweight = 7 lb 1 oz (3203gm)
  - APGARS 9, 9 and 10

Jill and Dillan PP day #4

- Dillan is nursing every 2-3 hours, day and night
  - 20 minutes per side
  - He is acting hungry as soon as he is removed from the breast
- One black stool yesterday, none today
- Parents pretty sure had a slightly wet diaper this morning
- Mom felt her breasts enlarge during pregnancy, but no changes since birth

5

Jill and Dillan PP day #4

- Dillan PE: Alert, rooting. Moderate jaundice. No obvious signs of dehydration. Normal suck exam, no lingual frenulum. Otherwise normal.
- Today baby's weight is 6 lb 4 oz (11.5%)
- Mom PE: Tearful. Not obese. Normal contours to breasts, but very soft. Nipples intact and normal size.

6

Jill and Dillan

- *Do you have more questions?*
- Tell me about the delivery…
  - Did you have blood loss? Pre-eclampsia? Gest Diabetes?
- Infertility? Irregular periods?
- PCOS?
- Diabetes?
- Breast surgery? Radiation?
- Are you taking any medications? Herbs? Placenta? Smoke?

Jill and Dylan

- *What else do you do at this visit?*
- Observe a feeding
  - Baby takes 7cc right and 5cc left – very sleepy at breast
- Have mom pump
  - How much does baby leave in breast?
- Discuss/demonstrate supplementation options
- FEED THE BABY!

8

www.newbornweight.org/chart/

9

Jill and Dylan

- *What are the priorities?*

#1 Feed the baby
- Offer baby >30ml at least 8 times /24 hrs
- Have parents demonstrate supplementation

#2 Milk removal
- Hands on pumping at least 8 times/ 24 hrs
  - Give her storage info

#3 Baby at breast (OK to skip breast in the night)

- See tomorrow for weight check

10

Paige and Walter

- Initial Visit via telemed due to Covid-19 pandemic- **PPD #10**
- 33y/o primip lesbian, IUI
- Lives with wife, new to town, no support
- Baby born at 37 2/7 via C sec for failure to progress
- Latch was "pinchy", so started nipple shield on Day #1
- Mom does not think her milk has "come in"
- Baby latching 3 times a day for ~10 mins/side
  - Sleepy at breast; given all pumped milk +1-2 oz formula/feeding or 10 oz/day formula
- Mom pumping 3 times a day with a Medela Pump in Style – getting 5-7 cc TOTAL at a pumping session, or ~20cc in a day, and no discomfort

11

What else do you want to know?

- No breast changes during pregnancy- wearing pre-pregnancy bras
- No engorgement, ever
- Dxd with PCOS + "high androgens" when tried to get pregnant; string of pearls in ovaries
  - Voice has deepened during pregnancy, increased facial hair so that mom is shaving daily, and acne has worsened- OB says due to PCOS
  - OB mentioned seeing multiple cysts on ovaries at C-sec
- Infertility? Used IUI - did not need any other meds.
- High blood pressure pregnancy only

12

What else do you want to know?

- BMI = 34
- Meds: Ibuprofen, pepsid, zyrtec, flonase, prenatal vitamins
- Has significant anxiety
- PE- breasts relatively small and widely spaced via zoom
- Mom is more concerned about having more milk than getting baby to bare breast, and is afraid to come in person due to covid

13

Breast exam

Reasons for her very low supply?

- Only pumping 3 times in 24 hours
- Nipple shield for 3 breastfeedings/day
- Hypertension can delay Lactogenesis 2
- PCOS, esp with high androgens
- Obesity
- Hormonal infertility
- NO breast changes during pregnancy – IGT?
- Breasts appear hypoplastic

15

What do you recommend?

- TRY and pump at least 8 times in 24 hours, and no more than 4 hours between any pumping sessions
- Try and put baby to breast 1-2 times a day so she remembers what breasts are for
- Let's check thyroid screen, prolactin hormone, testosterone and DHEA levels
- After we see where supply is and what labs show, will talk again on Monday

16

4 days later…

- Paige reports her testosterone was done on November 21st, 2019 during infertility work-up was
  Total=34 Free= 4 Percentage free= 1.1 SBG: 71
- She is pumping 5-6 times in 24 hours with a Symphony (hosp grade) pump.
- Her DAILY TOTALS for the last 3 days= 23cc, 26cc, 36cc in a day. At a session she is pumping 1-9cc per breast at one time. Gets the most first thing in the morning after not pumping for a while.
- Baby will get on the breast with shield and nurse for a short while, then takes the bottle.

17

PP Day #14

- Paige's current testosterone levels: (Drawn on PPD #11)
  - Total= 1039 (nl <48) Free= 49 (nl 1-9) % free= 0.5 SBG= 225 (nl 30-135)
  - Prolactin and TSH normal at 125 and 1.48 respectively
- What do you do now??
  - Can she anticipate an improvement in her milk production??
  - Should she keep pumping?
- D Dx for extremely high testosterone?
  - Luteoma
  - Theca-lutean cyst
  - Adrenal tumor

18

PP Day #17

- U/S done in OB office – no mass or cysts identified
- Paige is extremely anxious about adrenal tumor- has appt with a new PCP next week
- CT scan ordered: Moderately enlarged ovaries and normal adrenals

19

Lab results – PP Day # 18

	NORMAL	ABNORMAL	REFERENCE RANGE	UNIT
TESTOSTERONE, TOTAL	H	333	<46	ng/dL
TESTOSTERONE, FREE	H	17	1-9	pg/mL
Postmenopausal: 1-9 pg/mL				
TESTOSTERONE, % FREE	L	0.5	1.8-3.2	%
SEX BINDING GLOBULIN	H	182	30-135	nmol/L

	NORMAL	ABNORMAL	REFERENCE RANGE	UNIT
Dehydroepiandrosterone 1,580 by TMS			1,930-7,780	ng/mL

20

PPD #25

- Paige is noticing the amount of milk pumped is gradually increasing
- Total pumped in a day:
  - One week ago 31cc L + 25cc R = 56 total in 24 hours
  - Yesterday 100cc L + 70 ml right = 170 cc total in 24 hours
- Able to pump 4-6 times in 24 hours; "hard to get it done".
- Is also doing some nipple stimulation when not able to pump to try and keep prolactin levels up.
- Day #22 repeat testosterone = 144

21

PPD #35

- Daily milk volume has plateaued at maximum 6 oz a day. (Left 3.5 + 2.5 oz right)
- Is pumping about 6 times a day - got the Elvie and is finding it a little easier to pump more often.
- No longer putting baby to breast; LC at Peds office told mom baby is discouraged by slow flow
- Offered to work with her in person to show her how to supplement at breast – declined offer

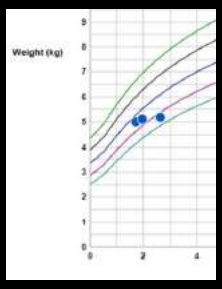
22

Judith and baby Emma

- Emma is a 3 month old in to see you for fussiness.
- The family is new to town, having seen you for the first time at 2 months of age for a well child exam. This is their first child, born at 41 weeks.
- Mom is 32 y/o and works as an administrative assistant for the state health department. Mom reports breastfeeding has been going well.
- Did not attend prenatal class as was busy preparing to move.
- In the last month, Emma has been crying more during the day, and she has been waking up more often at night to nurse.

Judith and Emma

- Mom reports that her breasts might feel less full than they used to.
- PE: Baby alert and happy, slightly thin-appearing, but exam otherwise normal.
- Emma was born term, healthy, and mom reports that her weight at 2 mos of age was at the same weight %tile as at 3 weeks.



24

- What else do you do at this visit?
- What are possible reasons for the drop in the Emma's weight gain?
- What do you recommend to Judith?

25

What else do you do at this visit?

- Clarify nursing/pumping frequency
- PE mom: Do breasts appear normal? Feel dense?
- Observe a feeding
  - How much does baby remove from breast?
  - Is this highly reliable in a 3 month-old baby?
- Have mom pump
  - How much does baby leave in breast?
  - Do flanges fit well?

?

26

What are possible reasons for drop in a 3 month old infant's weight gain?

- Pumping
  - Back to work – stressed, or not frequent enough
  - Relying on an insufficient pump/flanges
- Maternal medications/alcohol/smoking
- Hormonal Birth control
- Maternal illness
- Infant transferring less milk
  - Less frequent nursing during the day
  - Sleeping too long
  - Decreasing to 1 breast/feed 'for the hind milk'
  - Tongue Tie
  - Nipple shield use
  - GERD
  - Pain
  - Other illness

What do you recommend?

- Stop any meds that might be interfering
- Increase removal by increasing frequency and effectiveness of emptying
  - May include pumping at mom's bedtime or in the night if baby sleeping long stretches
  - "Dream feed"
- Offer baby supplemental milk as needed
- Return for a weight check in 1-2 weeks

28

Lauren

- 33 y/o G2P1 now at 23 weeks gestation
- First baby lost 15% of birthweight, and mom had to supplement with at least 16 oz formula/day, and ended up weaning at 5 months due to breast refusal.
- Has PCOS, and requires Metformin to become pregnant.
- Metformin stopped end of 1st trimester with both pregnancies.
- Passed glucose tolerance test with first pregnancy; this one scheduled for next week.
- Wants to optimize her milk supply for this baby- what can she do?

29

Physical exam

30

What suggestions do you have for Lauren?

31

Past history of low milk supply…

- New baby- will not necessarily be the same situation
- Prenatal expression ~36 weeks if not "high risk"
- Frequent hand expression in early days and offer to baby in a spoon
- Herbs (esp Goats Rue) at ~1 week if not enough
- Consider supplementing at breast if looks like long-term supplementation necessary

32

Kacie and Juliet

- BF first baby for over a year- struggled with high supply and plugged ducts
- Saw LC starting at Day #5 for reassurance
  - Baby was 10% below birthweight and took 18cc L + 20cc R = 38cc total
  - Effexor, hydroxazine for anxiety
- Seen again Day #12 and only gained 3 oz in 7 days
  - Baby removed 62cc total from both sides at visit, nursing Q 2 hours
  - Mom hand expressed 30cc easily from fullest breast
  - Mom resistant to pumping/supplementing due to previous high supply
  - Edinburgh = 6

33

Kacie and Juliet

- You see them at 6 weeks for fussiness
- Baby looks good, weight gain now normal
- Mom nursing 10-12 times in 24 hours
- Baby sleeping 10:30-0400
- Giving 2-3 oz milk in the evening when fussy at breast
- Haaka 1-2 times a day to collect 3 oz total in a day
- Mom had to add Abilify at 3 weeks for increasing anxiety

34

What would you recommend?

- Offered to check thyroid and prolactin
  - Prolactin = 105 when due to feed
  - TSH = 2 (nl)
- Mom tried stopping Abilify – within a week needed to resume
- Supported Kacie in addressing her mental health needs and starting formula supplementation to decrease stress re: pumping at work and fussy baby in the evening

35

Breastfeeding Support and Management of Common Problems in the First Week Postpartum

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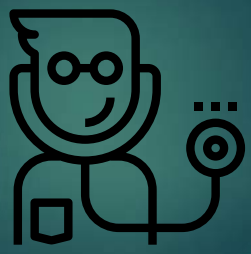
Conflicts of Interest



Objectives

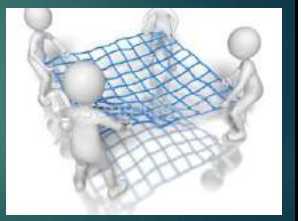
- List 3 questions to ask in the first 2-5 day visit to identify problems with breastfeeding.
- Describe 3 signs of adequate milk intake in the first 3 days postpartum.
- List 3 interventions that support infants and breastfeeding mothers during a delay in lactation in the first week postpartum.

See Babies Within 24-72 Hours after Discharge

- 24 hours:
  - If jaundice, poor nursing, sore nipples
  - Primip, feeding OK, milk not in yet
- 48 hours:
  - If multip and nursing fine, milk increasing, no jaundice, no soreness
- 72 hours
  - If C-Section, nursing fine, milk in at discharge, baby's weight loss has stabilized

Safety Nets

- What safety nets do your hospitals have in place currently to ensure that the recommended F/U appt is scheduled on the appropriate day(s)
- How can we do this better?



Presentermedia.com

First Office Visit

- Typically infant's day 2-5 of life – Crucial timing for encouragement, education and guidance on BF management
  - Enter room with a "Confidence Booster"
  - Ensure that mom is comfortable and gaining confidence

First Office Visit

- Review
  - Breast changes during pregnancy?
  - Pregnancy or L&D complications, gestational age
    - Special considerations for late preterm infants
  - Timing of first S2S and breastfeeding
  - Any separation of mom & baby
  - Maternal meds and supplements

Other info you need:

- Frequency & duration of feeds (start to start)
  - one side or both?
- Is milk in?
  - hear/see sucks and swallows?
  - Feeling fullness?
- Sore nipples, wounds, difficulty with latch?
  - If pain, quality/description of pain, when does it occur and duration, pain only with nursing or pumping too?

More info…

- Engorgement?
- Has baby used any bottles?
- Nipple shields?
- What does baby look like after & between feeds?
- Output data (#/24 hrs + appearance, size)
- Support @ home? Visitors? Stressors?

Reassuring Signs of Adequate Intake After Milk "Comes In"

- The baby nurses ≥ 8 times per 24 hrs
- 3-4+ yellow seedy stools/day
- Diaper is always wet
- Baby is content between feedings
- Breasts full before feeding, emptier after feeding
  - Baby begins gaining at least one ounce a day
  - Hear swallows when BF
  - No nipple/breast tenderness

Other…

- Vitamin D supplementation options
- *Bright Futures, the AAP's comprehensive health guidelines for well child care, recommends next baby appt @ 1 mo old!?!*
  - Next clinic visit @ 2 wk wt check, NOT @ 1 mo of age unless experienced mom **and** baby back to birth wt @ day 2-5 day clinic visit

Ideally, observe a feeding!

- Latch/positioning?
- Swallows!!!
  - Point out letdowns
  - May need to "switch nurse"
  - Non-nutritive vs nutritive sucking
  - Signs of satiation
  - Stop watching the clock!
- You cannot estimate milk transfer by watching- must use scale

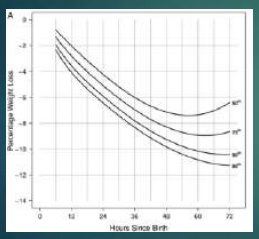
Assess specific needs

- Is weight loss excessive?
- Do you expect further weight loss?
- Engorgement treatment/education?
- Referral to a lactation specialist?
- Home visits?
- Interim check in via phone?
- Other support options before next clinic visit?

Diagnosis of Delayed Lactation

- Milk is not 'in'
  - By day 3 for multip
  - By day 5 for primip
- No breast fullness
- Excessive infant weight loss
- Typically inadequate outputs

What IS excessive?

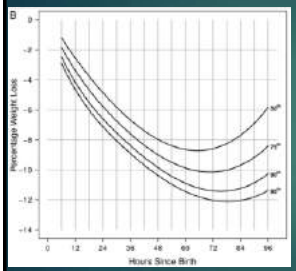


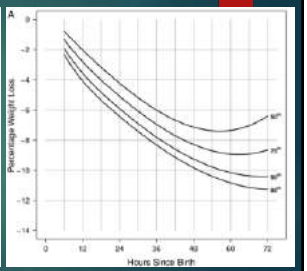
NEWT

108,932 healthy singleton at least 36 weeks exclusively breastfed

Weight Loss Nomogram for Exclusively Breastfed Newborns Vaginal/C sec Birth

Flaherman, Valerie J. et al. "Early Weight Loss Nomograms for Exclusively Breastfed Newborns." Pediatrics 135.1 (2015): e16–e23. PMC. Web. 8 May 2018.





https://www.newbornweight.org/

Delayed Lactogenesis- What to do?

- "Triple Feeding"
  - Nurse the baby first with breast compressions, ≥ 8 times every 24 hrs
  - LIMIT TIME SPENT AT BREAST ~20 mins
  - Hands-on pumping after nursing
  - Supplement with EBM, donor milk or formula
  - Written feeding plan and close f/up




Choose a method…

How about some Paced Bottle Feeding?

- Familiar, easy to clean
- Slows feeding to mimic breastfeeding
- Prevents overfeeding
- Prevents propping
- Encourages socialization during feeding

Cup?


www.foleycup.com~ $2


Medela ~ $1.50

Cup Feeding

Pros

- Does not fulfill infant's suck need
- Cups are easily available and cheap (shot glass)
- Easy to clean

Cons

- Learning curve
  - Spillage, slow
- Not typical in our culture
- Overwhelming task for some

Click for Video

Supplementer at the Breast

Pros

- Saves time
- Increase breast stimulation
- Avoids artificial nipples

Cons

- Clumsy, hassle
- Need extra equipment
- Not easily transportable
- Some babies refuse it
- Not for sleepy babies

Click for Video

How much??

TABLE 2. AVERAGE REPORTED INTAKES OF COLOSTRUM BY HEALTHY, TERM BREASTFED INFANTS

Time (hours)	*Intake (mL/feed)*
First 24	2–10
24–48	5–15
48–72	15–30
72–96	30–60

- These are expected feeding sizes – a dehydrated or underweight infant may need more! Babies know what they need – ***give a minimum to offer!***
- ***A LITTLE SPITTING UP IS TO BE EXPECTED***

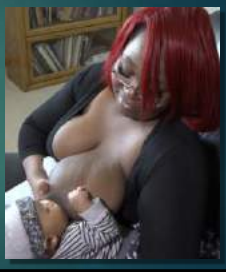
ABM Protocol #3 Supplementation

HOW MUCH TO SUPPLEMENT 4-30 DAYS OF AGE??

- 1 Mo Old- ~ 27 oz/day, ~3.4 oz each, 8 times a day
- Or for 1st mo, ~2.5 times the weight in lbs =24 hour total
- Need to account for "catch-up" if baby is underweight
- However much is needed to optimize growth on curve

Other Early Postpartum Concerns

- Days and nights mixed up
- Sleepy baby
- Late Preterm Infants
- Tongue Issues
- Hyper/Hypotonic infants
- Other anatomic/motor problems
- Nipple shield/scheduling feeds/pacifier



My Baby is Up at Night & Sleepy during the Day

- Wake the baby to feed during the day
- Parents take daytime naps
- Keep baby up in the evening
- Keep lights low at night, put baby back to bed after feeding
- ACCEPT HELP from friends and family!

"My Baby Eats Every 30-60 Minutes!?"

- Baby falls asleep at the breast, does not finish feeding?
  - Keep baby awake during nursing
  - Use breast compressions when baby is slowing
  - Switch breasts watching baby's cues- **ok to do 3-4 "sides"**
- Is milk supply is low?
  - Watch a feeding
  - Pre/post feed weight
  - Pump after nursing to check residual
  - Monitor baby's weight; may need supplementation

"Mom is exhausted, can we give a bottle at night?"

- If too tired, pump a bottle while partner gives a bottle and go back to bed
- Nap with baby during day so mom can be up at night
- Make sure baby is finishing feedings to decrease nursing frequency

"We want to measure volumes, so we have decided to pump and bottle feed"

- Check infant weight with current feeding pattern for reassurance
  - Weigh naked often for confidence
  - Rent a scale?
- Pumped volumes don't mean anything without a naked weight check
- Risk of low milk production, nipple trauma, recurrent plugged ducts with excl pumping
- Difference in milk quality

Sleepy Baby

- Common reason baby doesn't gain despite an adequate milk supply
- "Living on the letdown"
- Ideas:
  - Stimulate baby
  - Undress baby
  - Breast compressions while nursing
  - Switch breasts often based on swallows ("switch-nursing")
- Avoid sedative substances

More on Sleepy Baby…

- Demand feeds may not work; teach parent-led feeding while still watching baby's cues
  - Be sure someone is holding baby between 2-3 hours after start of last feeding if possible- watch for cues
- Bottles often necessary for supplementation- watch out that not TOO slow flow!
- Common in babies with jaundice, SGA, LPI
- Typically start to "wake up" when past their birth weight/due date-- Tell parents this!

Tongue Problems

- Tongue thrusters
  - Increased risk w/ preemies, babies w/ high muscle tone, **artificial nipple use**
  - Baby keeps pushing breast out of mouth while trying to latch
  - Can cause nipple soreness
  - Suck training?

Suck Training

- Watch for baby to show early hunger cues
- Hold baby in a stable position
- Elicit gape if possible
- Insert clean (gloved if not parent) finger carefully into mouth, nail down, & gently stroke roof of mouth
- When suck begins, extend finger & push down gently on back of tongue
- Gently push down and out as baby sucks, pulling down on chin so tongue can extend out further
- Once baby is relaxed & in good sucking rhythm, then latch baby onto mom's breast (mom leaning back)

Ankyloglossia? Other anatomical issues?

- Covered in lecture yesterday

Pumping Parameters

- Encourage NO pumping for first 3 wks of baby's life (unless needed for supplement) & explain why
- When baby is **>** 3 wks old, mom may pump just after the first morning BF session; limit to 2-4 oz EBM per day

Nipple Shields?

- Both baby and mom often become very dependent
- Can decrease milk transfer/production over time
- Can lead to a shallow latch; "nipple only"
- Must ask directly about this - often will not volunteer the information
- Ask mom to pump after nursing with a nipple shield unless you are certain baby is transferring plenty
- Weigh baby at least weekly until no shield use

Baby must use it correctly!!!

Milk removal may be compromised

Other Reasons for Decreased BF Frequency

- "Sleep training"
- "Block feeding"
- Pacifier use
- Haaka on second side rather than newborn

Conclusions

- Early postpartum support during the first week allows the opportunity to instill breastfeeding confidence in families & gives us another opportunity to educate/guide.
- Mothers with delayed lactogenesis need support to protect and support breastfeeding during infant supplementation.
- Many early postpartum concerns may lead to inappropriate supplementation or inadequate milk removal. With proper advice, breastfeeding can be supported and protected.

Challenging Cases During the First Week Postpartum

Anne Eglash MD, IBCLC, FABM

Conflicts of Interest

Objectives

- Describe evaluation and management of nipple sores in the first week postpartum.
- Describe reasons why a term infant does not transfer milk sufficiently postpartum
- Outline early postpartum management of overproduction

The Parent with Nipple Pain

Elliot is a transgender male, 5 days postpartum who reports bilateral nipple pain. He gave birth to his first child Mimi at 38 5/7 weeks gest, BW 8 lb 3 oz (3714 g).

Pregnancy was uncomplicated.

His noted enlargement of his mammary tissue during pregnancy.

L&D were uncomplicated, natural delivery.

Mimi chestfed immediately after birth, & regularly during the hospitalization. The nurses were not concerned with how latch appeared.

Elliot developed nipple sores by 24 hours, and the sores have not healed.

He and Mimi have continued to chestfeed regularly.

What Else do You Want to Know About the History?

Father

- Chest fullness/heaviness
- Frequency/duration of feeds
- Describe the pain
  - Just during latch or thru feed?
  - Is it improving?
  - Deep breast pain/tenderness?
  - Fever, breast redness, swelling?
  - Engorgement?

Infant

Infant feeding behavior
- Sleepy, vigorous

- Any concerns re TT in the hospital?
- Does the baby prefer 1 side?

What Would You Look for On Exam?

- Father
  - Breast exam
    - Breast fullness, redness, masses
    - Nipple size/shape
    - Nipple wounds- location, signs of infection
- Infant
  - Tone- low or high
  - Oral exam
    - Submucosal cleft/cleft
    - Tongue tie
  - Torticollis
  - Nasal congestion

Breastfeeding Exam

- Positioning
- Latch

More Details on the Dyad

- History on Dad
  - Healthy with no signif PMH
  - No history of top surgery
  - He describes pain with latch, improves somewhat during feeding. The pain was the worst on days 3-4 pp, today it is slightly improved.
  - No chest redness, swelling, and no oozing from the nipple wounds.
  - He states that his chest feels full/tight.
- History on Infant
  - No concerns, no comments about tongue tie in the hospital. Someone mentioned lip tie.
- Exam of Dyad
  - Today the infant is 7 lb 14 oz (3572 grams), down 4% from BW
  - The baby's tone is normal, no torticollis, no tongue tie on exam
  - The mammary tissue is firm and taut bilat. Nipple sores are at the nipple/areolar junction bilat
  - Dad hold him in football hold, and does not latch in an asymmetric fashion

What Are Your Management Suggestions?

- Asymmetric latch
- Hold close to the chest
- Express some milk to soften areola before latching
- Reverse pressure softening
- Lymphatic massage
- Cold after feeding, warm compresses before feeding
- Moist wound healing

The Non-Gaining Neonate

- Madeline is a 24yo G1P1 who gave birth to her son Maverick at 38 3/7 weeks gestation, birth weight 7 lb 1 oz (3203 grams). They are seeing you back for a weight check on day 7.
- Pregnancy was unremarkable until diagnosed with gestation HBP at her prenatal visit, so hospitalized and induced at 38 2/7 weeks.
- VD without complications
- Maverick nursed immediately after birth, and then was a little hard to wake up in the hospital. They continued to nurse as often as possible

Maverick's Weights

Birth Weight	7 lb 1 oz = 3203 g
Day 2 at discharge	6 lb 13 oz = 3090g (-3.5%). Advised to nurse ad lib at discharge
Day 4 in the office	6 lb 5 oz = 2863g (-10.6%). Mom reported breast fullness, Maverick was being woken to nurse every 3 hours, no changes. Recheck in 2 days
Day 6	6 lb 3 oz =2806g (-12.3%). Mom is surprised by drop in weight. Stooling 4 times a day, yellow. 5 wet diapers a day. She wakes him up to feed, and he feeds for 15 min on each side every 3 hours He seems content. She once pumped after nursing due to fullness and expressed 180 ml

What Else Would You Ask About History?

Mother

- PMH
- Meds
- HPI
  - Any nipple pain?
  - Does she have constant fullness?

Infant

Infant feeding behavior

- Sleepy, vigorous
- Fever, illness symptoms

What Will You Look for On Exam?

- Breast exam
  - Do breasts appear normal in size/contour
  - Are nipples too large for the infant's mouth
- Infant exam
  - Check for barriers to successful nursing
  - Oral restriction
  - Sleepiness
  - Inability to create a vacuum
  - Oro-boobular disproportion
  - Low tone
  - High tone/tight jaw
  - Torticollis
- Breastfeeding Exam
  - Positioning
  - Latch
  - Infant behavior at the breast

More Details on Madeline and Maverick, based on Day 6 visit

- Madeline takes no regular medication, no drugs/alcohol
- On exam the breasts are full, normal size
- The baby's mouth exam and oromotor exam are normal
- Maverick is sleepy, and is hard to wake up to nurse
- As soon as he is put to the breast, he seems to fall asleep
- He nursed in the office for 40 min and transferred 35 ml

What is Your Management Plan?

- Maverick needs more calories
  - When at the breast, switch nurse to keep him swallowing
  - Undress, stimulate
  - Breast compressions
  - Supplement pc after nursing
- Decrease # of feeds at the breast
  - Pump and feed an alternative way- bottle or possibly cup
- Gradually add more feeds at the breast when he no longer needs supplementation when nursing

The Mother with a History of High Milk Production

- Veronica is a 34 yo G3P3 who gave birth to Edwin at 39 5/7 weeks, BW 8 lb 9 oz (3883g) via NSVD, no complications. You are seeing the dyad on day 3 postpartum in the office for a routine followup.
- Edwin nursed like a champ in the hospital.
- Veronica reports that her breasts feel like watermelons. Her breasts felt much heavier by 24 hours postpartum. Edwin is nursing on 1 side every 2.5 hours, and spits up often. Veronica has been using the Haakaa on the other side while nursing Edwin because she feels so full. She expresses 60 ml from the other side while he nurses.
- Veronica expresses concern because she has a history of high milk production with her first 2 children. She developed mastitis several times with her second child, starting at 2 weeks postpartum. She thought that if she used the Haakaa to prevent overfullness she would avoid mastitis.

More Details

- Veronica is otherwise healthy, no medications, illnesses, tobacco
- Edwin looks terrific, blissfully well fed, no jaundice- weight is 8 lb 9 oz (3883g), so back to birthwt.
- Edwin latches on to Veronica's very full breast, chokes with swallowing, nurses for 5 minutes and is done. He cries, then stools immediately after nursing.

What is Your Recommended Feeding Plan?

- Block feed for 3 hour blocks
- Consider either peppermint, sage, or pseudoephedrine to decrease production
- Lymphatic massage
- Cold compresses for edema
- Wean off of Haakaa use

Conclusions

- Open sores of nipples early postpartum are due to latch/positioning issues, and require moist wound healing.
- Term babies can be as sleepy as late preterms!
- Women with a history of high production need counseling on management early postpartum to prevent plugs and infections.

Overview

- What is PMADs?
  - Definition, risk factors, diagnosis
- Relationship between PMADs and breastfeeding
- Clinical presentations of PMADs in breastfeeding mothers
- Breastfeeding grief and trauma
- Special considerations
- Treatment
- Resources
- Conclusions

PMADs: Perinatal Mood and Anxiety Disorders

- Overarching term for any mood or anxiety disorder diagnosed during pregnancy or up to one year postpartum
- At least 1 in 5 or 20% of moms experience this, likely more
  - 70% thought to downplay/hide symptoms
- **Women in childbearing years account for largest group of Americans with depression**
- **Most common complication of childbirth**

Image: Stefano Pollo, Gaynes et al Obstet and Gyn 2005, Wisner et al JAMA Psychiatry 2013, Earls et al Pediatrics 2010

PMADs

- **PMADs**
  - **P**erinatal: in pregnancy or postpartum period
  - **M**ood: depression, bipolar psychosis
  - **A**nxiety: anxiety, panic, OCD, PTSD
  - **D**isorders: interferes with daily functioning
- INCREASED RISK for developing these in the perinatal period and **symptoms have a UNIQUE PRESENTATION**

Image: Yuris Alhumaydy, Postpartum Support International

Perinatal Mood and Anxiety Disorders (PMADs)

Type	Symptoms	Onset	Prevalence
Prenatal depression or anxiety	Sadness, weepiness, lethargy, anxiety, panic, insomnia, fear of pregnancy or birth, low appetite, rumination, anger and extreme irritability, obsessive thoughts, regret	Pregnancy	13-20%
Bipolar disorders	Often first onset during postpartum period. Hypomanic, manic, or mixed moods. Euphoria or agitation, decreased need for sleep, racing thoughts, increased productivity but scattered, pressured speech. Often look like acute depression. Can present as anxious, irritable.	Pregnancy-one year pp	<20%
Depression	Overwhelmed, despair, weepiness, flat or volatile emotions, detachment and depersonalization, often with anxiety and agitation. Detachment from baby. Anger and irritability. Difficulty eating, sleeping, concentrating, taking care of oneself/family. Increased somatic symptoms.	Birth-one year pp	15-20% (60% of which have associated anxiety disorder)
Anxiety or panic disorder	Excessive anxiety and worry, often about one's health or baby's health. Difficulty controlling one's worry (ruminating, persistent thoughts). Agitation/irritability, feeling on edge. Poor concentration, easily fatigued. Increased somatic complaints. Panic: Rapid heartbeat, dread, insomnia, dizziness. Vomiting. Catastrophic interpretation of normal body sensations. Fears of going crazy, of illness, losing sight or ability to breathe. Hot/cold flashes. Fluctuates in intensity. Often no identifiable trigger.	Birth-one year pp	10%
Obsessive-Compulsive Disorder (OCD) or Intrusive Thoughts	1.5-2X greater risk for onset in perinatal period. OCD is an anxiety disorder, not a thought disorder; 60% comorbid depression. Repetitive and intrusive thoughts, fears that are troubling or abhorrent to the woman (thought does NOT = action). Anxiety about specific places or activity, ritualized avoidance or compulsive behaviors, hypervigilence (e.g. watching baby breathe). Repetitive fears about health and safety.	Birth-one year pp	5-10%
Post Traumatic Stress (PTSD)	Anxiety, panic, intrusive thoughts or flashbacks, related to a specific event (e.g. birth or past trauma). Recurrent images or nightmares, fears, ruminating, withdrawal and anger. Dissociation and depersonalization	Birth-3 months	1.5-6%
Psychosis	Early onset. Periods of delusional thought, disconnect, delirium. Delusions make sense to woman. Possible auditory or visual hallucinations, suspiciousness, withdrawal. Might deny birth or baby, or glorify. Might start as mania, with decreased desire for sleep, rapid speech, grandiose plans and ideas, cycles of extreme depressed and manic moods	Usually first two weeks	0.1-0.2%

Wendy Davis, PhD
wdavis@postpartum.net/503-246-0941; www.postpartum.net

Baby Blues

- 60-80% new moms
- First two weeks
- NOT a mild form of depression
  - Hormonal fluctuation at birth, sleep deprivation
- **Self esteem unchanged**
- Labile, teary, but predominantly happy
- Exhausted but rest restorative

Image: Hermes Rivera, Degner BMJ 2017

Risk factors include, but not limited to …

- Genetics
  - Personal history of depression or anxiety
  - Family history
    - 30-50% inheritance
  - Variation in sensitivity to sleep deprivation
  - Medical issues
    - Diabetes (35% more common), thyroid, infertility, other endocrine
- Biological sensitivity to hormonal changes
  - History of PMS, PMDD
  - Mood changes with contraception/fertility treatment
  - Abrupt cessation breastfeeding

Image: Arif Riyanto. Postpartum Support International, NIH Institute of Mental Health, Freeman 2011 Miller ES 2016, Hynan et al 2015, Wenze et al 2015, Tzilos et al 2012, Gavin et al 2011, Tarney et al 2015, Levinson 2006, Segre et al 2009

Risk factors include but not limited to …

- Psychological
  - Adjustment to new roles/responsibilities
  - "Old" versus "new self"
  - Perfectionism/need for control
  - Difficulty with adversity, lack confidence in ability to cope
- Social/environmental
  - Teen pregnancy
    - 60% depression rate
  - Traumatic birth
  - Multiples
  - History of abuse
  - Domestic violence
  - Other intrapersonal conflict
  - Recent move/loss
  - Barriers to care/institutional racism/disability
  - Military or other deployment

Postpartum Support International, NIH Institute of Mental Health, Freeman 2011, Miller ES 2016, Hynan et al 2015, Wenze et al 2015, Tzilos et al 2012, Gavin et al 2011, Tarney et al 2015

Risk Factors: NICU

- 20-30% or higher of NICU parents experience mental health disorder in first year
  - Up to 60% endorse depression, 30% anxiety, 30% suicidal thoughts
  - PTSD 50% moms, 30% dads
  - Even after baby leaves NICU, challenges of adjusting to life at home, isolation, "fragile" infant
- Others will experience subclinical PTSD symptoms
  - Avoidance NICU visitation
  - Disturbances in attachment
  - Later impairments growth/development of child

Postpartum Support International, Hynan et al 2015, Segret et al 2014, Shelton et al 2014, Lefkowitz et al 2010, Tahirkheli et al 2014

Risk factors: social isolation

Postpartum Support International

Prevalence of Disorders

- Prenatal depression or anxiety: 13-20%
- Postpartum
  - Depression: 15-20%
    - 60% of these have associated anxiety
  - Bipolar disorders: + 20%
  - Anxiety or panic disorder: 10%
  - OCD: 5-10%
  - PTSD: 9%
  - Psychosis: 0.1-0.2%

Image: Syndey Sims. Wisner et al JAMA Psych 2013, Wenzel A 2011, Miller ES J Reprod Med 2013, Beck Birth 2011, Sit et al JWH 2006

Why?

- Rapid **drop in estrogen and progesteron**e after birth can also **decrease serotonin**
  - Mood disorders decrease across first postpartum year, which corresponds to hormones returning to baseline levels
- Baby's cry activates neural networks associated with OCD and anxiety
- Healthy maternal brain "hardwired for transient OCD"
  - 95% of mothers report symptoms consistent with this in weeks prior to delivery
- Evolutionary hypothesis is period of high alert may have helped mothers protect infants->those infants lived-> traits passed on
- **Oxytocin** promotes attachment and nourishment of newborn
  - Both depressed and non-depressed mothers have heighted vigilance
  - Elevated oxytocin levels may overstimulate mom to protect baby and keep baby safe
    - Epigenetics: altered DNA methylation in the oxytocin receptor gene may promote development of OCD

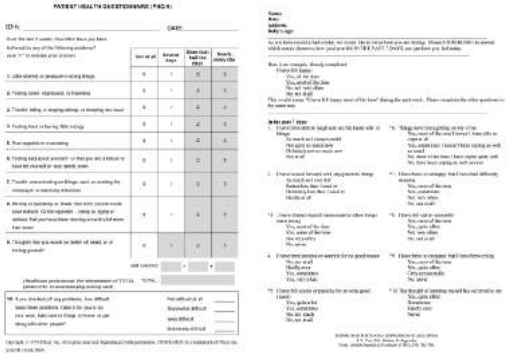
Image: Callie Gibson. Swain et al J Child Psychol and Psych 2007, Beck and Driscoll 2006, Muller et al Archives Women Maternal Health, Wenzel et al 2005, Park et al Clin Epigen 2020

Diagnosis: do screening tools address breastfeeding experiences? Not really …

- Edinburgh Postnatal Depression Scale (EPDS)
- Patient Health Questionaire (PHQ-9)
- Generalized Anxiety Disorder (GAD-7 Scale)
- Postnatal Depression Scale
- Informal: PSI Perinatal Mental Health Discussion Tools

Image: Callie Gibson

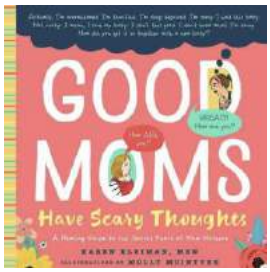
EPDS most validated tool, 60 different languages

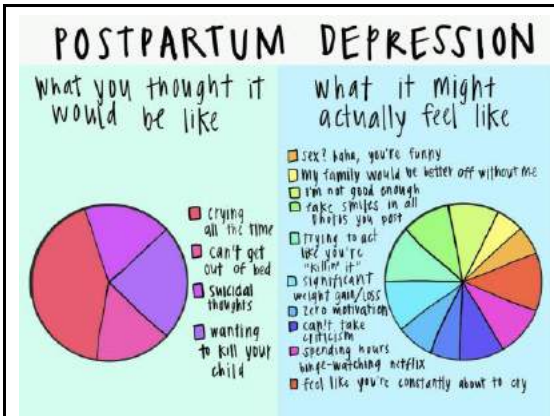


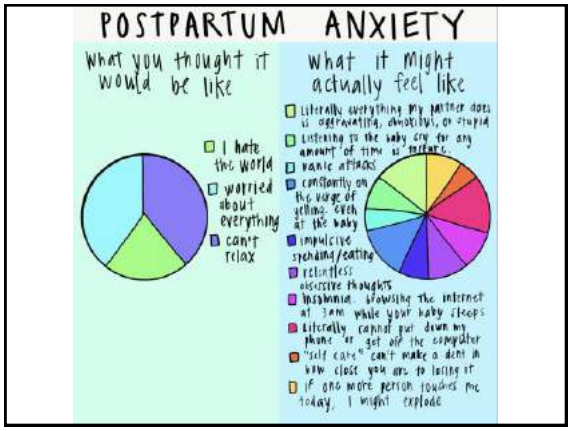
PHQ 9 next most commonly used

Infographics may be more relatable, but **breastfeeding still not represented…**

These kind of specifics about thoughts/behaviors may help most in general identification of PMADS …







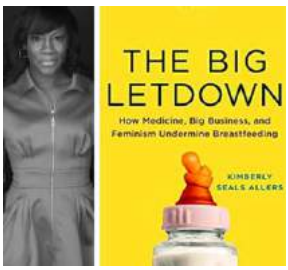
Relationship between breastfeeding and PMADs

- Breastfeeding protective against PMADs
  - Reduces inflammation, stress hormone response
  - Higher prolactin levels = deeper slow wave sleep
  - Breastfeeding moms report lower stress, higher happiness
  - When stressed, do not experience lower immune function
  - If going well, breastfeeding associated with pride and achievement

Image: Louiza Braun. Wouk et al Maternal Child Health Journal 2017, Dennis et al Acta Paediatrica 2007, Ystrom E 2012, Grzeskowiak et al 2014, Kendall-Tackett, Cong and Hale 2011, Hahn-Holbrook, Haselton , Schetter and Glynn 2013, Bascom and Napolitano 2016, Handlin et al 2009, Blyton D et al 2002, Cong Z et al 2011, Kendall Tackett 2007

Relationship between breastfeeding and PMADs: Breastfeeding as healing

- "It has nothing to do with nutrition, everything to do with everything else"
- Can be healing after traumatic birth/pregnancy
  - "Breastfeeding helped me see myself in a different, more powerful way"
  - Eye synchronicity (deep gazing between mom and baby) can rewire trauma connections in the brain
- Healing after abuse
  - Reclaiming breasts as nourishing organ rather than sexual; depression less common in survivors who were breastfeeding
- Reversing narratives of slavery
- "Reclaiming bodies from oversexualized hip hop culture"



Amy Brown 2019, Seals Allers

Relationship between breastfeeding and PMADs

- Postpartum depression = higher risk of breastfeeding cessation
  - Depression lowers prolactin and oxytocin, hormones integral to lactation
- Breastfeeding complications increase risk of PMADs
  - Persistent pain, baby that won't latch, milk supply that will not increase, mastitis and nipple trauma, simply overwhelmed by things being too difficult
- Prenatal anxiety/depression: more likely to stop breastfeeding before six months pp
  - Then experience a greater increase in anxiety/depression
- **Mothers with depression and treated with medication fed with human milk for longer durations than with untreated depression**

Image: Mehmet Turgut Kirkgoz. Wouk et al Maternal Child Health Journal 2017, Dennis et al Acta Paediatrica 2007, Ystrom E 2012, Grzeskowiak et al 2014, Kendall-Tackett, Cong and Hale 2011, Hahn-Holbrook, Haselton , Schetter and Glynn 2013, Bascom and Napolitano 2016, Handlin et al 2009, Blyton D et al 2002, Cong Z et al 2011, Kendall Tackett 2007

Relationship between breastfeeding and PMADs

- If a woman stops breastfeeding because of pain, physical difficulty, or lack of support, her risk for depression is higher
  - **How ready mom felt to stop breastfeeding predicts her risk of depression**
- One study in UK showed up to 90% of women not ready to stop breastfeeding when stopped

Image: Milada Vigerova.. Amy Brown 2019, McAndrew F et al 2012

Stopping breastfeeding doesn't make other postpartum challenges go away

"When women turned to others for help, breastfeeding was blamed. If they stopped breastfeeding, it would all be ok. They'd feel less overwhelmed. Their mental health challenges would disappear. Apparently all their difficulties were down to breastfeeding and once that was out of the way, they would be fine. Of course, not much changed when they stopped. **The reason why so many women were so overwhelmed in the first place is they didn't have support circles around them. Their baby still needed feeding and settling to sleep, and now they had lost the mothering tool of being able to feed a fractious baby."**

Image: Christopher Campbell, Amy Brown 2019

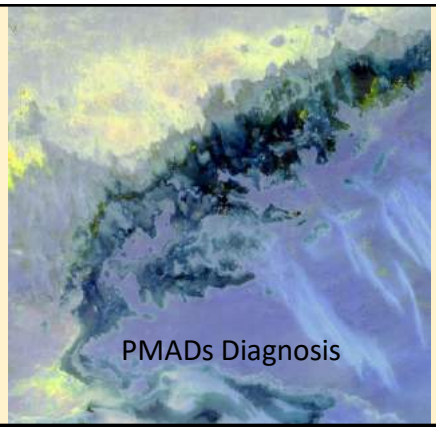


Image: USGS

What are challenges with diagnosis & how can lactation providers help?

- Screening tools may not be widely used
- Screening tools may not identify all who are suffering
  - Focus is often on depression screening rather than anxiety and other comorbidities/diagnoses
- Ob/gyn six week postpartum visit short and peds visits often not focused on mom
  - AAP screens 1, 2, 4, and 6 month visits
    - 60% feel they should identify, but only 30% feel confident
  - Major depression peaks six weeks pp, minor 2-3 months and 6 months
  - FP repeated at 6, 12 months
  - ACOG screen once during perinatal period
- **Lactation consults often lengthy/behaviors can be explored**
  - **Support/listening can be very helpful while awaiting formal therapy**

ACOG Committee Opinion 757, Earls et al Pediatrics 2019, Larsen 2014, Seehusen et al 2005

Challenges to diagnosis

- Tendency to remain silent for long periods of time
- More likely to report to husband/mother than healthcare provider
- Would first tell ob/gyn rather than pediatrician
  - Increased intimacy after pregnancy/childbirth
  - Felt within confines of ob/gyn specialty
  - Feared being judged by pediatrician as unfit to be mother
    - Women go to great lengths to give pediatrician impression they are feeling fine

Image: Claudia Wolff, Kleiman 2008

Mothers hesitant to make negative feelings known to others

- 5 of 6 mothers in one study hesitated to reveal their symptoms
- Believed symptoms reflected inability to cope as mothers
  - Shame, guilt, good mothers don't have these thoughts
- Feared babies would be taken away, mom locked up
- In another study, 90% of moms knew something was wrong but only 1/3 believed they had PPD
- Over 80% had not reported symptoms to healthcare provider
- Ambiguity of symptoms
  - Fatigue, loss of libido, moodiness, weepiness, changes in weight, sleep disturbance, low energy can also be normal expectation for postpartum adjustment

Image: Anthony Tran. Whitton et al 1996, Edwards and Timmons 2005, Kleiman 2008

Limitations of healthcare providers

- Limited time and **"distracted doctoring"**
- Unaware of how common experience is
- Presume "scary thoughts" associated with severe illness
- Unsure how to proceed with positive response
  - May panic
  - **Need to remain calm if mom reveals "scary thoughts"**
- Focused on physical recovery from childbirth
- See it as someone else's responsibility

Image: NCI, Kleiman and Wenzel 2012

PSI recommendations for screening

- First prenatal
- At least once 2nd trimester
- At least once 3rd trimester
- Six week ob/gyn visit
- Repeated at ob/gyn or PCP 6 and 12 months
- 3, 9, 12 month pediatric visits
- **Anyone who interacts with childbearing families should be screening! I.E. LACTATION providers!**
  - Identification shortens period of depression, reduce prevalence, increase treatment response

O'Connor et al 2016, van der Zee at al 2017

You often can't find breastfeeding solutions until you find PMADs solutions …

PMADs and breastfeeding language and behavior

- Broad anxiety themes
- Extensive focus on possible baby pathology
- Language and behavior around breastmilk itself
- Somatic complaints about breast
- Language/facial expression/body language
- Doctor/LC shopping/internet searching

Broad themes: Anxiety and Lactation

- PPD often a highly agitated depression
  - Anxiety first on complaints with PPD
    - Insomnia, agitation, irritability
  - Depression symptoms 10th on list
- Intolerance of uncertainty
  - Must know the answer
    - "**When will this lactation problem resolve**"
- Inaccurate beliefs
  - Feel that hyperalert state prevents problem
    - **Hypervigilence about pumping**
- Poor problem orientation
  - Lack confidence in problem-solving and therefore engage in extensive e.g. **internet research**

Dalton 1996, Dugas et al 1996, Image Karen Kleiman

Pathologizing baby

- Moms suffering from PMADs tend to perceive babies as "fussier"
  - Perceive baby's behavior as more disruptive or harder to tolerate
  - ?Expression of dissonance/ambivalence towards motherhood/baby
  - Reactive babies may have predisposition to anxiety as adults
- Patients may own a scale and conduct repeated weighted feeds despite adequate gain
  - Engaging in these rituals can prevent habituation to anxiety
- Unrealistic expectations
  - Sleep patterns/schedule
    - Overfeeding baby to attempt to induce sleep
  - Infant feeding patterns
    - Extreme detail

Image: Sergiu Valenas. VilEdhborg et al 2000, Kleiman and Wenzel 2012, Petzoldt et al Child Care Health Dev 2016, Hiscock Arch Dis Child 2014, Kagan and Snidman 2009

Excessive focus on baby breastfeeding "technique"

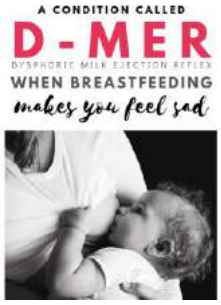
- Persistent concern over latch
- No pain, no trauma, adequate baby weight gain: explore further why mom is feeling this way
  - If pain, see next few slides …

Somatic Complaints

- Postpartum women more likely to express somatic complaints than use the term "depression"
- Perception of breast fullness, whether real or not
- Alternatively, worrying about breast being too empty
  - "Too soft" if engorgement has been successfully reduced
  - Not nursing to comfort baby because worried about "having enough for next feed"
- "I just can't letdown"

Image: Twila Miles
Hamilton Rating Scale for Depression; Ross et al Archives Women's Mental Health 2003

DMER



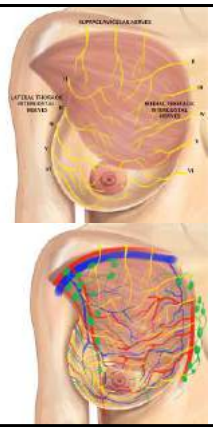
- Dopamine drop prior to prolactin/oxytocin rise for milk ejection reflex
- Prevalence 9%
- Despondent, anxiety, agitation variations
- Symptoms occur prior to MER and resolve after
- DMERs not postpartum depression, but ? comorbidity

Ureno et al BF Med 2019

Image: Syndey Sims

Breast and nipple pain during lactation - why?

- The lactating breast is an extremely complex organ
  - Complex innervation
  - Highly vascular
  - Congested lymphatics
  - Myoepithelial cells
- Deep pain radiates to nipple, nipple radiates deeply
- Physical/medical reasons
  - ENGORGEMENT, dermatitis, vasospasm, blebs, subacute mastitis, trauma, etc



Berens et al 2016, Kristensen et al 2018

Breast growth & dependent edema

- If symmetric, bilateral
  - Reassurance
  - Supportive bra
  - PT
  - Lymphatic massage

Breast and nipple functional pain

- If all else ruled out, address possibility of PMADs
  - Particularly stress associated with exclusive pumping
- Pharm approaches for functional pain
  - **SSRIs (e.g. Zoloft)**
  - Cetirizine 10mg QD
  - Propranolol 20-80mg BID-TID (??!)
  - ? Neurontin (600 mg TID?!!)

Kristensen et al 2016, Muddana et al 2018

Is pain the chicken or the egg?

- Women who stop breastfeeding because of pain have markedly increased risk PPD
- Decreased pain threshold in depression
- In all populations, chronic pain increases risk for depression
- "Pain is not just painful … it's exhausting, demoralizing, and depressing"

Image: Engin Akyurt. Urits et al Current Pain and Headache Reports 2019, McClellan et al JHL 2012, Brown A Journal Advanced Nursing 2012, Brown 2019

Perinatal OCD

- Do not need to experience both obsessions and compulsions
  - Obsession: Recurrent and persistent thoughts
    - **E.g. persistent fears of mastitis/plugging**
  - Compulsion: Repetitive behaviors that individual feels driven to perform in response to obsession; behaviors aimed at preventing/reducing anxiety
    - **E.g. pumping around the clock to "reduce the risk"**
- Typically have one of seven types of obsessive thoughts mostly **related to the baby**
  - Suffocation or SIDS
  - Thoughts of accidents
  - Ideas or urges of intentional harm
  - Thoughts of losing the baby
  - Illness
  - Unacceptable sexual thoughts
  - Contamination
    - Not just germs; also e.g. medication side

Image: Christian Newman. Sichel et al 1993, Abramowitz et al 2003 Uguz et al 2007, Oguz 2011, Miller 2013, Abramowitz 2010

OCD and breastmilk

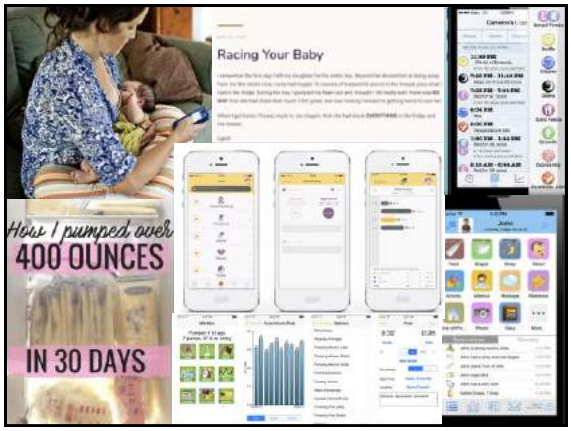
- Building a "freezer stash" that exceeds infant needs
- Fear of "losing supply"
- Setting alarm to wake up multiple times to pump overnight
- Pumping constantly "to empty to prevent mastitis/plugging"

Oguz 2011, Miller 2013

Exclusive Pumping

- Can become excessively focused on volume
- Apps, Facebook, forums: online comparisons
- "Mama bear" oxytocin to protect/feed disconnected from oxytocin of baby's touch
- Many exclusive pumping moms have or had baby in NICU, which additionally increases stress/anxiety about infant health and ability to protect

Hynan et al 2015, Segret et al 2014, Shelton et al 2014, Lefkowitz et al 2010, Tahirkheli et al 2014



Language

- It's just so hard
- I'm so exhausted
- DESPERATE
- When will this be better
- I just can't take this another day
- I need to know when this will be better
- If I just can get _____ right, then it will be better (then a new concern may develop)
- I just feel so anxious about _____

Image: Anh Nguyen

"You can't tell by looking"
(or can you? "Screening doesn't substitute for clinical judgment")
Body language and facial expression

Image: Engan Akyurt

Even with a mask …

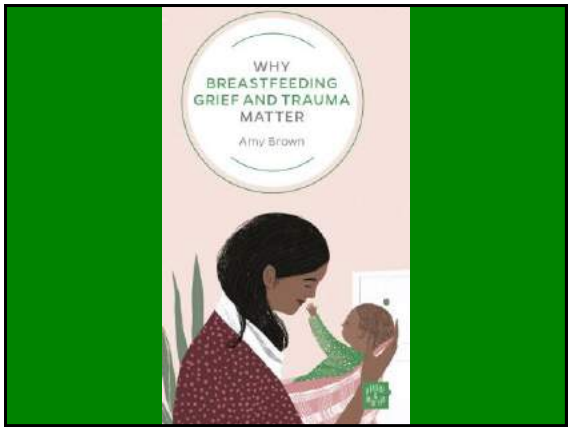
Other social/behavioral …

- Disconnect from baby
- Splitting
  - It's all good or all bad, breastfeeding must be perfect or mother has failed
- Have done extensive internet research and patient is CERTAIN the issue is e.g. "yeast" or "tongue tie"
- Repeated self-diagnosis
  - Wanting a specific prescription without evaluation
- Doubtful of medical recommendations, fearful about side effects or behavioral changes like stopping pumping

Image: Christopher Ott

Repeated self-diagnosis/self-rx

- See these patients **in person** and do physical exam +/- imaging and refer to physician or other medical provider
- Extremely hard to address mental health via the phone
- **Very often, there's no physical issue**
  - **e.g. this image represents early postpartum engorgement, not mastitis**



Cultural expectations

- Africa
  - Breastfeeding baby sign a mom is a good and faithful wife
  - Baby that can't breastfeed identifies mom as someone who wasn't faithful to father
    - Father may divorce mother
- Hinduism/Ayurvedic teach breastfeeding promotes longevity
- Islam: Koran describes breastfeeding for two years
- Christian imagery: calming, love, security

Amy Brown 2019

What happens when breastfeeding stops too early

- Sadness, grief, shame, anxiety, concern about harm to baby
  - Grief for loss of mother they thought they were going to be; Breastfeeding part of maternal identity/mothering
- Robbed, defeated, broken, traumatized, devastated, exhausted
  - "I was completely emotionally destroyed by the experience and spent months in a black hole"
- Shocked – why hadn't anyone warned me?
- Failure
  - "I felt especially like I was failing after we were readmitted for weight loss and he was basically starving"
- Feeling letdown/anger at everything that let them down (professionals, system, their bodies)
  - "I felt such anger at constant breastfeeding campaigns when there was such poor practical support available for those who really wanted to breastfeed"
- Envy and jealousy of those who can breastfeed; avoiding friendships
- Lasting regret
- Perceived judgment and feeling inadequate

Photo: Ian. Amy Brown, 2019, Lee Health Risk and Society 2004

Why is the grief so strong?

- Physiological
  - "Feeding is fundamental. If you can't that right, you feel like a failure."
- Timing
  - "Feeding your baby is the ultimate first guilt you feel as a parent."
- Expectation
  - "As a middle aged, middle-class woman, the expectation was that I would breastfeed."
- Lack of choice
  - "In other areas, not following suggested advice has been my choice. With regards to breastfeeding, the choice was taken out of my hands, making me helpless."
- Tied to identity
  - "Seen as natural, and if you can't do it, you're not a good mother."
- Desire
  - "I really wanted to do it."
- Omnipresence
  - "In that first six months, when feeding is everything, it's everywhere."
- Others' reactions
  - "You feel judged."

Image: Ben White. Amy Brown 2019

Breastfeeding trauma

- Overwhelming emotion; results from event/series of events experienced by individual as physically or emotionally harmful and has lasting adverse effects on individual's functioning or well-being
  - If we feel we are responsible, embeds trauma more deeply
- Physically painful complications
  - Abscesses, bleeding nipples
- Emotional
  - Continuing to put baby to breast with no milk over and over again
  - Hospital readmission
  - Giving formula, but being concerned about impact on baby's health
    - Giving bottle frequent visual reminder of failure

Image: Kunj Parekh. Amy Brown 2019

PTSD symptoms

- Intrusion
  - "I have a regular dream where I'm back in the hospital and trying to get support for my dehydrated baby, and I can't … each time I fail to get help, my baby shrinks more. I always wake up right before he disappears."
- Avoidance
  - Blocking friends, Facebook groups, mother's groups
- Negative emotions
  - "I hate myself and think I am not a good enough mother. Nothing anyone says or does can change the fact that I failed."
- Activation
  - Anger, irritability, fighting with friends/family, preoccupied

Image: Logan Fisher

How to help

- VALIDATE and LISTEN, avoid advice
- Ask open-ended questions
  - What does she want, what does she want with baby?
- Let her grieve, let her be angry
  - Everyone's experience is different with loss, no one right way to feel or act
- For moms:
  - Recognize how normal your feelings are, understand you're not alone, be kind to yourself, talk to someone, take care of self/get outside
- Help mom find resources she needs
  - MD, support groups

Hypolactation/not enough milk

- Unfortunately, very little research to understand hypolactation
- Interventions can worsen depression
  - Breastfeeding difficulties stressful and timing consuming
  - Triple feeding around the clock
  - Metoclopramide (Reglan) increases depression risk 7X
- Supporting decision to wean, "permission to stop"
  - "It almost made me resent the baby that he wouldn't do the thing everyone said should come naturally and should be easy. I began to dread feeding him and in between feeds, I would begin worrying about the next feed."

Image: Kat J. Brown 2019, Hale, Kendall-Tackett, Cong 2018

Additional Considerations

Image: Brian Kyed

Multiple populations at risk

- Close to 20% dads will experience anxiety disorder
- 10% dads will experience depression
  - Peaks 3-6 months postpartum
  - Maternal depression greatest risk factor, even beyond father's personal history
  - More likely to self-isolate/"check out", be irritable/aggressive than sad
  - Distractions and habits
- Miscarriages/stillbirths/abortions/ infant death
  - Increased risk for PTSD, OCD, anxiety
- Single parents
- Sexual/gender minorities
  - Increased risk PMADs, suicidal attempts with lesbian women

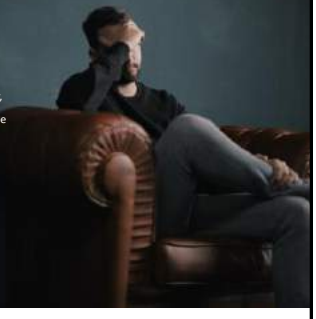


Image: Nik Shuliahan, Leach et al 2016, Geller et al 2004

Birth PTSD

- Individual experience
  - Objective criteria do not determine whether event is traumatic; subjective emotional experience/how helpless/frightened you felt
- Prevalence
  - 12% of all women; 9% postpartum (34% report traumatic birth)
  - **Estrogen/progesterone enhance social cognition and so women are able to detect subtle emotions (e.g. concern from ob/gyn, midwife during labor)**
- Stressor
  - Actual or threatened injury during birth
    - Hemorrhage, prematurity, severe preeclampsia, severe lacerations, long labor, shoulder dystocia, unexpected NICU/baby anomaly, failed pain medication
  - Perception lack of caring, poor communication, powerlessness, betrayal by MD or staff
- Symptoms
  - Intrusion/reexperience
    - Flashbacks, nightmares, somatic complaints
  - Avoidance/numbing
    - Social withdrawal, apathy, emotional numbing
  - Cognitive negativity
    - Depression, irritability, hopelessness, blaming self or others, diminished pleasure
  - Arousal
    - Sleep disturbance, aggression, hypervigilance, poor concentration

Wenzel 2011; Beck, Driscoll, Watson 2013

Postpartum Psychosis

- Medical emergency
  - 5% will commit suicide, 5% infanticide
- Risk factors
  - Previous psych illness, family history, discontinuation of meds, sleep deprivation
- Usually first two weeks after birth
- Disoriented, hyperactive, distant, elated, labile, hallucinations, disorganized/flight of ideas
- As compared with "scary thoughts" in OCD, where thoughts do NOT = action, psychosis is egosyntonic
  - Psychosis: person does not recognize thoughts as unhealthy
  - No insight about distortion of thoughts
- **Good is sleep is essential for prevention and treatment**

Brockington 2017, Monzon 2014, Bergink 2012

PMADs: May be persistent

- At any point between 4 months and three years postpartum, 30% of moms still meet criteria for depression
- 50% in clinical samples

Image: Christian Palmer, Milanen et al Harvard Review Psych 2016

Risks of Untreated PMADs

- Relationship problems
  - Separation/divorce/IPV
- Poor adherence to medical care
- Financial
  - Missed work, disability, unemployment
- Child neglect/abuse
- Developmental delays in children
- Tobacco, alcohol, drug use
- Infanticide/homicide/ suicide

Image: Kat J. Postpartum Support International, Kendig et al Obstet Gynecol 2019

Economic cost

- Maternal health care costs associated with depression are 90% higher than comparison groups
  - Mental health services/ER visits
- Worker absence/lost productivity $44 billion per year and $12.4 billion in health care costs

Image: Brooke Cagle. Dagher et al J occup Environ Med 2012, Ross et al J Clin Psych 2006

Treatment

Medications: "put out fire before rewiring"

SSRI	Dosing	Notes	Reported possible infant effects
Sertraline (Zoloft)	50-200+mg	More stimulating, take in morning. Most common peripartum med, older/most data, lowest transfer into breastmilk. Diarrhea/nausea/headache initially	Transient agitation, benign sleep myoclonus
Paroxetine (Paxil)	10-40+ mg	Slowing, take at night. May be better for significant anxiety/OCD. Shorter half life, may have more withdrawal symptoms	Agitation, irritability, difficulty feeding, constipation, SIADH
Fluoxetine (Prozac)	20-80+ mg	Moderate slowing. Longest half-life, least withdrawal symptoms if missed dose. Highest transfer into breastmilk (1.5-14% relative infant dose) but no data showing negative effects on infants	Irritability, GI (vomiting, diarrhea), tremor, somnolence, decreased weight gain, reduced nursing, grunting
Escitalopram (Lexapro)	10-20+ mg	Not as activating, may work faster than other SSRI.	Enterocolitis
Citalopram (Celexa)	20-40+ mg	EKG above 40 mg, risk of prolonged QTC	Drowsiness, irritability, restlessness
Fluvoxamine (Luvox)	100-300 mg	Dose at bedtime, use for OCD. Not for anxiety/depression	
Atypical: Buproprion (Wellbutrin)	100-300 mg	Works on dopamine/norepinephrine. Highly stimulating, may exacerbate anxiety/insomnia considerably and not ideal in PMADs.	Seizures

*SSRI aside from Fluoxetine have 0.4-7.9% relative infant dose (< 10% acceptable)

Sleep/anxiolytics (careful with bedsharing)

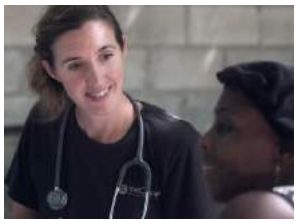
Medication	Dosing	Notes	Reported possible infant effects
Trazodone	50-200 mg	No addictive potential, may cause morning grogginess	
Mirtazapine (Remeron)	7.5-15 mg for sleep	Inverse relationship between dose and sedation; can also help relieve nausea	More rapid weight gain, earlier sleeping through the night
TCAs (Nortriptyline)	25-75 mg		
Benzodiazepines • Clonazepam (Klonopin) • Lorazepam (Ativan)	0.25-2.0 mg	Avoid alprazolam (Xanax) for short half life and rebound anxiety. Brief dosings of benzodiazepines can be helpful for anxiety/insomnia with starting SSRI	Sedation is main side effect in younger infants, < 2% report issues. Infant receives 2.5% of mother's clonazepam, diazepam 3.0 %, alprazolam 3.0%, lorazepam 8.5%
Zolpidem (Ambien)	5-10 mg	Rapid onset of action, sleep walking/eating	
Antihistamines • Diphenhydramine (Benadryl) • Doxylamine (Unisom) • Hydroxyzine (Vistaril)	25-50 mg	Can reduce milk production in lower supply. Grogginess, not ideal in untreated depression/anxiety	
Quetiapine (Seroquel)	25-100 mg	Lower doses for insomnia/anxiety, 100+ for psychotic disorders	
Buspirone (Buspar)	5-60 mg/day	Can dose BID-TID. Limited pregnancy/lactation data. No abuse potential.	

Additional (not first line)

- SNRI
  - Venlafaxine (Effexor), duloxatine (Cymbalta)
- Atypicals
  - Buproprion (Wellbutrin)
    - Stimulating, do not use in seizures/eating disorders
  - Mirtazapine (Remeron) 15-60 mg
    - Lower doses: sedating. Appetite stimulation
  - Vortioxetine (Trintellix)
- TCAs (tricyclic antidepressants)
  - Notriptyline, amitriptyline (insomnia)
  - Easy to overdose, levels required
- MAOIs (monoamine oxidase inhibitors)
- Bipolar/Psychosis
  - Lithium, antipsychotics, antiepties
- Brexanolone/Zulresso
  - Modulator of GABAA receptors
  - IV over 60 hours requiring hospital stay; effective within 24 hours

Image: Paola Chaaya. Postpartum Support International

Frequent patient questions …



- Discuss with moms about warning labels on meds, what pharmacist may say
  - OCD/contamination fears = increased worry about "side effects" or "risk of drug"
- Remain on medication 6-9 months
  - Neuroreceptors need this time to re-set
- Medication isn't meant to change your personality or make you a "zombie" – it's meant to help you feel more like yourself
- SSRIs may cause transient nausea, diarrhea, headache 4-10 days, resolving
- SSRIs are not addictive, they support your ability to maintain wellness
- If a patient is already on a medication, should you change it? No (unless risk outweighs benefit)

Image: Zach Vessels. Postpartum Support International

Medication concern and risk of untreated PMADs

- "Exposure always occurs, be it to a treatment or illness"
- "When a psychiatric condition necessitates pharmacotherapy, the benefits of such a therapy outweigh the potential minimal risks"
  - Untreated depression/stress = SGA, LBW, PTL
    - **Increased cortisol, decreased growth hormone**
  - **"Treat to remission" or else you have two exposures (drug plus inadequately treated PMADs)**
- Consider epigenetics
  - Biological mechanism through which environment of relationships, physical, chemical and built environments and early nutrition cause physiological adaptations and disruptions that influence a lifetime of well-being

Image: Sharon McClutcheon. Stowe et al 2001, Karen and Nordeng 2012, Wisner et al 2009, Class et al 2011, Kanherkar 2014

Non-pharmacologic

- Counseling
  - First-line intervention for mild/moderate distress
- Social support
  - Lower rates PPD with communities that provide support
- Wellness
  - Yoga, meditation, exercise, massage, healthy eating
- SLEEP
  - Medications will not work without sleep, moms will not improve without sleep

Image: Bady Abas. Rosenthal et al 1999, O'Hara 1995, Okum ML et al 2011, Rute de Paive, 2019, Dimidjian Clinical Obs and Gyn 2009

Recovery and Lactation Provider Support

- Recovery strongly tied to mom's belief to take control and be successful. If she believes she will be successful, she will be more likely to succeed

Kinnier et al 2009

Treat underlying conditions

- Thyroid
- Anemia
- Diabetes
- Psychosocial and economic issues

Image: Creators Collective. Miller ES et al 2016

Resources

- Postpartum Support International (PSI)
  - postpartum.net (great bookstore, too)
- 2020 Mom
  - 2020mom.org
- The Blue Dot Project
  - thebluedotproject.org
- The Postpartum Stress Center
  - postpartumstress.com
- Hopeful Mama
  - hopefulmama.com
- National Suicide Prevention Hotline
  - suicidepreventionlifeline.org
- Substance Abuse and Mental Health Treatment Hotline
  - samhsa.gov
- Proyecto Mama
  - proyectomamamke.com
- Maternal Mental Health Leadership Alliance
  - mmhla.org

Conclusions

- PMADs is COMMON and often missed
- Screens/short MD visits may miss issues or focus on depression rather than anxiety
- LC/peer counselors have opportunity to explore in language/behavior of breastfeeding
- Ability to support breastfeeding grief/trauma

Breastfeeding the Infant with Health Problems

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IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

1

Conflicts of Interest

Objectives

- Understand the pros and cons of breastfeeding a child in some respiratory distress
- Identify 3 challenges the breastfeeding dyad faces when a child has significant health problems
- Describe management of breastfeeding for infants with chylothorax

The challenges of medically complex breastfed children and their families: A systematic review

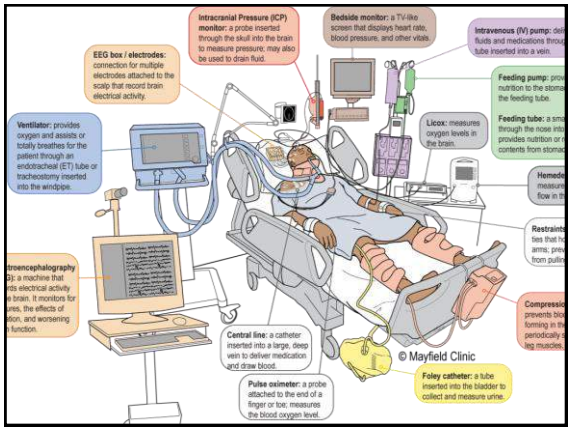
- 11 studies
  - eight qualitative
  - three mixed-methods studies
- All the studies explored the impact on breastfeeding of illness, disability or congenital abnormalities
- 7 themes

Matern Child Nutr. 2021 May 6

Challenges

- Practical and psychological impact of infant hospitalization on the parent
- The impact of infant acute critical illness, chronic condition or instability affecting infant ability to effectively breastfeed
- The availability of specialized lactation support in the hospital pediatric setting
- The support, training and attitudes of healthcare professionals
- The necessity and availability of specialized equipment or resources

Matern Child Nutr. 2021 May 6



Issues

What are some of the issues and barriers that affect the feeding plan of a critically ill infant?

- PICU environment
- Multiple interventions
- No circadian rhythm
- Distance / lack of positive physical contact
- Stress
- Respiratory failure / support / hypoxia
- Circulatory failure / support / low cardiac output
- Multiple tubes, lines and monitors
- Pain / Sedation
- Inflammation / Fluid overload, third spacing / renal insufficiency / failure
- Infection / sepsis
- FTT / high metabolic demand

Recommendations

What shall and what can we do to support lactation in this setting?

Talking with Families Who Will Deliver Early, Have Delivered Early, or Those Expecting a High-Risk Baby

Mothers of ICU Infants are at Higher Risk for Postpartum Mood and Anxiety Disorders

- Parents worry about the survival of their critically ill child
- Psychological reactions to having their newborns admitted to the ICU
- New sights, sounds and medical terminology
- Deep sadness due to separation from the baby
- Feelings of helplessness and guilt
- Loss of their expected experience of having this baby
- Mothers can also suffer from loss of the maternal role
- Maternal postpartum recovery following a high-risk pregnancy, maternal illness

Wyatt,., Shreffler, ., & Ciciolla,. 2019.

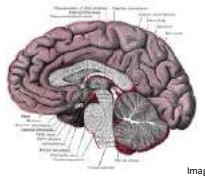
Two Parallel Paths of Work and Research

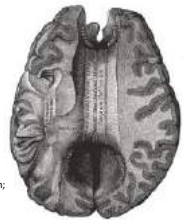
NICU and Neonatology Professionals	Breastfeeding and Lactation Professionals
Severely ill vulnerable infants	Healthy mothers and babies
Life-saving interventions	Family support
Feeding = nutrition	Feeding > beyond nutrition
Long hospital stays, separation	

Right Brain Versus Left Brain

Left and right communicate

Don't really work alone





Images in the public domain; from 1918 Gray's Anatomy

Health care providers?

Right brain back seat

Own motions suppressed/ignored

Listens to words but may miss emotional content

May not notice own tone of voice, body language

Can misinterpret her responses

Mothers

Right brain *ACTIVE*

Emotional

Remembers words associated with strong emotion

Attends to body language

Focused on emotional meaning of your words

Health care providers?

Left Brain *strong*

Wants information, facts.

When, how often did baby feed?

How many wet diapers yesterday?

How many stools?

How long does the baby sleep?

Explains with details.

Gives specific instructions.

Plans for next week, month.

Mothers

Left brain back seat

Has trouble with memory for facts and numbers

Might try to compensate:

- Watch the clock
- Keep a (confusing) log
- Write down what you say

Confused by long explanations.

Confused by instructions

Next week seems far away

What is Our Ethical Obligation?

AHRQ Agency for Healthcare Research and Quality

"The evidence suggests that the debate over the relative value of breastfeeding compared with artificial means of feeding is over, as the data are unequivocal in favor of breastfeeding. The challenge must now be to establish appropriate systems and resources to support women and families who are interested in breastfeeding."

Dr. David Myers

AHRQ's Acting Deputy Director and Chief Physician

Talking with Mothers

- Importance of deciding to provide milk vs. whether to breastfeed
- Protectiveness and uniqueness of her milk for her baby
- Importance of early and frequent milk expression after delivery
- Realistic goals for milk expression and expectations
- Any amount of breastmilk is helpful for your baby

- video at firstdroplets.com
  https://med.stanford.edu/newborns/professional-education/breastfeeding/babies-at-risk.html

Milk Expression For the NICU/PICU Parent

Empowerment

The way in which milk expression is discussed can empower mothers to feel how important her milk is for her baby

Control

Gives women a sense of control in a situation that is very much out of her control

Focus

Gives mom something to focus on that provides for her newborn. Makes her feel like she is "mothering" by providing food

Oral Immune Therapy with Colostrum

Decreased risk of neonatal infection

Improves long term immunity for infant

Empowering to parents

Breast milk with Saliva

- Milk is alive- immune cells, stem cells, microbes of maternal and infant origin
- Breastmilk + Baby Saliva = chemical reaction produces hydrogen peroxide
- Inhibits growth of bacteria
  - *Staphylococcus aureus*
  - *Salmonella spp*
- Promotes growth of beneficial bacteria

Al-Shehriet al. 2015)

Including Parent in Care

- Oral Immune Therapy / Colostrum Therapy
- Pumps at bedside
  - Pump bundle initiative
  - More milk at day 14 in post-initiative group
  - More exclusive breastfeeding at discharge
    - (from 26-76%!)
  - Hospital savings in donor milk paid for the increased collection kits and containers given out!

Breastfeeding Medicine. Apr 2021.309-312

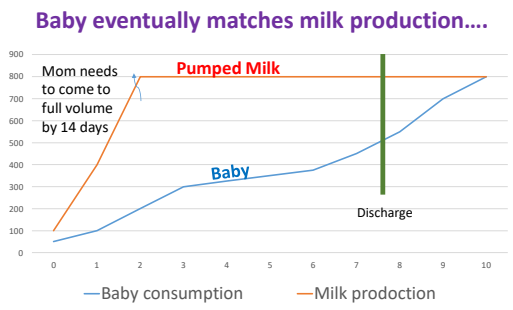
Best Practices: at the Beginning

- Initiation and Coming to Volume
  - Start early expression
  - Express as often as baby would nurse, > 8 times / 24 hours
  - Pumping every 2-3 hours during the day
  - No more than 4 h break overnight
  - Pump approximately 15 min or at least 2 let downs
  - Use a double electric pump
  - Use hands on expression techniques

Best Practices

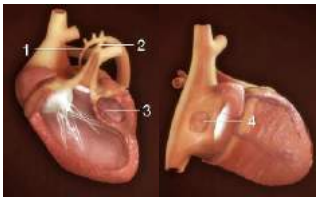
- Milk as a vital sign
  - To be tracked and trended
  - Pumping sessions should be visualized regularly

Baby Consumption / Milk Production **Mismatch**



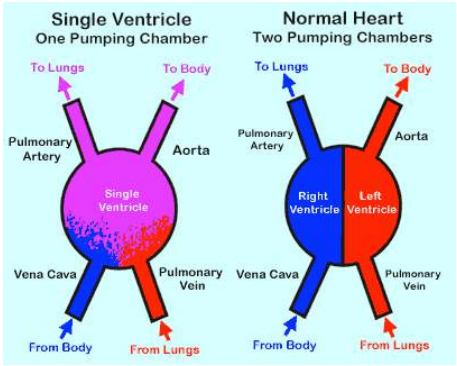
Daniel

- Born at 38w 6d; G2P1 – 1 living child
- Apgar 8, 8; weight 3120 g
- Prenatal diagnosis of HLHS (Hypoplastic Left Heart Syndrome)
- Admitted to the PICU for pre-operative management of single ventricle physiology
- UVC, UAC, on PGE to keep ductus open
- DOL 1 - Norwood with 5mm RV to PA conduit placement without complications
- Back to the PICU intubated, sedated, on vasoactive drugs



HLHS Normal

1. Hypoplastic ascending aorta and aortic arch
2. Large patent ductus arteriosus supplying the only source of blood flow to the body
3. Hypoplastic left ventricle
4. Atrial septal defect allowing blood returning from lungs to reach the single ventricle



Complications after Norwood

- Society of Thoracic Surgeons Congenital Heart Surgery Database
- Undergoing Norwood operation 2000-2009
- 2557 patients from 53 centers
- 90% had a right dominant ventricle
- Mortality was 22% in the interstage period
- 75% had ≥1 complication

Ann Thorac Surg. 2011 Nov; 92(5): 1734–1740.

Complications

- Respiratory insufficiency > 7 days mechanical ventilation (21%)
- Arrhythmya (19%)
- Low Cardiac Output (16%)
- Mechanical Circulatory Support (14%)
- Cardiac arrest (12%)
- Unplanned reoperation (12%)
- Sepsis (11%)
- Acute Renal Failure requiring permanent dialysis (0.5%)

Ann Thorac Surg. 2011 Nov; 92(5): 1734–1740.

More complications

- Failure to thrive
  - inadequate calorie intake
  - high metabolic demands
  - gastrointestinal pathology
  - genetic and extracardiac abnormalities
- Heart failure
- Vocal cord paralysis
- Necrotizing Enterocolitis (NEC)
- Oral aversion
- Feeding difficulty
- Associated GI problems – GERD, malrotation, delayed gastric emptying

Congenit Heart Dis. 2013 Mar; 8(2): 89–102.

Back to Daniel

- Genetic evaluation – baby not dysmorphic
  - prenatal amniocentesis; normal microarray
  - most likely isolated heart defect
    - 30% of babies with heart defect have the defect as part of a syndrome
    - 70% have isolated defect
      - Daniel is more likely in the 70%
- Increased risk of learning problems in baby who requires heart surgery in first year of life

Umbilical Catheters

- **High risk neonates commonly receive enteral feedings even with the presence of an umbilical arterial catheter (UAC)**
  - **Little effect on pre/postprandial blood flow**
  - **No increased risk of feeding problems**
- **Skin to skin should be promoted even with umbilical catheters in situ**
  - **Check catheter placement**
  - **Make sure bedside RN and frontline provider are comfortable**
  - **No increased risk of infection**

- Did well, extubated on POD 2 (DOL 4), but had respiratory distress, needing RAM cannula and eventual reintubation
- NPO initially, started feeds NG on DOL 5, advancing slowly
- Extubated on DOL 8 onto HFNC
- Goal feeds NG continuous DOL 10
- Began working with speech therapy on PO feeds DOL 10
- Transitioned to bolus feeds DOL 12
- Chest tubes removed DOL 14
- Weaned off sedation on DOL 14
- Started going to the breast on DOL 14
- Ongoing intermittent tachypnea, poor PO intake
- Cellulitis surgical site DOL 18 – 7 days antibiotics
- On RA, no flow only on DOL 20

Daniel is more stable now, but what else complicates the decision to feed Daniel?

A. Marginal heart function with tenuous fluid balance tolerance
B. Feeding difficulties
C. Respiratory insufficiency
D. Pain
E. Sedation and/or withdrawal
F. A, B and C
G. All of the above

Factors and Confounding factors for adequate nutrition

- Need adequate fluid and calorie intake
  - Marginal heart function
    - Careful tolerance for positive or negative fluid balance
    - Need to diurese – electrolyte imbalances
  - Feeding difficulties
  - Pain / Sedation / Withdrawal
  - Respiratory insufficiency
- Ongoing intermittent tachypnea and poor PO
  - Low cardiac output
  - Fluid overload / Pulmonary edema
  - Respiratory complication – infection, pleural effusions
  - Metabolic or infectious complication
  - NEC

Barriers to Transition

- Severity of illness
- Physical: tubes, lines, incisions and machinery
- Mother's availability to breastfeed
- Emotional: lack of confidence, maternal depression, trauma history, cultural aspects
- Support: lack of support or knowledge of how to help mom
- Maternal and professional misinformation

True or False

A baby is still very tired and recovering from acute illness. Therefore, it's better to give him/her a bottle for now as he/she is not strong enough to handle the breast at this point.

Breastfeeding versus Bottle-feeding

- Breastfeeding - Sucking pattern is dependent on the milk flow
  - non-nutritive sucking until the MER occurs
    - Higher frequency, shorter duration
  - nutritive sucking after MER
    - slow
- With bottle-feeding, an infant obtains milk flow when a teat is inserted into the mouth

Pediatr Res 2006 May;59(5):728-31.

Table 1. *Suckling parameters (breast-feeding versus bottle-feeding and NNS versus NS)*

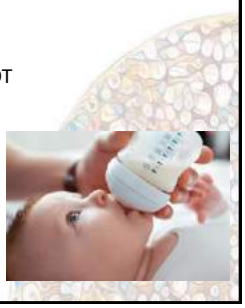
	NNS	NS	*p* Value
Suckling pressure (mm Hg)			
Breast-feeding	−97.6 ± 10.7	−74.5 ± 6.9	<0.01
Bottle-feeding	−27.6 ± 10.4	−88.6 ± 26.0	<0.01
p Value*	<0.001	0.06	
Suckling frequency (sucks/min)			
Breast-feeding	100.8 ± 10.1	78.2 ± 7.4	<0.001
Bottle-feeding	96.8 ± 23.6	70.6 ± 7.8	<0.001
p Value*	0.5	<0.005	
Duration of each suck (s)			
Breast-feeding	0.49 ± 0.05	0.64 ± 0.06	<0.001
Bottle-feeding	0.47 ± 0.09	0.79 ± 0.08	<0.001
p Value*	0.09	<0.001	

These data were obtained during breast-feeding. Values are expressed mean ± SD (n = 17).

* *p* Value in comparison between breast-feeding and bottle-feeding.

Bottle-feeding

- "Bottle-feeding as a goal for discharge"
  - early bottle-feeding does NOT shorten time to discharge!
- 'Need' to know accurate measurements of intake



Test Weights for Patients with CHD

Study in a Cardiac Transition Care Unit

- Maternal intent to breastfeed at infant's admission
- Pre- and post-breastfeeding weights
- Education on breastfeeding weights
  - Healthcare staff
  - Family
- Breastfeeding episodes - At baseline there were 92 episodes and post implementation there were 168
  - 45% increase
  - Helpful in monitoring patients' fluid balance

JBI Database System Rev Implement Rep 2018; 16(11):2224–2245.

Noah

- 6 week old previously healthy
- Admitted to the PICU with RSV bronchiolitis complicated by RML pneumonia
- Congestion and wheezing x 2 days (ED visit yesterday, d/c home)
- Back today with labored respirations and grunting
- Requires intubation and mechanical ventilation in the ED prior to admission to the PICU

Noah

- Born at 39 weeks, 3 days
- C-section (repeat)
- 4th child, all were breastfed
- Mom is the primary caregiver and does not work outside the home

Noah - Questions

- How to support Noah's mom related to their breastfeeding needs?
- What to expect?

Noah

- Hospital Day #2
  - Start enteral feeds with EBM via NG
- Hospital Day #5
  - Still on respiratory support, lots of secretions
  - Self extubate
    - Made NPO
    - Sedation discontinued
    - Upper airway obstruction with stridor
      - Improves with medical treatment

Noah

- Hospital Day #6
  - Mildly tachypneic on HFNC low settings
  - Still a little sedated

Questions for discussion

- Can he be fed now? Why? How?
- What are some specific concerns that could affect Noah's feeding?

Noah – Concerns

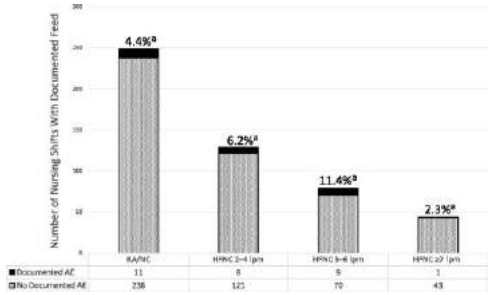
- Respiratory status
- Respiratory support
- Risk for aspiration
- Sedation, pain, withdrawal
- Insufficient PO intake
- Oral aversion post intubation / extubation
- Interstitial edema from SIRS / sepsis

Feeding during HFNC for Bronchiolitis

- Typically well tolerated
  - Varying levels of HFNC and respiratory rate
  - Oral route vs tube feeding
  - Interruption of nutrition increases length of stay by 2.5 days
- Few adverse events
- During HFNC only 26% achieved all nutritional goals
- By discharge, 42% achieved all nutritional goals

J Hosp Med. 2019 Sep 18;14:E43-E48

Feeding-Related Adverse Events and Respiratory Support in Bronchiolitis



Hospital Pediatrics 2017;7:256-262

Guidelines for parents and the health team

- Able to go to the breast if:
  - Respiratory status is not "terrible" on "reasonable" respiratory support
  - Parent is comfortable with breastfeeding prior to the child becoming ill
- Don't "push it"
- Consider offering a half empty breast at first, alternative positions
- Remember advantages of "retrograde flow" while breastfeeding

Jacqueline (Jackie)

- 8 week old previously healthy
  - Term, exclusively breastfeeding prior to illness
- Admitted to the PICU with RSV bronchiolitis complicated by pneumonia
- Congestion and wheezing x 3 days
- Labored respirations, nasal flaring and grunting
- Placed on HFNC for respiratory support
- Still has with significant respiratory distress

Jackie – Yes or No

Do you think Jackie should try to breastfeed now?

Jackie's Hospital Course

- HD#1- Her respiratory status worsens that night because she does not tolerate her HFNC
- She is placed on a dexmedetomidine infusion for sedation to help her tolerate her HFNC in an attempt to prevent intubation and mechanical ventilation
- HD#2- stable; she is being fed EBM via ND tube
- HD#3- she is better and is able to be off sedation, still on HFNC, moderate distress

Jackie – True or False

Jackie can be breastfed now.

Jackie can be breastfed now.

- ✓ Why?
- ✓ What's the difference?

Rosa

- 2.5 year old, ex 28 wk premie, doing well, not breastfeeding any more
- Admitted to the PICU with RSV bronchiolitis
- Congestion and wheezing x 2 days (ED visit yesterday, d/c home)
- Back today with labored respirations and grunting
- Requires intubation and mechanical ventilation

Rosa – Social History

- Hispanic family
- Lives at home with parents and younger sibling
- Family lives 40 miles from the hospital
- Don't have own transportation

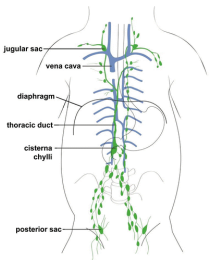
- **Would you like to know anything else?**

Keyner

- 4 month old born with complex congenital heart disease – single ventricle physiology
- s/p Glenn procedure 12 days ago, discharged home 6 days ago
- Presents with decrease PO intake, increase respiratory distress and cyanosis

Chylothorax

- An accumulation of milky chylous fluid in the pleural space
- Can be congenital or acquired (post operative complications)
- Can lead to respiratory distress, malnutrition, dehydration and increase risk of infections



Which one is INCORRECT regarding chylothorax?

A. Conservative treatment includes cessation of breastfeeding
B. Defatted breastmilk is usually an option to treat these patients.
C. Medium-chain triglycerides are absorbed directly into the portal venous system, bypassing the lymphatic system.
D. IV intralipids are contraindicated in patients with chylothorax

Breastfeeding Medicine Volume 14, Number 9, 2019 / *Pediatrics* April 2014, 133 (4) 722-733

BF associated Hypernatremia

Na ≥ 150 mmol/L

What are some of the risk factors associated with breastfeeding associated hypernatremia?

How does the child may present?

BF associated Hypernatremia

- Na ≥ 150 mmol/L
- ≤ 21 days of age AND ≥ 10% weight loss from birth weight
- Cesarian delivery
- Primiparity
- Breast abnormalities, BF problems
- Low maternal education
- Poor feeding, poor hydration, decrease urine output
- Jaundice
- Hyperthermia
- Irritability or lethargy
- Seizures

Journal of Human Lactation 2016, Vol. 32(1) 67–74

Screening tool

Which one of these better detect hypernatremia?

A. Daily weight in the first 4 to 5 days of life in exclusive breastfed newborns
B. Diaper counts in the first few days of life
C. Hospital referral of all infants with a weight loss ≥ 10%
D. B and C

Journal of Human Lactation 2016, Vol. 32(1) 67–74

Choose the best option.

Which of these *SHOULD NOT* be part of the the management of hypernatremia?

A. Therapy by oral or nasogastric feeding
B. Rehydration therapy with fluid boluses because a hypernatremic child is often severely dehydrated
C. Rehydration therapy with intravenous fluids is the preferred route
D. Slow correction of severe hypernatremia is recommended
E. B and C

"We are not all in the same boat. We are all in the same storm. Some of us are on super-yatchs. Some have just one oar."

Damian Barr
Writer& Journalist

May 30th, 2020

Take home message

- Don’t get lost in the acute or chronic illness, but don’t ignore it either
- Understand the pathophysiology of both the illness and breastfeeding
- Construct a feeding plan
- Realize that plan will likely change
- Support the parent with the milk production in adversary circumstances
- Remember that the parent could be feeding a younger sibling that is not around

Thank you!!!

Medications and Breastfeeding

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Image from Markus Spiske Unsplash

Objectives

- Describe 2 basic principles of how medications enter human milk.
- Recite 2 reliable sources of information for medication use while breastfeeding.
- List 3 substances that are contraindicated while breastfeeding.

Basic Principles of Meds and Mothers' Milk

- Maternal Oral Bioavailability
- Medication half-life
- Molecular weight
- Protein binding
- Ion trapping
- Lipid solubility
- Protein binding
- Infant absorption
- Effect on milk production
- Effect on the infant

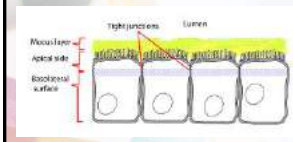
Maternal Oral Bioavailability

- Mom must absorb it to have it enter her milk!
- Low oral BA if either poorly absorbed or high first pass metabolism
- % of oral dose found in the plasma compartment

Half-Life of Drug

- How long does it hang around?
  - Choose meds that have shorter half-lives
    - Antidepressants
    - Anti-anxiety meds
  - Medication is effectively gone in 5 half-lives

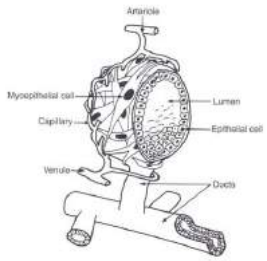
Paracellular Pathway



- 1st 72 hours after birth large gaps between alveolar cells
- Most drugs enter milk more easily during this phase
- Absolute dose low given low volumes
- By the end of 1st week, alveolar cells swell and close gaps

Passive Diffusion

- From capillary loop into lactocyte then milk compartment
- Mother's plasma level most important determinant of drug penetration
- Milk level rise w/maternal plasma level
- As plasma level falls, equilibrium forces drive drug out of the milk compartment back into the plasma for elimination



Molecular Weight

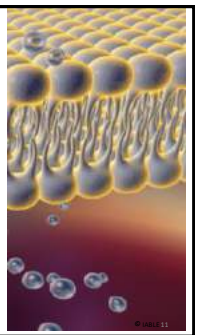
- MW affects diffusion thru alveolar membrane
  - < 200 Daltons easily pass into the milk
  - > 800 Daltons do not
    - LMH heparins = 2000-8000 daltons
    - Heparin = 12,000-15,000 daltons
- Exception is active transport
  - Insulin is large but is taken up by alveolar cells
    - Undergoes cellular regulation like other milk components

Protein Binding

- If protein binding >90%, milk levels low
- **A very important determinant of drug penetration**

Other Factors Affecting Diffusion

- Ion trapping
  - Milk pH is ~7.2, plasma is 7.4
  - Basic drugs accumulate in milk
- Lipid solubility
  - Lipid content of milk varies from 1-20%
  - Lipophilic meds have higher milk levels
    - Usually not clinically significant



Active Transport

- Active Transport Systems are rare
- Alveolar Cell Wall Pump:
  - Iodine pump: same pump found in thyroid; created to maintain infant's iodine
  - Ionic forms of iodides, esp. radioactive iodides (i.e.: I -131) concentrate in milk due to this energy driven pumping

Infant Absorption

- Choose medications that are not well absorbed from the infant gut
  - IV, IM medications

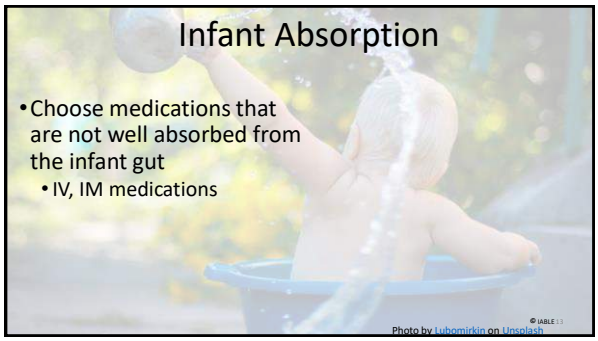


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Photo by Lubomirkin on Unsplash

Relative Infant Dose

RID = infant's dose via milk (mg/kg/day) divided by mother's dose (mg/kg/day)

- Provides a general idea of how much medication the infant is exposed to on a weight-normalized basis.
- **RID<10% widely accepted as safe**, most drugs <1%
  - Even if RID >20% such as with metronidazole or fluconazole, they are safe drugs (L2) that are given directly to infants!

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Other Considerations

- OK during pregnancy ≠ OK for lactation
  - Sudafed
- Infant issues?
  - Prematurity
  - Infant medical problems
- Timing of meds vs feeding
- OK for infants usually OK for lactation
- Choose the best med in a category

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Nappy from Pexel Images

What medications can potentially decrease milk production?

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Avoid Meds that Increase Dopamine

↑dopaminergic activity causes a ↓prolactin level

- Cabergoline (Dostinex)
- Bromocriptine
- Pramipexole (Mirapex)
- Ropinirole (Requip)
- Rotigotine (Neupro)
- Selegiline (Eldepryl, Emsam, Zelapar)
- MAO inhibitor/dopamine agonist for Parkinsons, Depression, ADHD
- Levodopa (Dopar, Larodopa, Sinemet)
- Aripiprazole (Abilify)

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High Risk of Decrease in Supply

↓ Prolactin

Pseudoephedrine
Aripiprazole (Abilify)
Enalapril (Vasotec)

↓ Oxytocin

Alcohol
Epinephrine
Nicotine (?)

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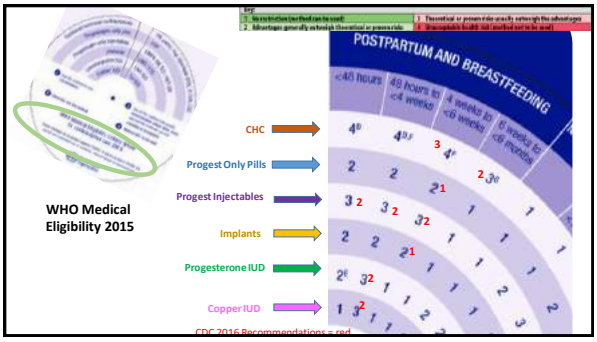
Some Risk of Decrease in Supply ? Mechanism?

- High Dose SSRIs
  Might act as FIL
- Frequent/High Dose Antihistamines
  Might decrease PRL
- High Dose Steroids

Hormonal Effects on Supply

Progesterone
Estrogen
Testosterone
Encapsulated placenta (??)



WHO Medical Eligibility 2015

Evidence-Based Medication Resources

- **LactMed**- thru the National Library of Med
- **Medications in Mothers' Milk** by Tom Hale
  +app for mom or provider
- **Infant Risk Center** - infantrisk.com
- **Mothertobaby.org**
- **Elactancia.org**

More Herbal References

- herbmed.org-American Botanical Council
  - English Translation to German Commission E Monographs
- nccam.nih.gov -fact sheets about alternative therapies, consensus reports and databases, but no specific lactation info. Free
- https://naturalmedicines.therapeuticresearch.com/– Natural Medicine Comprehensive Database $$$

Academy of Breastfeeding Medicine

www.bfmed.org

- Only international physician-only organization re: breastfeeding
- Pertinent protocols:
  - Use of Antidepressants in Nursing Mothers (2015)
  - Galactagogues (2018)
  - Contraception and Breastfeeding (2015)
  - Analgesia and Anesthesia for the Breastfeeding Mother (2017 and 2018)
  - Breastfeeding and Substance Use (2015)
  - Radiology and Nuclear Medicine Studies in Lactating Women (2019)
- ABM Listserv – JOIN and you can ask medication questions of the group!

The List of Unsafe Meds/Substances is Short!

- Most chemotherapy for maternal cancer
- Recreational drugs
  - Occasional marijuana, alcohol are exceptions
- Statins for high cholesterol

The List of Unsafe Meds/Substances is Short!

- Opiates
  - Tramadol and codeine have black box warnings
    - Risk of overdose of metabolites due to individual variations in metabolism
  - Best oral options- oxycodone and hydrocodone
    - Use is smallest amounts possible
    - Unclear if oral morphine or hydromorphone are safer
- Methadone and buprenorphine OK for mothers with h/o substance use disorder
  - Bfeeding decreases NAS in newborns

ABM protocol #15

Imaging Agent	Breastfeeding Interruption
Non-Contrast Radiography	No
Nonvascular Administration of Iodinated Contrast	No
CT with Iodinated Intravenous Contrast	No
MRI with Gadolinium-Based Intravenous Contrast	No
Nuclear Medicine Imaging	
PET	No
Bone Scan	No
Thyroid Imaging	
I-123	Cessation for this agent
I-124	Recommendations vary, up to 2 weeks
Technetium-99m pertechnetate	up to 24 hours, depending on dose
Renal Imaging	
Tc-99m DTPA	No
Tc-99m MAG3	No
Tc-99m DMSA	No
Tc-99m glucoheptonate	No
Cardiac Imaging	
Tc-99m Sestamibi	No
Tc-99m Tetrofosmin	No
Multi-gated acquisition scan (MUGA)	
Tc-99m RBCs in vitro	No
Tc-99m RBCs in vivo	up to 12 hours, depending on dose
Ventilation-Perfusion (V/Q) Scan	
Tc-99m MAA	12 hours
Breast Imaging	
Screening or Diagnostic Mammography	No
Ultrasound	No
MRI with Gadolinium-Based Intravenous Contrast	No

Adapted from ABM Protocol #31

The List of Unsafe Meds is Short!

- Amiodarone
- Most novel oral anticoagulants (no info)
- Smallpox and yellow fever vaccines in non-emergencies
- Always look up medications to be sure!

http://anesthesiology.pubs.asahq.org/article.aspx?articleid=2654616

What about Alcohol?

- Breastmilk level=blood level
  - Peaks at 30-60 min after consumption
  - Detectable for 2-3 hours after consumption
- Alcohol in BM decreases infant's intake
- Suggested Safer Rules:
  - No more than 2 drinks in a day, and not daily
  - Each drink over 2-3 hours
  - Eat food when drinking to delay absorption
- 4-5 drinks drops PRL and inhibits oxytocin

CDC, Lactmed Alcohol 2020

CDC Alcohol 2019

Should a woman who smokes breastfeed?

Smoking During Breastfeeding

- Smokers can breastfeed
- Increased risk of SIDS
- Decreased milk production
  - Dec'd PRL
  - Dec'd blood flow to breast
- Decreased fat in breastmilk

- Reduce exposure by smoking right after feeding, not before
- Low dose nicotine replacement is preferred

Environ Research 151 (2016)

Image- Arun Anoop Unsplash

Marijuana Use During Breastfeeding

Marijuana (THC) is stored in fat -Baby's brain and breastmilk are high in fat

"The systemic bioavailability is dependent on numerous factors including the depth of inhalation, duration of use, breath holding and frequency of use. Occasional users may have a bioavailability of 10-14% where chronic users tend to be higher, 23-27%. With oral use, THC can be measured in blood 1-2 hours post ingestion and peak around 4 hours. Although oral absorption appears to be very good, an extensive first pass effect results in a low systemic bioavailability of 4-12% Unclear how long THC stays in breastmilk – probably highly variable

Breastfeeding Med 12(10) 2017

Ryan Lange Unsplash Images

Marijuana Use During Breastfeeding

- The average concentration of THC has risen from 3.96% in 1994 to 11.8% in 2014
- Studies on transmission of THC into breastmilk are small
- Short and long term effects of marijuana use during breastfeeding is unclear
  - The majority of mothers who use during pregnancy also use during bfeeding
    - Hard to sort of infant effects from exposure during pregnancy vs lactation
- Inadequate evidence to support discontinuation of breastfeeding
- Risk of lower supply
  - THC can lower maternal PRL level
  - May delay oxytocin release (letdown)
- Concerns for inadequate parenting

Breastfeeding Med 12(10) 2017

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Pediatric RESEARCH

CLINICAL RESEARCH ARTICLE

Cannabis use and measurement of cannabinoids in plasma and breast milk of breastfeeding mothers

- Prospective observational study of 18 subjects
  - Lactating and regular cannabis use in Oregon State
- Collected blood & milk samples at 2 week and 2 mo WCC
  - All had used cannabis within 48 hours of sample collection
  - Some smoked marijuana, some used edibles
- No difference in levels whether smoking or eating

"THC and CBD accumulate in breast milk. Breastfeeding mothers used cannabis frequently and increased use in the early postpartum period. Research on the effects of infant exposure to cannabinoids in breast milk is urgently needed."

Published online Jan 2021 Ryan Lange Unsplash Images

Marijuana Metabolism

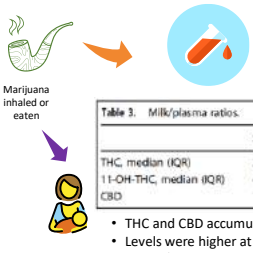

Table 3. Milk/plasma ratios.

	Sample pairs (n)	Milk/plasma ratio
THC, median (IQR)	22	7.0 (1.8–34.6)
11-OH-THC, median (IQR)	4	0.07 (0.03–0.52)
CBD	1	2.6

- THC and CBD accumulate in breastmilk
- Levels were higher at 2 months than at 2 weeks (increased use pp)

Reasons for medical use	(n = 17)
Pain	12 (70)
Nausea	8 (47)
PTSD	7 (41)
Anxiety/depression/mental health	5 (29)
Appetite	2 (12)
Headache	2 (12)
Insomnia	1 (6)
Typical method of cannabis use	
Inhaled (all methods)	21 (100)
Edible	4 (19)
Topical	2 (10)

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Marijuana Use During Breastfeeding

- Counsel mothers on minimal use of marijuana, if they cannot stop
- Discuss underlying problems for which it is used medicinally
  - Consider other medications for pain or anxiety
- Counsel mothers that we don't have good data on long term effects of THC on infants exposed via breastfeeding
  - Esp for those who are heavy users

Breastfeeding Med 12(10) 2017 Ryan Lange Unsplash Images

What Does Everyone Else Say?- ABM

Information remains insufficient to recommend complete abstention from breastfeeding initiation or continuation
HOWEVER: ***urging women to stop using marijuana while they are breastfeeding should occur for recreational use***
Medicinal use is a complex risk/benefit discussion including all of the unknowns
Women with + tox screen should be strongly urged not to breastfeed while using

Breastfeeding Med 12(10) 2017 Ryan Lange Unsplash Images

What Does Everyone Else Say?- ACOG

There are insufficient data to evaluate the effects of marijuana use on infants during lactation and breastfeeding, and in the absence of such data ***marijuana use is discouraged***
(citation is the ABM protocol #21)
Recommended that ***medicinal marijuana be discontinued*** during pregnancy and lactation in exchange for a therapy with better and longer term safety data

Ryan Lange Unsplash Images

What Does Everyone Else Say?- AAP

Women should be ***informed of the potential risks*** of exposure to MJ during lactation and ***encouraged to abstain*** from any MJ products while breastfeeding.
Pregnant and Breastfeeding women should be ***cautioned*** about infant exposure to smoke from ***MJ in the environment***.
Women who have become abstinent from MJ should be counseled to remain abstinent while pregnant and breastfeeding.
Further research is needed regarding the use and effects of MJ in pregnancy and breastfeeding.
Pediatricians should work with state and local health depts if legalization is being considered or has occurred to help with constructive, non-punitive policy and education for families.

Ryan Lange Unsplash Images

Narcotics During Lactation
Naive Newborns

- Newborns who are narcotic naïve
  - At risk for decreased respirations, sleepiness
  - Decreased ability to metabolize
  - Metabolism of codeine and tramadol too variable to assume safety in infant
- Limit round-the-clock maternal opiates to 2-3 days for pain control

Narcotics During Lactation
Exposed During Pregnancy

- Infants exposed to methadone and buprenorphine during pregnancy
  - Ok to continue during breastfeeding
  - Less NAS
  - Monitor infants closely over time

Conclusions
Meds During Breastfeeding

- Most medications are safe during breastfeeding.
- Pharmacologic properties of medication help determine their safety during breastfeeding.
- Use an evidence-based resource that is kept up to date.
- Share medication information resources with families.

Back to Work (or School) and Breastfeeding

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- Conflict of Interest to disclose- Willow pump
- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and a completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required

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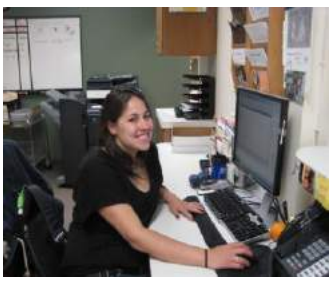
Original version credit to

Liliana Simon, MD, IBCLC, FAAP, FABM
Pediatric Critical Care
and Breastfeeding Medicine
liliana.simon@som.umaryland.edu

Objectives

- Identify 3 common challenges in maintaining lactation when back to work
- Understand principles of longitudinal milk production when separated from infant
- Explain how creating and using a large freezer stash can undermine feeding goals

Returning to Work or School…



… interferes with breastfeeding!

Breastfeeding Support for Mothers in Workplace Employment or Educational Settings: Summary Statement

KA Marinelli, K Moren, JC Taylor, and The Academy of BF Medicine

- "The level of evidence of the majority of the articles reviewed is moderate to weak, with many of them either review articles or studies with very small sample sizes and no comparison groups."
- Length of maternity leave
  - Longer maternity leaves correlate with a longer duration of breastfeeding
  - Women with short or no maternity leave are less likely to initiate breastfeeding.

Continued…

- Paid vs Unpaid: Most developed countries have paid maternity leaves, with the United States being a significant exception.
- "Professional women may have greater success than laborers as they are more likely to have a private office to express milk and/or a supportive work environment."
- "Research has shown that a corporate environment designed to enable and encourage continued breastfeeding does not engender negative attitudes in other employees."
- "Women who are bound by shift work may have a strictly regulated schedule and less flexibility to express milk when needed."

ACA(2010)/FLSA(1938)

The federal **Patient Protection and Affordable Care Act** contains a provision that amends the **Fair Labor Standards Act (FLSA) :**

- Un-paid break time
- Private place
- All employers (if under 50 employees, must prove "undue hardship")
- An employer is exempt if it has less than 2 employees, an annual dollar volume of sales or business of less than $500,000, and is not involved in any interstate commerce

ACA/FSLA cont…

- Covered employers must provide "***reasonable break time***" and a "***private location other than a restroom"***
- Applies for **1 year after birth**
- Pay **not required,** but employees can use paid breaks
- Breaks must be ***breaks*** (can't be forced to work while pumping)
- Break time should not count against FMLA
- Options should be provided if extra time is needed

FSLA "Final Rule"- 2014

- Exempt from protection if salaried employee makes > $47,476 annually
- Fact Sheet:
  - https://www.dol.gov/whd/overtime/final2016/overtime-factsheet.htm

Benefits to Employers Who Support Breastfeeding

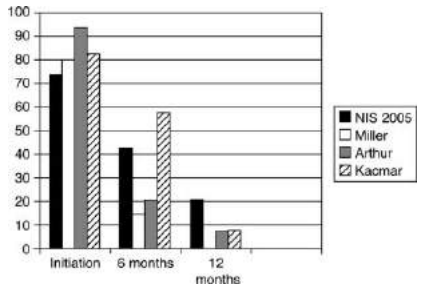
Financial benefits to employers:

- Some of those workplaces report a $3 return on investment for each $1 spent according to the United States Breastfeeding Committee.
- Less employee absenteeism, less time off to care for sick children
- Higher productivity
- Better infant health means fewer health insurance claims

Employee attraction and retention:

- Women make up 50% of the current workforce; half of those are of childbearing age.
- Mothers are looking for workplaces that support breastfeeding.
- Improved workplace satisfaction: higher morale and improved productivity are found among breastfeeding mothers.

Physician Mothers BF vs population



Breastfeeding Medicine. February 2010, 5(1): 35-39

Physician Mothers

Need to develop workplace strategies and programs to promote breastfeeding among physician mothers!

- A strong predictor of physicians' breastfeeding advocacy is their successful personal or spousal breastfeeding experience.

Breastfeeding Medicine. December 2010, 5(6): 297-302

Dr. MILK physician network

- 32,000+ members across the globe
- FAQs and moderators
- Prevent common "booby traps"
- Share successes
- Advocacy and system level change
- MD/DO
- No cis-gendered men

Common Problems return to work/school

- Milk supply STABLE over time
  - 24 to 30 oz per 24 hours month 1 – 6
  - Slowly decreases month 6 to 12 months
  - Average is 18 oz per 24 hours at a year
- Breast storage capacity exceeded
  - Magic Number Principles (Nancy Mohrbacher)
- Pseudo-low milk supply
- Frozen Milk Treadmill

Longitudinal milk production

- Empty frequently enough to maintain exactly what infant needs to grow
- Keep systems as simple as possible
- Protect direct breastfeeding abilities of infant by using paced bottle feeding methods

Myth of Frozen Milk Stash

- Create oversupply during maternity leave
- Pumping while baby is sleeping
- "Lowering" supply to normal over time
- Stuck on frozen milk treadmill
- Always use freshest milk
- Mental permission to skip pumps at work
- Supplementing with frozen stash when not needed – overfed infant
- Supplementing with frozen stash when truly not making enough – have to increase # emptyings

General Anticipatory Guidance

- Encourage mom to stay home as long as possib
- Start part time if possible
- Start on a Wed or Thursday
- Talk to employer/coworkers and make a pumping plan, using resources about FLSA if needed
- Nurse baby over lunch hour?
- Offer to write a letter to employer if needed
- Mom should talk to daycare re: handling of milk and mother's expectations for paced bottle feeding
- Suggest mom ask about feeding baby right before departure and immediately upon arriving to get baby

More tips…

- MODEST freezer stash: save 1-2 ounces of breastmilk a day approximately 1 month before returning to work
- Store the milk in 2-4 ounce increments
- Usually, the best time to pump for storing extra milk is after the baby's first am feeding
- There is no magic bottle; slow flow important
- Is daycare familiar with paced bottle feeding?
- Bottle introduction around 4-6 weeks
- Anticipate baby may want to breastfeed more at night
- Throw the "schedule" out the window on days off and breastfeed ad lib

Helpful Tools

- A good pump
- Hands-free system
- Remember pumping tips

LactaMed Simplicity Hands Free Bra Kit- $15

Simple Wishes Hands-Free Breastpump Bra- $28

Brauxiliary - $29

Let-down tips…

- Massage your breasts
- Gently rub or "tweak" your nipples for 60 seconds
- Visualize the milk flowing down
- Think about your baby: bring a photo or a blanket or an item of clothing that smells like your baby
- Cut yourself some slack wherever possible
  - You can only do what you can do!!
  - YOU ARE A GREAT MOM!

Come in .. sit down I'll be right with you as soon as I've finished with the pump

Risks of Oversupply

- Behavioral Strategies
  - Block feeding (see ABM protocol hyperlactation)
  - Gradually reduce pumping times and / or volumes over days-weeks
    - Just stopping is not safe
- Medication Use
  - Stop taking galactogogues
  - May need medication to control hyperlactation

Resources for Mothers

The Business Case Employee's Guide:
https://www.womenshealth.gov/files/assets/docs/breastfeeding/business-case/employee's-guide-to-breastfeeding-and-working.pdf

US Department of Health & Human Services:
www.womenshealth.gov/breastfeeding

US Department of Labor
http://www.dol.gov/whd/regs/compliance/whdfs73.htm

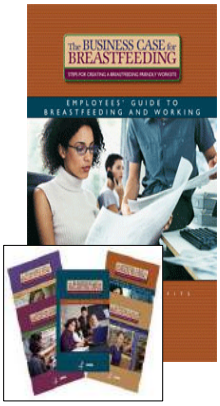
The Milk Mob handouts:
http://thepixelfarm.com/milkmob/membercontent/BFHandouts/MilkMob_BF-Ed_WorkingMomLaw.pdf

http://thepixelfarm.com/milkmob/membercontent/BFHandouts/MilkMob_BF-Ed_MilkStorage.pdf

http://thepixelfarm.com/milkmob/membercontent/BFHandouts/MilkMob_BF-Ed_BreastfeedingAtWork.pdf

Business Case for Breastfeeding Resources

- About The Business Case For Breastfeeding
- For Business Managers
- Easy Steps to Supporting Breastfeeding Employees
- Tool Kit: Resources for Building a Lactation Support Program
- Employee's Guide to Breastfeeding and Working
- Outreach Marketing Guide



Start a Dr. MILK chapter!

Some Guidelines and Tips

- Wash hands
- Label milk - amounts of 2 – 4 ounces
- Do not store breastmilk in the door of the refrigerator or freezer or next to the wall
- If don't think you will use it in 4 days, freeze
- Use insulated cooler bags with frozen ice packs for transport in and out of the buildings
- Don't mix warm and cold/frozen milk

www.cdc.gov, ABM protocol #8

Using Expressed Milk

- Fresh
  - Greatest immunologic activity, current IgA
  - Less heating decreases fat loss
- Frozen
  - Overnight in fridge is best (less fat loss)
    - More fat lost with warm water bath
  - Use within 48 hours after thawed
  - Use within a few hours (1-2) after it is warmed
- Never heat in a microwave!!
- Not recommended to re-freeze milk

ABM protocol #8, www.cdc.gov

Feeding Expressed Breastmilk

- Does not need to be warmed – RT or cold is ok
- If warming:
  - Keep container with milk sealed
  - Test temperature before feeding to the baby
- Swirl the breastmilk to mix the fat
- If baby did not finish the bottle, leftover breastmilk can still be use within 2 hours

ABM protocol #8, www.cdc.gov

Childcare Settings / Crock Pots

1. Contamination of milk
2. Temperature
   - Lukewarm: 40° C / 104° F
   - Warm setting on crock pot: 165° F – 175° F
- Hot pockets of milk – burn the child
- Above 80° F
  - Denaturation and inactivation of milk's bioactive proteins
  - Decrease in fat content

ABM protocol #8

Practical Advice

- No special handling needed for milk
- Storage: RT 4h, cooler 24h, fridge 4 days
  - Not at the door or next to walls
- If you are not going to use it, freeze it
- Don't mix warm and cold milk
- Careful not to overheat milk
- Use within 48 hours of thawing, 2 hours of heating

Food Protein Induced Allergic GI Disorders

Anne Eglash MD, IBCLC, FABM
Clinical Professor
Dept of Family Medicine
University of WI School of Medicine and Public Health

Disclosures: None

- I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity
- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation

Accreditation

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

Objectives

- Explain 3 different forms of food protein induced GI disorders.
- Describe 3 symptoms and signs of FPIES.
- Describe 2 characteristics of food protein enteropathy.
- Discuss the relationship between eosinophilic GI disorders and food protein induced GI disorders.
- Explain initial workup and advice for a family whose 3 month old infant has blood streaked stools.

Mom calls you because her 3 month old exclusively breastfed baby boy has blood streaked stools for the last day. The baby has been a little fussy, and has been spitting more than usual in the last week. The infant had a huge vomit right before mom called. He does not seem acutely ill with fever or lethargy, according to mom.

You schedule the infant to see you within the next 48 hours, but mom wants to know what you advise at this time.

Initial Phone Recommendation Includes:

A. Stop all dairy products
B. Stop all dairy and soy products
C. Stop dairy, soy, eggs and peanuts
D. Upper and lower endoscopy to find source of bleeding

Typical IgE Mediated Food Allergy

- Examples
  - Hives, swelling from peanuts
  - Severe vomiting, diarrhea, hives from shellfish
  - Facial swelling from eggs

IgE vs Non-IgE Mediated Syndromes

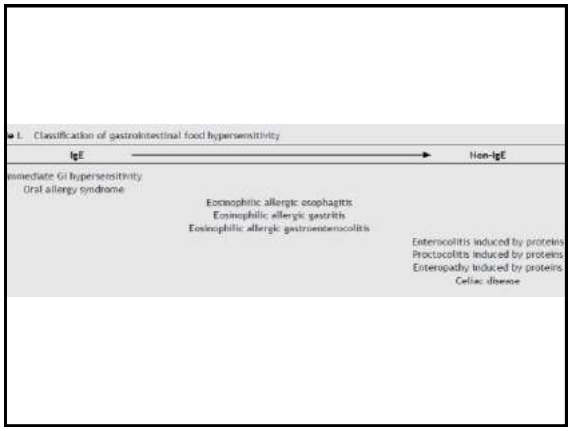
IgE Mediated

- Symptoms within minutes
- Allergic symptoms such as N&V, diarrhea, wheezing, rash, swelling, hives anaphylaxis
- Physiology understood

Non-IgE Mediated

- Symptoms come on gradually
- No anaphylaxis
- Symptoms relatively mild
- Usually resolve by age 2
- Unclear physiology
  - Less well-studied
  - Hard to access gut tissue in real time to see reactions

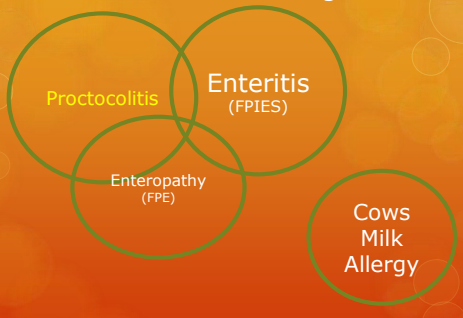
We are covering non-IgE allergic reactions today



Why Do Infants Develop Allergic Enteritis?

- More permeability of gut mucosa
- Immature gut immune system
- More common in infants with a dominance of Clostridium rather than Bifidobacterium
- More common in breastfed infants
  - Exposed to maternal food proteins

Food Protein Induced Allergic Diseases



J Allergy Clin Immunol 135(5) May 2015 ©IABLE

What is Allergic Proctocolitis? (FPIAP)

- An immune-mediated hypersensitivity GI disorder
  - Occurs in the large bowel (sigmoid/rectum)
    - Erosions
    - High eosinophils in crypts of rectosigmoid mucosa
  - Blood streaked stools with mucous

J Allergy Clin Immunol 135(5) May 2015 ©IABLE

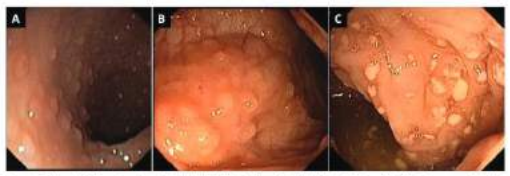


Figure 1 Endoscopic findings showing colonic (A), ileal LNH(B) and rectal aphtoid ulcers (C) in a child with dietary protein-induced allergic proctocolitis

Demographics of Allergic Proctocolitis

- ? 0.16% in healthy infants- few studies
  - 64% of infants with blood in stool
- 18-64% of cases among infants with bloody stools
- Typical age of onset is 2 weeks-5 months of age
- 60-80% are exclusively bfed
- In one study, more common in males (66.6%) (JPGN 2015; 61)

Allergol Immunopathol (Madr) 2018;46 (1): 1-2 ©IABLE

Clinical Presentation of Allergic Proctocolitis

- The infant tends to look fine
  - Typically gains well
  - Usually not fussy, not vomiting
- Labs usually normal
  - Possible increase in blood count eos
  - Possible increase in platelets
- Diagnosis based on blood in stool, and resolution with removal of offending food proteins

World Allergy Org J (2020)13:100471 ©IABLE

Differential Dx of Allergic Proctocolitis

- Gut infection
- Volvulus
- Anal fissure
- Coagulation disorder
- Necrotizing enterocolitis
- Inflammatory bowel disease
- Immune deficiency
- Intussusception

World Allergy Org J (2020)13:100471 ©IABLE

Most Common Offending Agents for FPIAP

- Most likely due to cows milk
- Other proteins
  - Soy
  - Eggs
  - Corn
  - Chicken
- Can occur with hydrolyzed formulas

World Allergy Org J (2020)13:100471 ©IABLE

Role of Gut Flora in Bloody Stools

- Food protein induced enteritis syndromes not well understood
- Gut microbiome plays a major role in gut maturity and immunity
  - Increased inflammation w/aberrant gut flora
- Gut microbiome differs between babies with bloody stools and controls
  - Less bifidobacteria in babies with bloody stools

Pediatr Res 2014 Oct 21
Folia Microbiol. **54** (2), 167–171 (2009)
Microbiol Immunol 2012; **56**: 657–663 ©IABLE

Maternal Elimination Diet for Food Protein Induced Proctocolitis

- Stop cows milk
  - Most cases resolve in 72-96 hrs, but allow 2 weeks
- If no change at 2 weeks, stop soy
- If no change, stop egg
- IF no change:
  - Consider re-introduction of milk, soy, eggs if elimination had no effect
  - Consider elimination of something else, e.g. citrus fruits, nuts, peanut, wheat, corn, strawberries, chocolate
- Families need education on how to read food labels to avoid substances of each allergen
- Geographic variability
- 12% cannot be identified thru maternal food elimination

World Allergy Org J (2020)13:100471 ©IABLE

What if Nothing is Done?

- 20% spontaneously resolve without maternal dietary intervention
- Consider no maternal diet restriction if mild symptoms
- Long term prognosis is excellent
  - Risk of anemia is low

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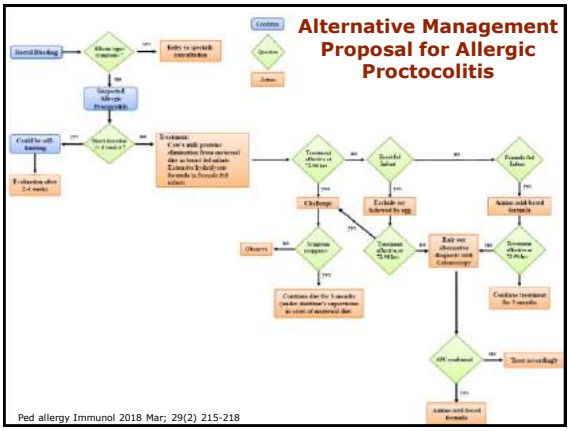
Alternative Management Proposal for Allergic Proctocolitis



Ped allergy Immunol 2018 Mar; 29(2) 215-218

Role of Hyperlactation and Bloody Stools

- Common Clinical Observation
  - Hyperlactation associated with infant GI sx
    - Frequent stools
    - Mucousy, blood streaked stools
    - Foamy, green, and gassy
  - These babies are more fussy
- If blood streaked stools are not resolving with stopping CMP, address hyperlactation, especially if infant has typical sx

©IABLE

Severe Cases

- Consider starting with a strict maternal elimination diet
  - Lamb, pears, squash, rice
- Once symptoms resolve, add a new allergen once a week
- Addition of pancreatic enzymes
  - No randomized controlled trials
  - Theoretically breaks down allergens in mom's gut before absorption
  - Two Creon 6000 units with each meal, one with each snack

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Management of Resistant Cases

- 7% of APC not responsive to maternal diet restrictions
- 14 exclusively bfed infants with APC refractory to maternal allergen avoidance (soy, milk, eggs)
  - Blood and mucous in stool, watery stools
- Blood tests for IgE, skin prick tests were negative
- Patch testing
  - variably + to milk, soy, eggs, wheat, rice
  - 100% + to breastmilk (with no cows milk, soy, eggs)
- 100% cleared rectal mucosa abnormalities after 2 mo on AAF diet

Allergic proctocolitis refractory to maternal hypoallergenic diet
Lucarelli et al. BMC Gastroenterology 2011, 11:82

©IABLE

Breastfed Babies Receiving Formula Supplementation

- Change to a soy based formula first
  - Controversial
- If sx are severe and persistent, an amino acid-based formula is preferred over hydrolyzed cows milk formula.

©IABLE

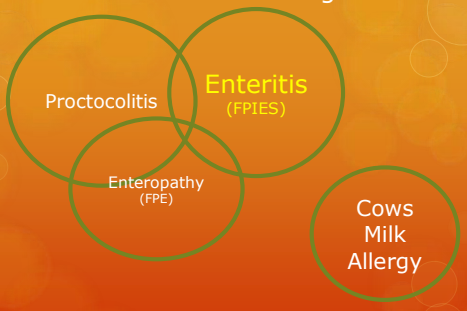
Re-introducing Allergens for Food Protein Allergic Proctocolitis

- Consider allergy testing if other allergic symptoms
- If baby otherwise well
  - Reintroduce offending allergens 6-9 mo after initial reaction, or at 12 mo old
  - Rarely persists past age 1
    - Longer duration more likely due to cows milk

JPGN 2015; 61: 69-73

©IABLE

Food Protein Induced Allergic Diseases



J Allergy Clin Immunol 135(5) May 2015 ©IABLE

Typical Case of FPIES

- 1-4 hrs after eating, child vomits extensively
- Profuse diarrhea occurs 5-10 hours later
  - May be bloody diarrhea
- Parents assume stomach flu
- In severe cases:
  - Child appears pale, ill, lethargic
  - Brought to the ER
  - Child is worked up for causes of shock
  - All tests are negative and child is fine the next day
- Can mimic sepsis, gastroenteritis
- Overall, sx can be mild, moderate, or severe

Allergy Clin Immunol 2017: 139:111-1126 ©IABLE

Diagnostic Criteria for Acute Food Protein-Induced Enterocolitis Syndrome (FPIES)

Table 2 Diagnostic criteria of acute FPIES (from reference [1], modified)

The diagnosis of acute FPIES requires the presence of vomiting (1–4 h after the ingestion of the suspected food) and the absence of classic IgE mediated allergic skin respiratory symptoms (**major criteria**), plus at least three of the following **minor criteria**:

A second (or more) episode of repetitive vomiting after eating the same suspected food

Extreme lethargy with any suspected reaction

Marked pallor with any suspected reaction

Need for Emergency Department visit with any suspected reaction

Need for intravenous fluid support with any suspected reaction

Hypotension

Hypothermia

If only a single FPIES reaction has occurred, it is strongly recommended to perform a diagnostic food challenge

Ital J Pediatrics 2020 46: 144 ©IABLE

Chronic FPIES

- No diagnostic criteria
- Occurs when the problem food is ingested frequently
  - Progressive vomiting
  - Diarrhea
  - Poor growth

©IABLE

Food Protein Allergies in FPIES

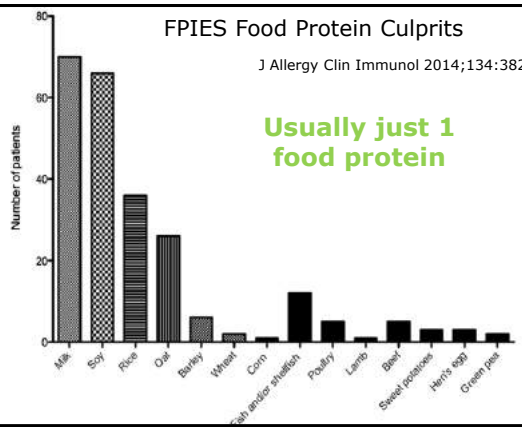
- Usually asymptomatic during exclusive bfeeding
  - Breastmilk seems protective
- Epidemiology not known
  - Few studies, from 15/100,000 to 3/1000
    - Likely more common due to under-reporting, mis-dx, mild presentations
- Need higher amts of food proteins than in breastmilk

©IABLE

FPIES Food Protein Culprits

J Allergy Clin Immunol 2014;134:382-9

Usually just 1 food protein



Diagnosing Food Protein-Induced Enterocolitis Syndrome (FPIES)

- No diagnostic test available
  - Rule out infectious disease or toxin exposure
- Milk/soy FPIES rare in exclusively bfed infants
  - Most common in formula fed infants
  - Bfeeding is protective

Characteristics of FPIES Patients

- 0.28% of individuals in the USA
- Median age at onset = 9 months of age
- Median age at diagnosis = 12 mo
- 27.5% + h/o eczema
- 11.8% + h/o asthma
- 18% have FPIES to > 1 food
- Most common culprit for adults=shellfish

J Allergy Clin Immunol Pract 8(5) 2020;1717-1720

Management

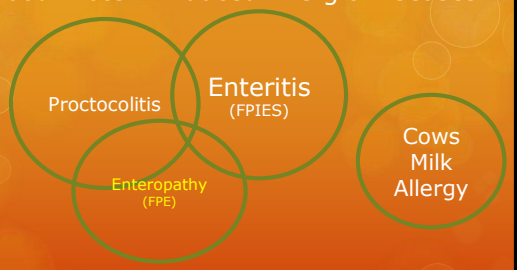
- Manage symptoms
  - Oral or IV fluids
  - Ondansetron
  - Possibly hospitalize
- Diagnosis based on ruling out other causes of symptoms
- Avoid offending food(s)
  - OK for breastfeeding mother to ingest them
- Allergy eval to r/o possible IgE role
- Oral food challenges under medical supervision, IV in place
  - Try every 12-24 mo
  - Higher risk with IgE Ab

Allergy Clin Immunol 2017: 139:111-1126

Prognosis of FPIES

- 24% of subjects had IgE antibodies to the FPIES-inducing food(s)
  - Less likely to grow out of a reaction
- If no IgE antibodies, median age of outgrowing FPIES:
  - Rice- 4.7 years old
  - Oats- 4 yo
  - Soy- 6.7 yo
  - Milk- 5.1 yo

Food Protein Induced Allergic Diseases

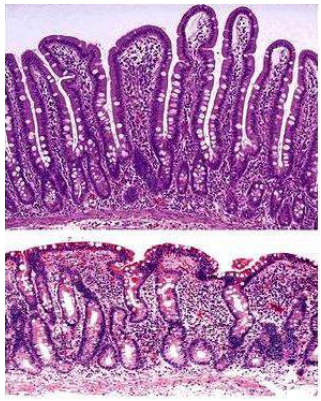


J Allergy Clin Immunol 135(5) May 2015

Food Protein-Induced Enteropathy

Allergology International 2013;62 297-307

- Chronic diarrhea, vomiting, and poor growth in first 2 years of life, usually under 12 mo
- Anemic, hypoalbuminemia
- Occurs in formula feeding infants
- Most commonly from cows milk, soy, rice, chicken, egg, fish.
- Requires endoscopy to diagnose
  - Small intestine villous atrophy
    - Similar to celiac sprue
- Allergy testing is negative
- Treatment is food protein elimination
- Resolves by age 2



Distinguishing Eosinophilic GI Syndromes with Food Protein Induced GI Syndromes

(Eosinophilic esophagitis, E. gastroenteritis, E. colitis)

- Eosinophilic syndromes are inflammatory w/eos infiltrating gut lining
- Biopsies of FPIES and proctocolitis have eosinophilia
- Clinical sx tend to differ
  - Eosinophilic syndromes triggered by many foods
  - Food protein enteritis syndromes caused by fewer foods
  - FPIES has more acute sx than the eosinophilic syndromes

J Allergy Clin Immunol 135(5) May 2015

A parents tells you at the 2 mo WCC that their exclusively bfeeding baby tends to be fussy, strains with stooling, fusses with feeding. No spitting up. Reasonable advice includes:

A. This is normal colic behavior, it will improve

B. This is likely due to GERD, suggest ranitidine tx

C. Stop cows milk protein in mother's diet

D. Gripe water for fussiness/colic

Association of FP Induced Allergic GI Syndromes with Infant Constipation, GERD, Fussiness

- Cows Milk Allergy assoc with gastric motility disorders, ie constipation, reflux, delayed gastric emptying
- 28-78% success rate in resolving constipation by eliminating dairy
  - Increased eosinophilic infiltration of anal sphincter causes increased anal pressure at rest (due to CM allergy)

J Allergy Clin Immunol 135(5) May 2015

Conclusions

- It is important to distinguish between IgE and non IgE mediated intestinal reactions to foods.
- There are at least 3 different types of food protein induced gastroenteritis.
  - Allergic proctocolitis
  - Food protein induced enterocolitis syndrome (FPIES)
  - Food Protein enteropathy
- Babies with classic allergic proctocolitis do not need further workup unless they have other allergy symptoms.
- Address hyperlactation when infants with proctocolitis don't improve despite maternal elimination diet.
- Cows milk allergy may also cause GERD, constipation, and infant fussiness.

Breastfeeding Management of the NICU Infant

Stephanie Attarian, MD, IBCLC

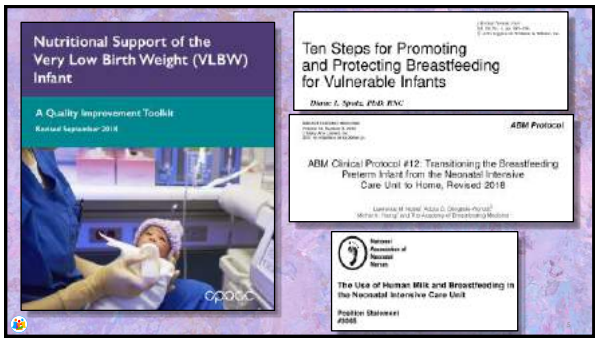
IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

Conflicts of Interest

- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required.

Objectives

1. Understand 3 ways the feeding of human milk during the NICU stay reduces the risk of short and long-term morbidities in premature infants.
2. Describe 3 ways to help a NICU mother protect her supply.
3. List at least 4 steps that should be included in every mother baby dyad's feeding plan.



Spatz 10 Steps to Promoting Breastfeeding in the Vulnerable Infant

1. Informed decision
2. Establish and maintain milk supply
3. Breast milk management
4. Feeding the infant the milk
5. Skin to skin care
6. Non-nutritive sucking
7. Transition to breast
8. Measuring milk transfer
9. Preparation for discharge
10. Appropriate follow-up

Spatz, 2004

7 Best Practices by the California Perinatal Quality of Care Collaborative

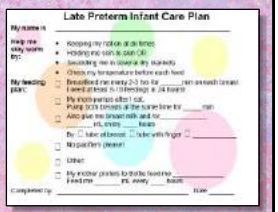
- Inform the mother of the rational to pump early and pump often.
- Providing equipment, staff and logistics to pump early (within 6 hours of birth), pump often (8 times/24 hours with no more than a 5 hour interval at night.
- Provide a diary log and begin recording every pumping and hand expression session.
- Teach adjunctive manual stimulation: breast massage and hand expression 8 times/day
- Facilitate early colostrum feeds.
- Provide skin-to-skin contact, whenever the mother is with her baby or as soon as the baby is stable enough to be transferred to and from his bed.
  Spatz, 2004
- Maternal discharge planning.

Develop a Feeding Plan

- **"The goal of the feeding plan recommendations for preterm infants is to enable the mother to exclusively breastfeed or provide as much human milk as possible while protecting and supporting the mothers' decisions."**
- **Shared decision-making by the mother, the infant's clinician, and any others involved in feeding support (nursing, lactation consultant, and dietitian).**

Develop a Feeding Plan

- **The food: what and how?**
- **Understand parents' home feeding goals.**
- **Teach mother how to assess good transfer.**
- **Encourage rooming-in when able.**
- **Expectation setting.**


Late Preterm Infant Care Plan

Early! Prenatal Consult: Informed Decision

- Human milk is the normative standard for infant feeding and nutrition.
- **Breastfeeding should be considered a public health issue, not a lifestyle choice- AAP.**
- **Informed Decision is Step 1** in Diane Spatz "10 steps"
- Mothers who intended to formula feed do not feel offended or guilty when asked to provide breastmilk
  - *On the contrary:*
- Mothers who were not given appropriate early information (or not given a breast pump or taught to hand express) ***do*** feel angry that their later breastfeeding goals were not met

Miracle, D. et al Mothers' decisions to change from formula to breastmilk for very low birthweight infants, JOGNN, 2004

Scripting – "unnatural, natural process"

1. The urgency and importance of deciding to provide milk vs. whether to breastfeed:

- Maybe you did not have the chance to think much about breastfeeding, but would you be willing to provide your milk for your baby, at least during this hospitalization? Your baby needs something only you can provide. (Not: "Have you decided to breastfeed?")

2. Protective role of human milk for preterm infants:

- Milk is far more than food. It's protection for your baby. Colostrum is more like a first vaccination.

3. Uniqueness of her milk for her infant:

- Your milk is constantly CHANGING and specifically designed for your baby, with live cells, immunoglobulin, enzymes, and hormones.

4. The importance of starting pumping ASAP after delivery and appropriate goals:

- Hand express your milk as often as a term baby would nurse, at least 8 times/day, beginning right from birth. Add pumping within 6 hours, 8 times per day, with no more than a 5 hour interval at night. This frequent breast stimulation is like "phoning in your order," so by the end of the first week, you'll reach your goal of 20 ounces per day. Today we will help you learn to express your milk for your baby. We expect just drops today. We'll catch those and take them to your baby.

https://med.stanford.edu/newborns/professional-education/breastfeeding/babies-at-risk/mothers-of-nicu-or-pscn-infants.html

Best Practices: at the Beginning

- Initiation and Coming to Volume
  - Start early expression, < 1 hour, with hand and pump
  - Express as often as baby would nurse, > 8 times / 24 hours
  - Pumping every 2-3 hours during the day and no more than 4 hour break overnight
  - Pump approximately 15 min or until milk stops flowing
  - Use a double electric pump
  - Use hands on expression techniques

Best Practices: at the Beginning

- Milk as a vital sign
  - To be tracked and trended
  - Pumping sessions should be visualized regularly

Previous Studies Not Adequately Powered RCTs

180 mothers with infants < 1500g, < 32 weeks

Timing of Milk Expression

N=58 Early
Within 60 Min

N=62 Intermediate
Within 61-180 Min

N=60 Late
Within 181-360 Min

Parker, Sullivan, et al J Perinatology 2020 40: 1236-1245

Outcomes	Initiation			p value*
	Early (n = 52)	Intermediate (n = 61)	Late (n = 55)	
Lactation and MOM consumption				
Onset of secretory activation (hours)	140.5 ± 144.7	94.7 ± 65.0	100.4 ± 58.4	0.08
Days lactated	45.3 ± 31.8	48.7 ± 28.2	48.2 ± 28.3	0.82
Lactating at day 42	52% (27/52)	53% (32/61)	60% (33/55)	0.64
Ceased lactating before infant's discharge	58% (30/52)	48% (29/60)	55% (30/55)	0.60
Percent MOM consumed by infant				
Day 7	71.7 ± 42.1	69.2 ± 43.4	81.9 ± 36.3	0.22
Day 14	65.7 ± 45.1	66.7 ± 44.1	70.2 ± 45.6	0.87
Day 21	55.7 ± 48.5	59.6 ± 48.7	70.2 ± 45.1	0.27
Day 28	57.5 ± 48.0	62.3 ± 46.4	64.3 ± 47.7	0.77
Day 35	51.8 ± 49.0	54.3 ± 48.1	65.6 ± 46.5	0.31
Day 42	51.1 ± 48.9	53.9 ± 49.7	56.0 ± 48.6	0.90

- Mothers who initiated at 181-360 min produced more MOM in the first 3 days and over the first 6 weeks; Overall P values are not significant
- **The late group had 14% more expression sessions vs other groups**
- **Higher # of expressions may be more important than exact timing of first expression if within the first 6 hours**
  - **Frequent expressions keep prolactin up and prevent prolonged fullness**

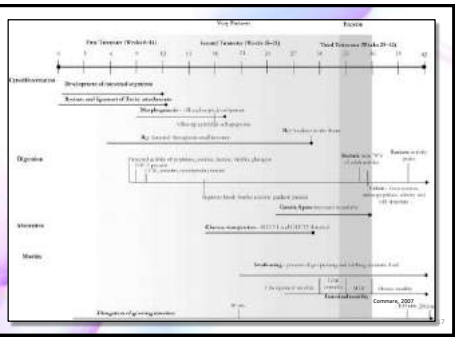
Milk Expression is Still Recommended in the First Hour After Birth

- Milk is needed immediately for infant
- Expression in the first hour increases # of expressions in the first 24 hours
- Milk expression in the first hour capitalizes on the oxytocin surge from labor and delivery

Gut Maturation by Gestational Age

Gut maturation factors:

Nerve GF
Insulin like GF
Insulin
Cortisol
Thyroxine
Nucleotides
Taurine
Glutamine
Lactose
Cytokines



Does Your Unit Emphasize Feeding of Colostrum First?

Oral Therapy and Long Term Immunity for Babies

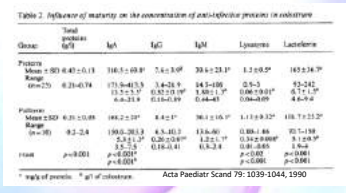
- ✓Moreno-Fernandez , et. al., 2019 - neonates who had received oral therapy with colostrum have more lactoferrin, IgA and IgM
- ✓Gephart and Weller, 2014 found that oral therapy with colostrum stimulates the lymphoid tissue in the **oral** mucosal lining of the mouth
  - ✓ thus causing the release of sIgA, an antibody that plays a crucial role in **Immune** function
  - ✓ lactoferrin, a protein of the **Immune** system with antimicrobial activity, to promote immunity development.
  - ✓ milk sIgA and saliva sIgA harmonize to prevent adherence of bacteria to the gastrointestinal tract and respiratory tract to promote immunity.

19

- Exposure to protective biofactors of breastmilk
- Theories:
  - administration may mimic the protective effects of amniotic fluid that is normally swallowed during the last trimester
  - intestinal growth factors may be absorbed mucosally and travel to the gut to accelerate intestinal maturation
  - human milk administration will lead to decreased use of parenteral fluids, ventilator associated pneumonia, central line days, and the duration of hospitalization
  - lead to increased maturation of oral feeding skills and enhance breastfeeding outcomes.
- Proven facts:
  - not harmful, alters oral microbiome
  - more parental empowerment, duration of breastmilk
  - increased urine levels of IgA and lactoferrin, decrease in clinical sepsis

- Oral therapy should be done around the clock with mother's own milk
- Use 0.1 ml per cheek every 3-6 hours with cares
- Place in sterile tuberculin syringes and apply to the baby's cheek, gums and the inside of their lips

Feed Me the Butter!



Acta Paediatr Scand 79: 1039-1044, 1990

- **Colostrum helps to prime the gut as it has the same factors as amniotic fluid**
- **Fresh milk before frozen milk**

22

Fresh Milk

- Place fresh, unfortified milk in refrigerator for up to 96 hours
  - No significant changes for osmolality, total and Gram-negative bacterial counts or concentrations of sIgA, lactoferrin, and fat
  - Gram-positive colony counts decreased, pH decreased, WBC decreased, and total protein decreased as storage duration increased
  - FFA concentrations increased
- Fresh milk has more current antibodies

23

Nutrient Changes in Freezer

- **Decline in lactoferrin by 3 mo**
  - **Major protein that fights infection**
    - **J Perinatol 2016 36, 207-209**
- **Decline in IgA, lysozyme, but not leptin**
  - **Pediatr Neonatol 2013 Dec; 54(6) 360**
- **Decrease in vit C and E**
- **Decrease in fat and total calories over 3 mo**
  - **Breastfeeding Med 7(4)2-12 p. 295**
- **Decrease in overall antimicrobial activity**
  - **JPGN 51(3) Sept 2010 p. 347**
- **Overall fresh frozen milk has more active properties than pasteurized milk**
- **Fresh milk has better energy and cell preservation compared to frozen milk**

Inpatient Fortification

- Preterm human milk is higher is both protein and energy content
- Use of unfortified human milk alone beyond the second and third weeks in preterm infants may provide insufficient amounts of protein, Ca, Phos, Cu, Zn, and Na
- Mature milk can range from 18-26 kcal/oz
- Fortification criteria: <32-34 weeks gestation at birth and <1500 g at birth
- Modest evidence to support fortification for short term growth but evidence insufficient if any evidence for long term effects on growth and development
- Otherwise healthy preterm infants can tolerate volumes up to 200 ml/kg/day with no increase in adverse outcomes (Travers, JPeds, 2020)
- Per CDC guidelines and due to risk of contamination, fortification should be sterile (not powdered infant formula)

1.5kg 225 mls	Kcals/kg	Protein, g/kg	Carb, g	Fat, g/ml/kg		Ca, mg	Phos, mg	Mag, mg	Fe, mg	Vit A IU	Na mEq/kg
Term Breast Milk	100	1.60	16.2	8.8	150	63	32	7.9	0.0	506	1.2
EBM+Prolact 4	120	2.85	17.1	10.4	150	277	144	16.2	0.3	839	3.3
EBM+Prolact 6	130	3.60	17.6	11.7	150	277	144	16.2	0.3	821	3.3
EBM+Prolact 8	140	4.35	17.8	12.8	150	277	143	16.2	0.4	801	3.5
EBM+SHMF 22	110	2.80	17.8	8.8	150	180	99	15.8	0.3	1267	1.7
EBM+SHMF 24	120	3.80	19.1	8.9	150	277	155	22.3	0.6	1899	2.0
EBM+Enfamil 22	110	1.50	19.6	8.6	150	63	36	0	0.3	401	0.0

Continuous Feeds Deprive Infants of Calories

Comparison of human milk macronutrient concentrations (mg%) throughout the studied treatment and offer processes – analysis of associated effects on slowly-thawed and quickly-thawed human milk (ANOVA for repeated measurements).

Treatment and offer processes	Lactose	Fat	Protein
Raw	6.51 ± 0.51	2.17 ± 1.46	1.03 ± 0.39
Post-pasteurization	6.28 ± 0.54	2.05 ± 1.46	0.90 ± 0.42
Slow-thawed-gavage offered	6.35 ± 0.57	1.91 ± 1.21	0.96 ± 0.41
Slow-thawed-continuous infusion offered	6.38 ± 0.56	0.89 ± 0.59	0.90 ± 0.39
Quickly-thawed-gavage offered	6.32 ± 0.54	1.88 ± 1.22	0.94 ± 0.38
Quickly-thawed-continuous infusion offered	6.36 ± 0.56	1.00 ± 0.69	0.89 ± 0.41
F	0.58	36.73	1.92
P	0.629	< 0.001	0.046

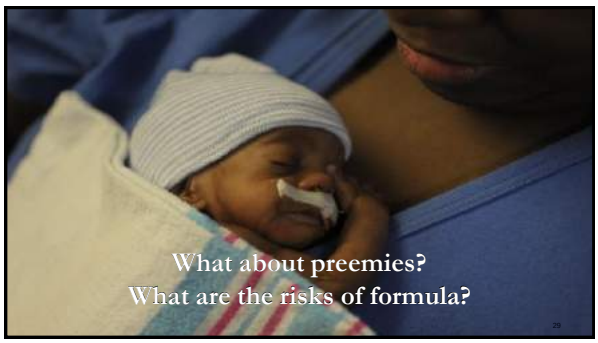
Vieira, 2011

Warming the Milk in the Hospital

- Warming milk leads to less caloric loss
- In preterm infants, feeding intolerance is reduced when feeds are warmed to body temperature
- Pseudomonas and other biofilm producing bacteria are a known contaminant of hospital tap water
- Waterless milk warmers can provide a safe and consistent way to warm milk in the hospital

Prepping the Syringe

- Consider syringe feeds by gravity with goal feed delivered over 20-30 minutes
- If using pump feedings, invert feeding syringe upward or at a 45 degree angle and prime with at least 2 ml of air
  - Fat floats to the top of syringe
  - Fortifier sinks to bottom of syringe
  - Priming with air prevents milk left behind
- Use syringes (vs bags) when possible to avoid milk loss with priming tubing



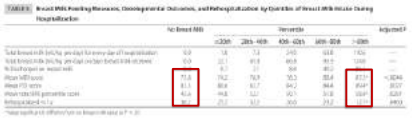
For Preemies, Formula Increases…

- Necrotizing enterocolitis (O'Shea 2007)
  - >half of feeds as formula = 6x risk of NEC
- Retinopathy of Prematurity (Collins, 2018)
  - Exclusive HM = 7.6% less risk ROP
- Sepsis (Patel, 2013)
  - ~20% less risk LOS for every 10cc/kg/d HM

Food for Thought

For every 10cc/kg/d MOM vs formula:

- Rehospitalization decreases 6%
- Neurodevelopment increases by ~0.5 pt



(Vohr, 2006)

Does the Colostrum Matter?

32

Benefit of Colostrum for Preterm

Image source: Lee, 2015

- Higher secretory IgA in preterm colostrum (Araujo, 2005)
- Higher urinary lactoferrin and urinary and serum sIgA (non statistically significant)
- Protective effect for sepsis
- Shorter time to reach full enteral diet
- Higher mean weight at 36 weeks of life
- Better breastfeeding rates at hospital discharge

Demetra; 2018; 13(2): 463-476

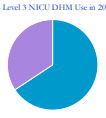
Does Donor Human Milk Have the Same Benefits?

34

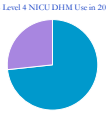
Pasteurized Donor Human Milk
Human Milk Banking Association of North America

- Member banks distributed 6.5 million ounces in 2018
- 74% increase in number of maternity hospitals providing donor milk from 2011 to 2015 (Perrin, 2018)

US Level 3 NICU DHM Use in 2015



US Level 4 NICU DHM Use in 2015



(Perrin, 2018)

Benefits of Donor HM (vs Formula)

- Half the risk of NEC ! (Quigley, 2019)
  - NNT = 33
- May help prevent BPD (Villamor-Martinez, 2018)
- May improve long-term cardiovascular risk factors (Singhal, 2001 and 2004)

Benefits of Mother's Own Milk (vs Donor)

- Decreased sepsis (1% vs 9%) (Schanler, 2005)
  - 29% vs 44% pathogens isolated
- Decreased BPD (Patel, 2019)
  - 10% decrease in BPD for every 10% increase in MOM
- Increased growth (de Halleux, 2019)

MOM is Far Superior to Donor Milk

Outcomes	Donor Milk (N=110)	Mother's Own Milk (N=68)	P value
Z-score for Weight at Discharge, Mean (SD)	-1.30 (0.98)	-0.88 (1.76)	0.06
ROP Requiring Treatment	22 (21%)	7 (10%)	0.075
Cognitive BSID Score	81.8 (11.2)	86.7 (11.2)	**0.023**
Language BSID Score	76.4 (13.7)	82.4 (16.1)	**0.041**
Motor BSID Score	79.9 (14.9)	83.5 (11.6)	0.17

- Donor milk is associated with:
  - Five point decrease in Bayley (BSID) cognition score
  - Six point decrease in language
  - Trend toward worsened growth and ROP

(Jordan Cowan, 2020)

Why is Donor Human Milk Different than Mothers' Own Milk?

39

Banked Pasteurized Donor Milk

- Pasteurization Process
  - Holder method: 62.5ºC for 5 min then rapid cooling
  - Destroys heat-labile microorganisms
  - Reduces hormones, growth factors, immunoglobulins, milk lipase (de Halleux, 2019) DHA and HMOs

Sterilized Donor Milk

- Sterilized (shelf-stable) donor milk
  - Retort processing: 121ºC for 5 min at 15lbs/in^2 above atm
  - Destroys all microorganisms (including spores)
  - Reduced nutrients: thymine and lysine (Lima, 2017)
  - Reduced Bioactive components: lysozyme and sIgA (Meredith-Dennis, 2018)
  - Reduced Protein and human milk oligosaccharides (HMO) (Meredith-Dennis, 2018)

41

Comparison of Infants Fed DHM

- Babies fed pasteurized DHM had improved weight change and head circumference.
- Trend toward decreased BPD

Outcomes	Pasteurized DHM (n=19)	Sterilized DHM (n=40)	p-value
Change in Weight Z-score from Birth to Discharge	-0.78 (0.8)	-1.29 (0.58)	0.01
Change in HC/Week (cm)	0.8 (0.09)	0.72 (0.12)	0.04
Oxygen at 28 days	14 (74%)	37 (93%)	0.097
Severe ROP	2 (11%)	7 (18%)	0.70
Poor Intestinal Outcome	0	2 (5%)	>0.99
Sepsis (CNS)	2 (11%)	5 (13%)	>0.99

Z-score change 0.8-1.2 = mild malnutrition
1.2-2 = moderate
>2 = severe

Mean (SD) for continuous variables.
Number (%) for counts.

(Jordan Cowan, 2020)

42

Conclusions for Preemies

- Donor human milk should be used to supplement any baby less than 1500g because it halves the rate of NEC
- **Mother's Own Milk** provides protection against sepsis, BPD, ROP, growth failure, and neurodevelopmental impairment that donor milk may lack, especially sterilized shelf-stable products

Preterm Breastfeeding Stages

- Tube-feeding, skin-to-skin contact, and frequent milk expression
- Breastfeeding begins-Rooting, licking, mouthing
- Single sucks, short bursts, long pauses, some milk intake
- Longer suckling bursts, stays fixed longer, more milk more often, supplements gradually reduced
- Milk intake increases, occasional larger volumes
- Milk intake varies, immature suckling pattern, can fully breastfeed with semi-demand feeding
- Vigorous, mature suckling, long bursts, breastfeeds on demand

Nyqvist, In Supporting Sucking Skills in Breastfeeding Infants 2017,

Direct Breastfeeding

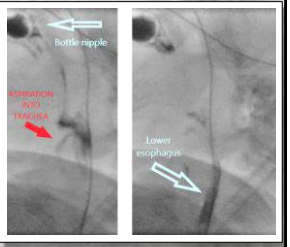
- **Increases milk supply during the first few weeks.**
- **Increases duration of lactation - exclusive pumping leads to early cessation.**
  - At 4 months post preterm birth, **73% of breastfeeding mothers are still breastfeeding**, only 10% of pump dependent mothers are still pumping.
- **Mothers who are pump dependent do not provide milk for as long as those who pump by choice.**
- **May reduce workload.**
- **Provides convenience – mothers don't have to "take care of the pump and take care of the baby."**
- **Help with emotional healing – may be the only "normal" experience they have.**

Umbilical Catheters

- **High risk neonates commonly receive enteral feedings even with the presence of an umbilical arterial catheter (UAC)**
  - **Little effect on pre/postprandial blood flow**
  - **No increased risk of feeding problems**
- **Skin to skin should be promoted even with umbilical catheters in situ**
  - **Check catheter placement**
  - **Make sure bedside RN and frontline provider are comfortable**
  - **No increased risk of infection**

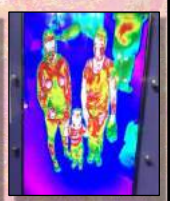
Is Going to Breast Safe?

- **Nonnutritive sucking is safe**
- **When feeding, different mechanism with bottle vs breastfeeding**
- **FEES study may be helpful if available**
- **Breastfeeding is the physiologic norm and is physiologically easier**



First Steps to Transition

- **For separated dyads, includes initiation of expression**
- **Oral Immune Therapy creates a positive oral experience and may contain oral maturation factors**
- **Skin to skin**
- **What's next?**



Milk: a Vital Sign

- We have to treat milk production and maintenance **like a vital sign**
- **Milk production should be monitored**
- **Discuss on rounds**
- **Track volume**
  - Goal of 500+ mls by day 10-14
  - "Coming to Volume"
  - Maintain over 500 ml

Transitioning to Breast – Tools & Tricks

- **Infants are 7.72 times more likely to leave direct BF if their first feed was at breast.**
- **Compressions during feed to keep infant interested.**
- **Supplementing systems.**
- **Feed when awakens before baby starts to cry- ideally a sleepy state.**
- **Paced bottle feeding and sliding scale.**
- **Continue to pump after feeds which means mother is "triple feeding".**
- **Breast before bottle – consider defining length of time.**
- **It takes time – good things in the NICU happen slowly!**

Non-Nutritive Sucking at a Pumped Breast

- **"Nuzzling (non-nutritive sucking) at the emptied breast during tube feeds can be initiated as soon as the infant is no longer ventilator dependent." NANN #3065**
- **Suck, swallow, breath is needed for both breast and bottle but can occur first in infants feeding at breast and they remain more physiologically stable.**
- **Begin putting baby's face near nipple.**
- **Anticipate rooting, licking, nuzzling**
- **This can begin much earlier than "PO readiness"**

Cue Based Feeding/ Semi Demand

- **Cue based feeding in the NICU is essential to promote breastfeeding**
- **At ~35-36 weeks, approaching discharge**
- **Feeding cues are subtle, and mother must offer breast Q1-3 during day and Q3-4 at night, until term corrected age**
- **Mother must also protect milk supply**
- **Full supply is 600-900 mls/day, but a 2kg baby taking TF 160 is taking 300-400; remainder must be pumped and stored**

"You've Have to Tuck to Suck"

Measuring Milk Transfer

- An electronic breastfeeding scale that locks should be used to measure pre- and post-weights to determine milk transfer volume.
- Initially assume minimal milk transfer.
- As transfer of milk improves, perform pre- and post-breastfeeding test weight.
- Pre- and post-weights are the only method that allow for direct measurement of milk transfer and are reliable.
- Gavage remainder of feed.
- Do this every few days, until milk transfer matches goal.
- Use post pump residuals as an estimate.

What Happens When Things are Not Working?

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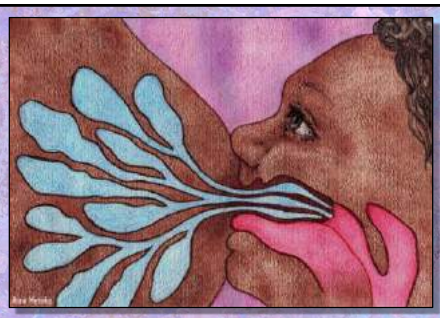


© The Milk Mob

Semi-Reclined (laid back) Positioning

Global Health Media

Skin-to-Skin and Self-Led Latch

- Awakens infant feeding reflex
- Organizes route to feeding
  - Search->feel->root
  - Baby finds the nipple/areola and latches

58

Why Not a Nipple Shield?

- **Don't assume a preemie needs this**
  - Not great evidence that it increases transfer
  - If used, avoid long term
- **Nipple shields may decrease prolactin**
  - Risk of decrease in milk supply
- **Risk of insufficient milk transfer**
- **Need to pump after nursing**
- **Does not teach nursing**
  - May increase nursing challenges

59

Supplementing at the Breast

Advantages:

- Decreases risk of bottle preference
- May increase breast emptying
  - Esp for low milk production
- Adds breast stim, increasing PRL

Tips:

- Does not need to be done for each feeding
- Ideal for infants who are effective nursers
  - Not for sleepy, weak infants
- Practice makes perfect
  - May take several tries to become efficient
- Can be used for small (syringe) or large (bottle) volumes

Finger Feeding vs Syringe Feeding

- 70 babies on room air at 30-35 weeks gest
  - Randomized to finger vs syringe feeding
    - 4 times a day for 20 min
    - Feeding finished via NG

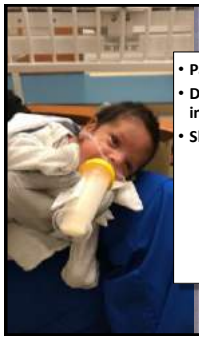
Buldur, Baltaci et al Breastfeeding Med 15(11) 2020

TABLE 2. COMPARISON OF TWO GROUPS ACCORDING TO STUDY OUTCOMES

	Group 1 (finger feeding) (n = 35) Mean ± SD	Group 2 (syringe feeding) (n = 35) Mean ± SD	p
Transition time to full enteral feeding (days)	7.7 ± 5.0	9.0 ± 6.1	0.436
Starting time to specified oral feeding method (days)	14.1 ± 13.9	11.7 ± 6.9	0.773
The amount of remaining milk given through orogastric tube after feeds (cc)	15.3 ± 6.5	15.9 ± 3.0	0.203
Transition time to fully breastfeeding (days)	10.4 ± 15.0	29.7 ± 10.2	0.000
Duration of hospitalization (days)	25.8 ± 17.4	35.9 ± 13.0	0.001
Weight gain at 10th day of study (g)	322.1 ± 82.3	252 ± 108.4	0.004

SD, standard deviation.

Always Pace Bottle Feeds!



- **Pacing is not just for preemies!**
- **Decreasing hydrostatic pressure in bottle slows flow**
- **Slower flow associated with**
  - ++ Infant control
  - Decreased risk of overfeeding
  - Less GERD/vomiting
    - Fewer prescriptions!
  - Less choking/coughing
  - Lower risk of bottle preference for nursing infants

Keep the bottle horizonal

Infant on their side until good head control

62

Energy Expenditure

Energy Expenditure for Breastfeeding and Bottle-Feeding Preterm Infants

Tips for Weaning Supplementation

- **Watching for subtle feeding cues.**
- **Pre/ post feed weights.**
- **Pre/ post pump residuals.**
- **Watching for satiation.**
- **Breast softness.**
- **<u>Growth!</u>**

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Newborns on Phototherapy can be Taken Out for Feedings at the Breast

- Intermittent vs continuous phototherapy
  - Intermittent = less than 12/24 hours
    - E.g. 3-5 hours, stop for 2-4 hours
  - Continuous = more than 12/24 hours (1 off-period at most in 24 hours)
- Intermittent associated with
  - As effective in reducing TSB
  - Shorter phototherapy duration
  - Fewer side effects
    - Fever, rash, bottle feeding
- Rationale
  - Photoreaction takes minutes
  - It takes hours for bili to come to the skin surface

J Adv Nurs 2021;77:12-22

Case 2- a case of the dwindles

- 35 week, 3.5 kg female infant born to a 25 yo G1P0 mother with an uncomplicated pregnancy until she went into preterm labor.
- Spontaneous preterm labor but after repeated fetal decelerations she was taken for emergent C-section at which time the infant was found to have a nuchal cord.
- Infant presented to the Ohio table limp, blue, and apneic and received chest compressions for 5 minutes with Apgars of 0, 1, 3, 7.
- Infant was intubated and taken to the NICU and was found to be mildly encephalopathic.
- She underwent the 72 hour hypothermia protocol.

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Case 2- a case of the dwindles

- On DOL 6, she was found to have a septic ileus and bacteremia.
- She was made NPO and received a 7 day course of antibiotics.
- She began receiving enteral feeds which were slowly advanced and she was receiving full feeds by DOL 17.
- Within a few days, she was taking about half of her feeds by mouth and was considered a NICU "feeder and grower."
- Around DOL 30, the nurse called the mother to tell her they were on their last few bottles of expressed breastmilk and asked her what formula she prefers.

Image source: Adv Neonatal Care. 2014 Apr; 14(2): 113–118.

Case 2- a case of the dwindles

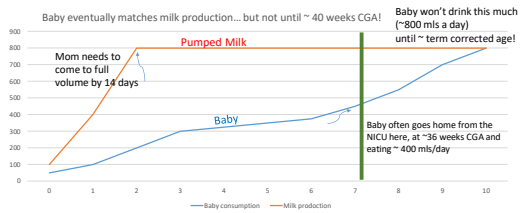
- What do you speculate happened and what do we do now?
- How can we set this mother up for future breastfeeding success with her infant?
- Could we have done anything to prevent running out of milk?

How Much Milk?

- A full term baby takes an average of 20-30 ounces, or 600-900 mls per day from ages 1-6 months.
- **"Coming to Volume"** indicates achieving this full milk volume of 600+ mls / 24 hours
- **Mothers of preemies who achieve > 500 mls by day 14 are three times more likely to be providing breastmilk at discharge than those who don't meet this goal [Milk: a Vital Sign!]**

Patel AL. Barriers to continued provision of human milk for mothers of VLBW infants. Sep 6.2016

Preemie Baby Consumption / Milk Production **Mismatch**



That's A Lot Of Milk!

- 24 week baby
- If mom achieves > 600 mls by day 14, Mom will pump ~ 2500 oz during the hospitalization, of which the convalescing preemie may drink ~ 600 oz
- **1900 ounces = 15 gallons**

Consider freezer space!

Booby traps - assumptions

- Don't assume you know what the picture of breastfeeding looks like.
- Don't assume all positive drug tests are real- drug tests can have false positives:
  - Zoloft false positive for benzo and LSD.
  - Labetalol, Sudafed, and metformin false positive for amphetamine and methamphetamine.
- Don't assume medications and radiological tests are contraindications.

Booby traps – watching our words

- "Mom said it was ok to give formula."
- "We wrote for feeds of 10 ml but mom isn't making that much."
- "You should sleep over night and get some rest!"
- Obtaining consent for alternative feeding regimens too early.
- Minimizing barriers – medications, elaborate pumping schedules, major lifestyle alterations, excessive pump part cleaning.
- Failure to set realistic expectations.
- Emphasizing that this doesn't last forever.
- Remembering that they didn't hear anything you said, say it over and over and/or providing literature they can reference!

Booby traps – watching our words

- We need to see how much your baby is getting.
- "Don't worry, you will make more milk as your baby needs more milk."
- "YOU HAVE TOO MUCH MILK!"
- Breastfeeding is too much work for your baby.

Case 2- a case of the dwindles- follow-up

- Mother was able to focus more on putting the baby to breast.
- She watched the "Maximizing your milk production video" and reported pumping increasing volumes each day.
- The infant was able to be transferred to a room where the mother could room-in.
- She was found to transfer 40 ml/feed and the infant was able to be fed on demand with close monitoring of weight gain.
- The mother was anxious- a discharge feeding plan was put in place.
- Mother practiced mindfulness techniques and started Zoloft. Lactation support saw her daily before discharge.
- The infant was discharged feeding on demand at breast with mother giving her a pumped bottle if she felt feeding was not going well.
- She followed up with her pediatrician 24 hours after discharge and was doing well. She was offered visits with lactation if needed after discharge.

Where to find Emotional Support Outside of Family, Friends and Partner?

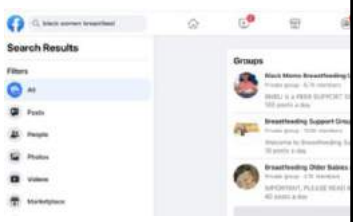
- Social Media Support
- Peer Support
- Social Work
  - Relaxation techniques, referral to mental health providers

Social Media Support

- Facebook and Instagram
- Exclusive Pumping Mums
- Black Women Do Breastfeed
- Pumping Mamas
- Pump_Momma_Pump
- Dr. Milk

Social Media: Facebook

- Qualitative Research Study of breastfeeding Black mothers:
- Facebook
  - Convenience
  - Community
  - **Improved confidence**
  - **Prolonged initial BFing goals**
- Choose a group with moderators who are lactation specialists
- Robinsinon et al "It Takes an E-Village" 2019



Partnering with the whole family

- Figuring out the best way to form a connection can be challenging!
- The millennial generation- meeting them where they are.
  - Texting for support and evaluation.
  - Videos.
  - Social media groups.
  - Phone apps.
  - Peer support.
- Anticipating issues- engorgement can change the flange size.
  - Using bfmedneo video.
- Family centered phototherapy (Szucs, 2013).
- Assign the support person tasks.

More Support Ideas

Breast Pump loaner
Insurance assistance

Letters of necessity

Support groups:
Local LLL
Mom-baby groups
Baby cafe

Travel support*
Parking vouchers

Goody bags:
Hands-free bras
Insulated bags
Scent cloths

Order meals in ICU
Meal vouchers

*Riley et al 2016: Study at Rush University in Chicago with 430 dyads, trend in less human milk feeding at discharge in Black mothers without access to a car

Assess for Postpartum Mood and Anxiety Disorders in the ICU

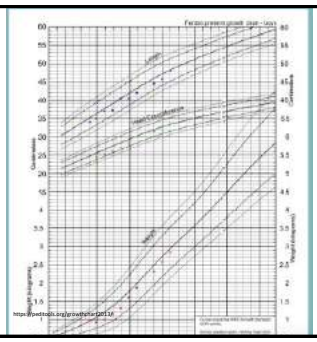
- Mothers who deliver prematurely or those with a baby who is ill should be assessed for PPD upon discharge from the postpartum unit
- Reassess at 2 weeks postpartum and 2 months
  - Screening with OB
- Plan referral process
  - Social services
  - Primary care provider
  - Other local behavioralist program
  - Community
    - Postpartum International- postpartum.net
    - https://www.acog.org/womens-health/faqs/postpartum-depression
    - National Alliance on Mental Illness- nami.org (free 24/7 support)

ACOG Committee Opinion #757: Screening for Postpartum Depression Obstet Gyn 2018; 132(5)

Case 3 – After discharge

- BB is a 3 month old male born at 24 w 5 d due to maternal pre-eclampsia.
- Uncomplicated NICU course now corrects to 36 w 2 d.
- In an isolette (projected to be out in one week), requiring 0.1 L/min NC, and eating about half of his feeds by mouth.
- He does "ok" with breastfeeding but mother has returned to work so visits twice per week.
- He has been nuzzling since 27 weeks when he was extubated and stable on bCPAP.
- Mother makes 24 ounces per day.
- He is currently receiving breastmilk fortified with sterile cow's milk based fortifier with feeds fortified to 24 kcal/oz.
- How do you prepare him for discharge?

Case 3 – After discharge



ABM Protocol #12, Transitioning the Breastfeeding Preterm Infant from the Neonatal Intensive Care Unit to Home, Revised 2018- Strategies:

- Enable the mother to exclusively breastfeed or provide as much human milk as possible while protecting and supporting the mothers' decisions.
- Correct deficits that arose during the NICU stay and minimize further nutrient deficits after discharge.
- Routine supplementation with Fe and Vitamin D.
  - 2-5 mg/kg/day depending on hemoglobin level
  - 400 IU – 1000 IU Vitamin D depending on alkaline phosphatase (AAP or ESPGHN)
- Fortification may be needed.

TABLE 1. BIOCHEMICAL AND GROWTH MONITORING FOR PREMATURE INFANTS IN THE POSTDISCHARGE PERIOD

Parameters	Goal	Action values
A. Growth		
1. Weight gain	20 g/day	<15 g/day
2. Length increase	0.5–0.8 cm/week	<0.5 cm/week
3. Head circumference increase[a]	0.5–0.8 cm/week	<0.5 cm/week or >1 cm/week
4. Weight/length		>85%[b]
B. Biochemical markers		
1. Alkaline phosphatase[c]	<450 IU/L	>500 IU/L
2. Blood urea nitrogen	>10 mg/dL	<8 mg/dL
3. Phosphorus	>5 mg/dL	<5 mg/dL
4. Vitamin D level	>30 ng/mL	<25 ng/mL
5. Hemoglobin	>11.5 g/dL	<11 g/dL

Modified from Hall[12] and Schanler[14]
Conversion factors for biochemical markers:
1. Milligrams/deciliter (mg/dL) to millimoles/liter—divide by 18.
2. Nanograms/milliliter (ng/mL) to nanomoles/liter—multiply by 2.5 (i.e., 1 ng/mL = 2.5 nmol/L).
3. International units to micrograms—divide by 40.
[a]Changes in head circumference require cranial imaging, such as a cranial ultrasound.
[b]High alkaline phosphatase levels may indicate a need for bone imaging, such as a bone x-ray.
[c]This is an indication of malnutrition and a cue to stop supplementation.

ABM Protocol #12

Action values

Helping Baby Grow

- Growth chart
- Increasing volume – new evidence
- Continuous feeds
- Inverting the syringe
- Ensuring milk transfer
  - Pre/post weights
  - Missed tethers/ torticollis
  - Trying SNS
  - Post feed residuals
- Lactoengineering
  - Scooping off fat if excess milk
  - Foremilk/ hindmilk separation
- If these fail and organic etiologies ruled out, fortification may be indicated.
- How much of a difference does it make with Ca/Phos?

	CALCIUM mg/dl	PHOSPHORUS mg/dl	VITAMIN D IU/dl
EBM +ENFACARE 22	31	17	6
ENFACARE 22	89	49	56
PROLACTA +6	122	64	40

Chart credit: St. Louis Children's Hospital Dieticians

What to do:

- Suboptimal assessment:

TABLE 3. THREE OPTIONS FOR FORTIFICATION OF HUMAN MILK

Option	Initial fortification	Enhanced fortification
1: Some formula feeds	Unfortified human milk for most feedings, with three feedings per day of preterm discharge formula (22 kcal/30 mL) or one feeding of a 30-calorie formula per day.	Increase the number of feedings a day of preterm discharge formula and/or increase formula concentration to 24 kcal/30 mL or higher.
2: Enriching feeds	Add powdered preterm discharge formula to expressed human milk feedings to enrich it to 22 kcal/30 mL.	Increase the amount of powdered preterm discharge formula added to expressed human milk to enrich it to 24 kcal/30 mL or higher.
3. Nursing supplementer	Change to breastfeeding at the breast for all feedings while supplementing with 15 mL of preterm discharge formula (22 kcal/30 mL) to all feeds using a nursing supplementer.	Increase the amount of preterm discharge formula given through the nursing supplementer during breastfeeding.

For each option, start with initial fortification. If the infant does not improve, enhance the fortification. We recommend an unfortified human milk diet for infants with an optimal nutritional assessment.

ABM Protocol #12

Compliance with CDC Guidelines (2013)

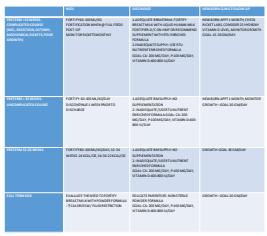
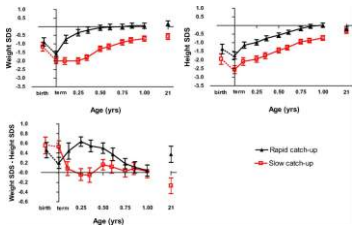


Chart credit: Christy Gilcrease, Washington University, adapted from Cohen, ICAN 2015

- Cochrane reviews say that fortification makes no difference in post d/c growth.
- Mothers perceive milk quality is inadequate.
- Algorithm depends on supply.
- Catchup growth may not be as good as we once thought.
- Increased risk for cronobacter, salmonella, clostridium.
- BM lactoferrin likely scavenges extra iron.
- Likely leads to decreased duration-pumping, extra steps and room for error with mixing.

1. www.cdc.gov/features/cronobacter.
2.Hunter,CJ and Bean,JF. Cronobacter: an emerging opportunistic pathogen associated with Neonatal Meningitis, sepsis and necrotizing enterocolitis. JofPerinatology 2013;1-5.

Too much of a good thing?



- Obesity
- Diabetes
- Heart disease
- Asthma
- Metabolic syndrome

From: Health Profile of Young Adults Born Preterm: Negative Effects of Rapid Weight Gain in Early Life
J Clin Endocrinol Metab. 2012;97(12):4498-4506. doi:10.1210/jc.2012-1716
J Clin Endocrinol Metab | Copyright © 2012 by The Endocrine Society

Rotteveel, Peds, 2008; Kerkhof, 2012

Outpatient followup:

- Frequent outpatient followup:
  - At least weekly at the beginning
  - Monthly for those with adequate growth until 6 mo CGA and then every 2 months until 1 yo CGA (Brodsgaard, 2015)
  - Biochemical markers at 1 month post discharge and 4 months CGA (if initially abnormal)
  - Continued fortification for 12 weeks or until adequate growth established or if weight/length percentile is >85%
  - Complementary feeds at 6 months CGA
- Is there a NICU specific follow-up option in your area?

ABM Protocol #12

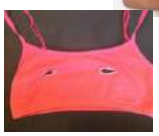
Support for mothers (ABM Protocol #12)

- "Optimal feeding, for preterm as well as term infants, is exclusive breastfeeding at the breast. With appropriate support, this goal is attainable for most premature infants." VON – 78%
- Help with transition to breast both inpatient and outpatient.
- Monitoring for signs of distress- sore nipples, mother's emotions, etc.
- Peer support through groups (mother's milk club) & peer counselors.
- Set them up for success - refer and coordinate care, nutrition support recommendations and appropriate referrals.
- Follow-up examinations with a trained, skilled lactation professional within 2 to 3 days after discharge for ongoing support and troubleshooting.

Tips/ Pitfalls

- Hands free bra
- Portable pump
- Car charger
- Flange size changes
- No wearable pumps for establishment of supply
- Simple mechanical
- Feed baby while pumping

Hands Free Pumping



Physician resources

- IABLE
- Dr. MILK
- Doctors Practicing Breastfeeding Medicine (Or Want to!)
- Academy of Breastfeeding Medicine
- Infant risk app/ hotline
- AAP Section on breastfeeding

Discharge rates matter

- The most critical determinant of post-discharge breastfeeding, with all the associated health and developmental benefits, is the early establishment of a robust milk supply (>600 ml/day by 2 weeks) (Wooldridge, 2003; Bier, 2002; Hill, 1999; Flacking, 2003, Smith, 2003; Furman, 2002).

US News and World Report Rankings

- **Outcomes and Experience (44.1% of score)**
- **Better survival odds and fewer complications**
- **% of discharged infants receiving at least some nutrition from breast milk when leaving NICU**
- **Ability to prevent infections in NICU**
- **Keeping breathing tube in place**
- **Dedicated milk room**
- **NICU BF committee**
- **Donor milk program**
- **Cohort of NICU RNs specially trained in lactation counseling**
- **Matching breast milk with correct infants: Success in insuring that newborns receive breast milk from the correct source**
- **Tracking of growth metrics for treated patients: Success in tracking growth metrics for treated patients prior to discharge or transfer**

Did we accomplish our objectives?

1. Understand 3 ways the feeding of human milk during the NICU stay reduces the risk of short and long-term morbidities in premature infants.
   - Decreasing sepsis, NEC, ROP, metabolic syndrome, BP, LDL, readmission, improved leptin and insulin metabolism, improved neurodevelopmental outcomes
2. Describe 3 important ways to help a NICU mother protect her supply.
   - Help mothers initiate pumping within one hour of delivery, encourage mother to take an active role in her child's care, oral care with colostrum, nuzzling when ready, encourage feeding on demand, encourage rooming in, encourage feeding at breast
3. List at least 4 steps that should be included in every mother baby dyad's feeding plan.
   - Breastfeeding goals, plan for pumping, plan for breastmilk management, help with understanding good milk transfer, plan for followup

Conclusions

- Colostrum helps the gut mature and all colostrum should be fed first before transitional and mature milk.
- Fresh is best! Use fresh milk over frozen when possible.
- Fortification supports short term growth but strong evidence for long term benefit is lacking.
- Warming milk is beneficial for the infant but must be done safely.

Conclusions

- **Preparing for transition to breast happens throughout the entire ICU admission.**
- **Developing a feeding plan can serve as a roadmap for the infant's family and ICU staff.**
- **There are many benefits of direct breastfeeding for the parent infant dyad.**
- **Tips for optimal latch include ensuring a secure hold with maternal comfort and placing the infant's nose to breast in proper alignment with the infant's mouth wide open.**

Ankyloglossia

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

- Conflict of Interest to disclose- None
- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required.

IABLE
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Objectives

- Describe the normal function of the tongue during breastfeeding
- Describe 4 symptoms of tongue tie for mother/infant dyad
- Identify anatomy of the lingual frenulum

Anatomic Definition

- Congenital tissue
  - The tongue separates from the floor of the mouth
    - frenulum = a remnant
- Demographics
  - 4-11% of newborns have an anterior tongue frenulum
    - Male: female = 3:1
    - Possibly familial

Cochrane 2018, Int J Ped Otorhinol 2013, Canadian Fam Phy 53(2007)

Functional Definition of Ankyloglossia- IATP

Based on current data (Haham A[1], Marom R, Mangel L, Botzer E, Dollberg S. Prevalence of breastfeeding difficulties in newborns with a lingual frenulum: a prospective cohort series. Breastfeed Med. 2014;9:438-41.) we recommend the following terminology:

1. ...dyads who have breastfeeding difficulties not solved by a lactation consultation and judged as being due to the infant's lingual frenulum should be clinically diagnosed as having **"symptomatic tongue-tie" or "symptomatic ankyloglossia."**
2. Infants with no breastfeeding difficulties and those with breastfeeding difficulties that are corrected after a lactation consultation should be considered as having an **asymptomatic "sublingual frenulum."**

Murphy

International Assoc of Tongue-tie Professionals:
https://tonguetieprofessionals.org/about-tongue-tie/

Recent history highlights in the literature...

- 2000 - Ankyloglossia Incidence and Associated Feeding Difficulties
  Messner A (Arch Otolaryngol Head Neck Surg)
  Feeding diff =25% TT vs Controls = 4.8%
- 2002 -Ankyloglossia: Assessment, Incidence and Effect of Frenuloplasty on the Breastfeeding dyad. Ballard, Pediatrics
- 2005 - Randomized, controlled trial of division of tongue-tie in infants with feeding problems. Hogan M, Westcott C, Griffiths M. J Paediatr Child Health

Recent history highlights…

- 2008 - Frenulotomy for Breastfeeding Infants With Ankyloglossia: Effect on Milk Removal and Sucking Mechanism as Imaged by Ultrasound. PEDIATRICS Geddes
- 2013 – Diagnosing and Understanding the Maxillary Lip-tie – Kotlow, DDS. JHL
- 2014 - Using topical benzocaine before lingual frenotomy did not reduce crying and should be discouraged. Acta Paediatr

Breastfeeding Improvement Following Tongue-Tie and Lip-Tie (2016) Release: A Prospective Cohort Study
Bobak A. Ghaheri, MD; Melissa Cole, IBCLC; The Laryngoscope

BF mother–infant (0–12 weeks of age) dyads with untreated ankyloglossia and/or tethered maxillary labial frenula who completed preoperative, 1 week, and 1 month postoperative surveys.

Results: A total of **237 dyads** were enrolled after self-electing laser lingual frenotomy and/or maxillary labial frenectomy.

Isolated **posterior tongue-tie was identified in 78%** of infants.

Significant postoperative improvements were reported between mean preoperative scores compared to 1 week and 1 month scores of the BSES-SF (F(2) 5 212.3; P < .001), the IGERQ-R (F(2) 5 85.3; P < .001), and **VAS pain scale** (F(2) 5 259.8; P < .001). **Average breastmilk intake** improved 155% from 3.0 (2.9} to 4.9 (4.5) mL/min (P < .001).

Breastfeeding Improvement Following Tongue-Tie and Lip-Tie (2016) Release: A Prospective Cohort Study
Bobak A. Ghaheri, MD; Melissa Cole, IBCLC; The Laryngoscope

Conclusions: Surgical release of tongue-tie/lip-tie results in significant improvement in breastfeeding outcomes.

Improvements occur early (1 week postoperatively) and continue to improve through 1 month postoperatively. Improvements were demonstrated in both infants with classic anterior tongue-tie and less obvious posterior tongue-tie. This study identifies a previously under-recognized patient population that may benefit from surgical intervention if abnormal breastfeeding symptoms exist.

Aerophagia Induced Reflux in Breastfeeding Infants With Ankyloglossia and Shortened Maxillary Labial Frenula (Tongue and Lip Tie)
Scott A. Siegel, MD, DDS
Int'l Journal of Clinical Pediatrics - 2016

"Of the 1,000 infants, 526 (52.6%) had an improvement of symptoms of reflux within the first week after the procedure. This was significant to the point of either reduction or cessation of H2/PPI medications. Two hundred eighty-three (28.3%) had no change in reflux symptoms, suggesting other cause for reflux, and 191 (19.1%) showed improvement in post-feed irritability and less symptoms of reflux but could not successfully wean off medications."

Cochrane Review 2017

Five randomized trials met inclusion criteria (n = 302)

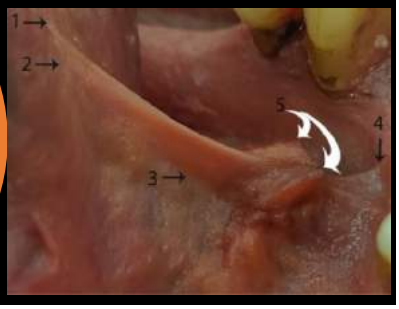
- Three studies objectively measured infant breastfeeding using standardized assessment tools
  - Pooled analysis of two studies (n = 155) showed no change on a 10-point feeding scale following frenotomy
  - A third study (n = 58) showed objective improvement on a 12-point feeding scale (MD 3.5, 95% CI 3.1 to 4.0 units of a 12-point feeding scale)
- Four studies objectively assessed maternal pain
  - Pooled analysis of three studies (n = 212) based on a 10-point pain scale showed reduction in maternal pain scores following frenotomy (MD -0.7, 95% CI -1.4 to -0.1 units on a 10-point pain scale)
  - A fourth study (n = 58) also showed a reduction in pain scores on a 50-point pain scale (MD -8.6, 95% CI -9.4 to -7.8 units on a 50-point pain scale)

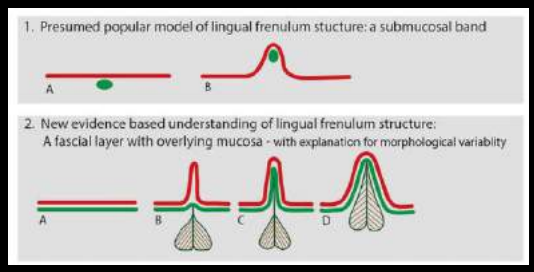
Cochranie Review 2017

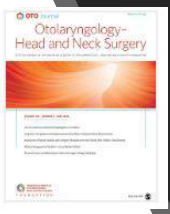
- No adverse effects
- Serious methodological shortcomings
  - small sample sizes
  - only two studies blinded both mothers and assessors
  - most controls underwent the procedure
  - no study was able to report whether frenotomy led to long-term successful breastfeeding

Authors' conclusions:
"*Frenotomy reduced breastfeeding mothers' nipple pain in the short term. Investigators did not find a consistent positive effect on infant breastfeeding. Researchers reported no serious complications, but the total number of infants studied was small. The small number of trials along with methodological shortcomings limits the certainty of these findings. Further randomised controlled trials of high methodological quality are necessary to determine the effects of frenotomy.*"

What is a tongue-tie? Defining the Anatomy of the in-situ Frenulum.
Clinical Anatomy
Jan 2019
Mills N, Pransky S, Geddes D et al.

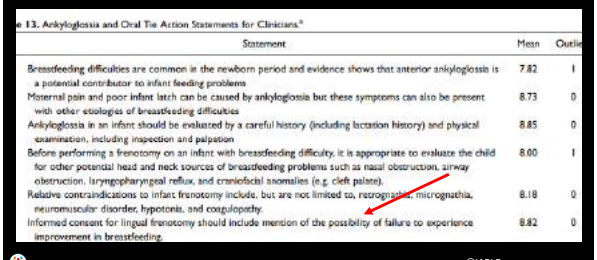






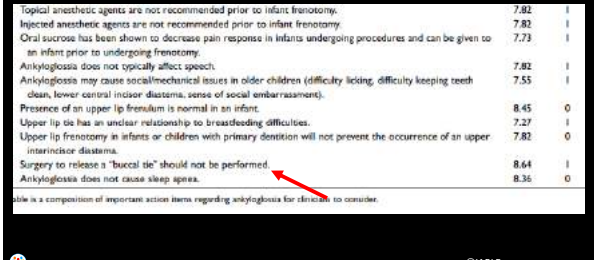
Clinical Consensus Statement: Ankyloglossia in Children.
Otolaryngol Head Neck Surg 2020 Apr 14
Messner AH, Walsh J, Rosenfeld RM et al

Otolaryngology– Head and Neck Surgery 2020, Vol. 162(5) 597–611



e 13. Ankyloglossia and Oral Tie Action Statements for Clinicians.[a]

Statement	Mean	Outlie
Breastfeeding difficulties are common in the newborn period and evidence shows that anterior ankyloglossia is a potential contributor to infant feeding problems	7.82	I
Maternal pain and poor infant latch can be caused by ankyloglossia but these symptoms can also be present with other etiologies of breastfeeding difficulties	8.73	0
Ankyloglossia in an infant should be evaluated by a careful history (including lactation history) and physical examination, including inspection and palpation	8.85	0
Before performing a frenotomy on an infant with breastfeeding difficulty, it is appropriate to evaluate the child for other potential head and neck sources of breastfeeding problems such as nasal obstruction, airway obstruction, laryngopharyngeal reflux, and craniofacial anomalies (e.g. cleft palate).	8.00	I
Relative contraindications to infant frenotomy include, but are not limited to, retrognathia, micrognathia, neuromuscular disorder, hypotonia, and coagulopathy.	8.18	0
Informed consent for lingual frenotomy should include mention of the possibility of failure to experience improvement in breastfeeding.	8.82	0



Topical anesthetic agents are not recommended prior to infant frenotomy.	7.82	I
Injected anesthetic agents are not recommended prior to infant frenotomy.	7.82	I
Oral sucrose has been shown to decrease pain response in infants undergoing procedures and can be given to an infant prior to undergoing frenotomy.	7.73	I
Ankyloglossia does not typically affect speech.	7.82	I
Ankyloglossia may cause social/mechanical issues in older children (difficulty licking, difficulty keeping teeth clean, lower central incisor diastema, sense of social embarrassment).	7.55	I
Presence of an upper lip frenulum is normal in an infant.	8.45	0
Upper lip tie has an unclear relationship to breastfeeding difficulties.	7.27	I
Upper lip frenotomy in infants or children with primary dentition will not prevent the occurrence of an upper interincisor diastema.	7.82	0
Surgery to release a "buccal tie" should not be performed.	8.64	I
Ankyloglossia does not cause sleep apnea.	8.36	0

able is a composition of important action items regarding ankyloglossia for clinicians to consider.

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DOI: 10.1089/bfm.2021.29179.ylf

ABM Position Statement

Academy of Breastfeeding Medicine Position Statement on Ankyloglossia in Breastfeeding Dyads

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https://www.bfmed.org/assets/Anklyloglossia%20position%20statement%202021.pdf

Indications for Frenotomy

Classic tongue-tie is a fold of mucosa and sometimes fascia that is visible on elevation of the tongue and that restricts its function. If it is assessed to be significantly restricting the infant's tongue function, regarding breastfeeding, a frenotomy can be offered at this time.

There is an ongoing need for high-quality research in these specific areas related to the treatment of tongue-tie:

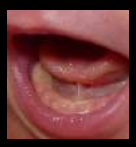
1. A clear definition of "tongue-tie" in distinction from the normal sublingual frenulum.
2. The extent of incision of the sublingual frenulum required for an optimal breastfeeding outcome.
3. Consistent documentation of immediate and long-term adverse outcomes after surgical intervention by any method.
4. Identification of the optimal surgical instrument and technique for frenotomy.
5. The subsequent long-term outcomes after frenotomy in the presence of a restrictive sublingual frenulum on effectiveness and duration of breastfeeding.

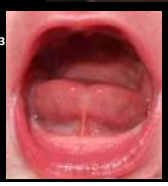
Normal Tongue Function

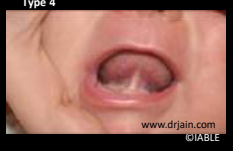
- Reach out to establish contact with the nipple/areolar complex (NAC)
- Sweep the NAC to the hard-soft palate junction
- Maintain contact with the NAC during feeding
- Dropping of mid-tongue provides a vacuum for milk to be sucked into the mouth

https://www.youtube.com/watch?v=RNJr-EyEq1E

Types of Frenula-Coryllos

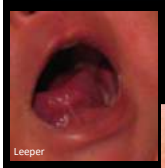






Coryllos Type 1

Coryllos Type 2



Coryllos Type 3

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Coryllos Type 3 with hourglass or Eiffel Tower insertion

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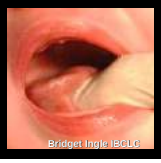
Coryllos Type 4



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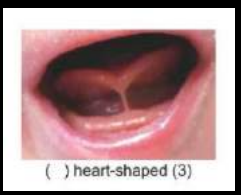
Lingual Frenula

- Its about form AND function and fit between breast and baby
- Not all need procedure
  - Good milk removal, no pain?
  - Good weight gain through 2-3 months? *(wt checks q 1-2 weeks)*
- How do some do ok?
  - Location of glandular tissue?
  - Elasticity and length of nipples?
    - Easy to grasp, no symptoms



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Maternal Symptoms Suggestive of a Restrictive Lingual Frenulum

- **Maternal pain**
  - Abrasions/open wounds on nipples
  - Feels "rough" like a cat's tongue rubbing
  - Compression visible after feeding
- **Poor breast emptying**
  - Triple feeds required
  - Decreasing production
  - Recurrent plugged ducts
  - Recurrent mastitis

Infant Breastfeeding Symptoms Possibly Due to a Restrictive Frenulum

- **Latch/seal difficulty:**
  - Cannot latch
  - Shallow latch
  - Biting while feeding
  - Clicking/snapping while feeding
  - Milk dribbling/leakage
  - ? Air swallowing due to clicking during nursing leading to GER
- **Poor removal:**
  - Frequent feeding
  - Sleepy at breast
  - Very slow/long feedings
  - Poor weight gain
  - Breast refusal
  - Popping on and off or fussy at the breast

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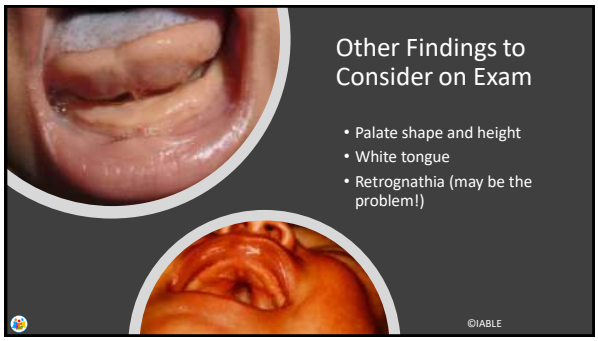

Other Findings to Consider on Exam

- Palate shape and height
- White tongue
- Retrognathia (may be the problem!)

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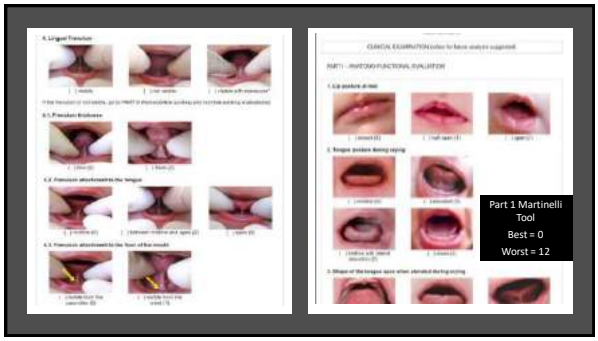
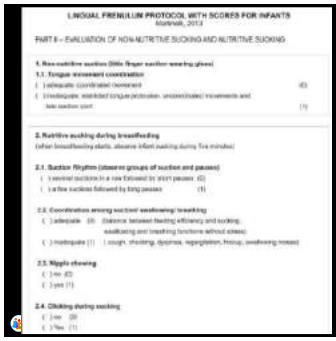
Objective Measures of Tongue Function

- Hazelbaker Assessment Tool
  - http://www.alisonhazelbaker.com/shop/hatlff-hazelbaker-assessment-tool-for-lingual-frenulum-function
- Martinelli Assessment Tool
  - http://www.scielo.br/pdf/rcefac/2013nahead/en_162-11.pdf
- **TABBY** (Bristol- The Tongue-tie and Breastfed Babies)
  - https://internationalbreastfeedingjournal.biomedcentral.com/articles/10.1186/s13006-019-0224-y#citeas



Part 1 Martinelli Tool
Best = 0
Worst = 12



Part 2 Martinelli Tool
Best = 0
Worst= 5

No clear guidance on what score is an indication for clipping

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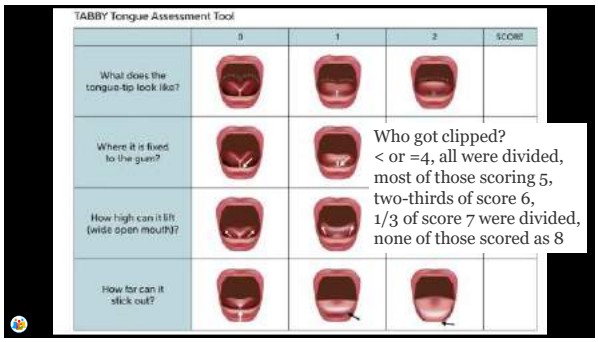


Who got clipped?
< or =4, all were divided,
most of those scoring 5,
two-thirds of score 6,
1/3 of score 7 were divided,
none of those scored as 8

Multifaceted Programme to Reduce the Rate of TT Surgery in Newborns in Canterbury NZ

TT clippings in **2013 = 7.5%** of infants
rate increased to **11.3% in 2015**, but no change in breastfeeding rates at 6 wks.

Study done at Christchurch Women's Hospital, NZ:
Infants <48 hrs only clipped if severe TT and feeding probs
Infants 48 hours-8 weeks criteria for TT clipping:
LC eval + BTAT (Bristol TT Assessment Tool) <=4

Results-
More consistent criteria for TT assessment and management
TT clippings dropped to **6.6% in 2016**, and **3.5% in 2017**
Exclusive breastfeeding rates were the same for infants with a frenotomy and those without!

Internat J Ped Otorhinolaryngology 113 (2018) 156-163

Association of Feeding Evaluation With Frenotomy Rates in Infants With Breastfeeding Difficulties

Christen Caloway, MD et al
JAMA Otolaryngol Head Neck Surg. 2019 Jul 11
Boston, MA

- 115 patients (median age, 34 days (range, 19-56 days), 68 (59%) were male) referred for surgical division of the lingual frenum
- Following the development of a program with feeding exam with a peds speech and language pathologist, 72 (62.6%) patients subsequently did NOT undergo surgical procedures
- Although all of the referrals were for lingual frenotomy, 10 (8.7%) underwent labial frenotomy alone and 32 (27.8%) underwent both labial and lingual frenotomy
- *"The majority of patients referred for ankyloglossia may benefit from alternative intervention strategies following comprehensive feeding evaluation. Close collaboration and formation of multidisciplinary teams are imperative for treating these children."*

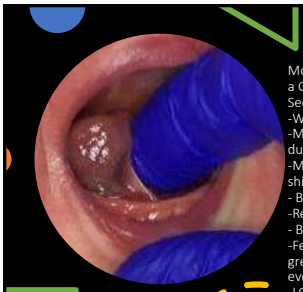

International Journal of Pediatric Otorhinolaryngology

Factors associated with frenotomy after a multidisciplinary assessment of infants with breastfeeding difficulties

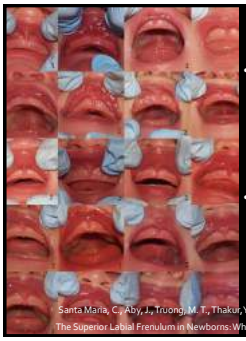
Gillian R. Dierala, Cheryl J. Hesch, Rebecca Baan, Sarah Sally, Christen Caloway, Christopher J. Hartnick

2020

153 patients (mean age 47.0 days, 56.2% male) referred for surgical division of the lingual frenulum. Following development of a program utilizing pediatric speech language pathologists to perform feeding evaluations prior to surgical consultation, 69.9% of patients (46) subsequently did not undergo surgical procedures. 11 (23.9%) underwent labial frenotomy alone and 30 (65.2%) underwent both labial and lingual frenotomies.



Moses is a 6 week old male 39 weeks gest, born to a G1P1, B Wt = 7 lb 7 oz, VD no complications
Seen by IBCLC:
-Wt today = 11-5
-Maternal history is unremarkable, + breast growth during pregnancy
-Mom cannot bf without pain – has tried a nipple shield, no help.
- BF 8-12 times a day, one side only for 30 mins
-Recently pumped X 24 hours- nipples felt better
- Baby suck exam: refused
-Feeding: took 110cc from one side, deep latch and great positioning, but could not get pain < 5/10, even with asymmetric latch.
-LC referred to you for a lingual frenotomy.
-Parents want your opinion...

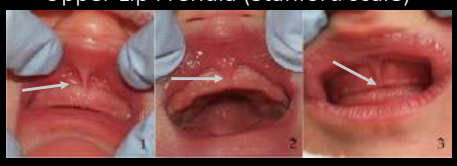


Upper Lip (Maxillary) Frenula

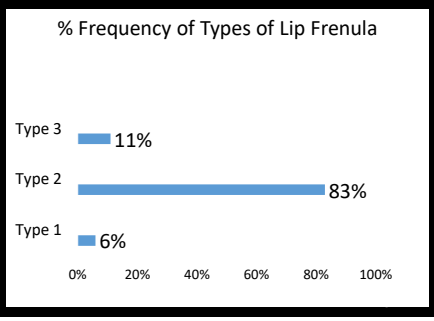
- 100 newborns
  - The frenula were evaluated by:
    - Newborn hospitalist
    - Peds ENT attending, Peds ENT resident
    - Peds dentist
    - IBCLC
  - Each photo was doubled, so each evaluator rated 200 photos
- 100% of all infants had an upper lip frenulum
  - Only 8% of babies had the same rating from each evaluator
  - Only 64-68% of the time did an individual evaluator give the same rating to the same frenulum

Santa Maria, C., Aby, J., Truong, M. T., Thakur, Y., Rea, S., & Messner, A. (2017). The Superior Labial Frenulum in Newborns: What Is Normal? Global Pediatric Health. https://doi.org/10.1177/2333794X17718896

The Rating System Used- Upper Lip Frenula (Stanford scale)



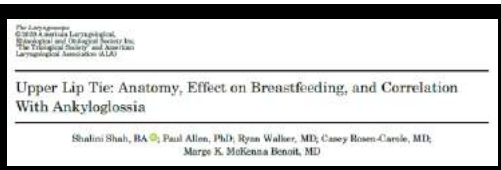
Type 1- Insertion near muco-gingival margin
Type 2- Insertion at mid attached gingiva
Type 3- Insertion along inferior margin at alveolar papilla and may wrap underneath



Systematic Review of Upper Lip Frenulum Clipping

- 15 articles identified
  - Mainly case reports and descriptions of surgical techniques
- No randomized controlled trials
- No good evidence for the effectiveness of routinely clipping the upper lip frenulum, in terms of improving breastfeeding problems.

Rizeq Nakhash, Natanel Wasserteil, Francis B. Mimouni, Yair M. Kasirer, Cathy Hammerman, and Alona Bin-Nun.Breastfeeding Medicine.Mar **2019**.83-87.http://doi.org/10.1089/bfm.2018.0174



Upper Lip Tie: Anatomy, Effect on Breastfeeding, and Correlation With Ankyloglossia

Shalini Shah, BA; Paul Allen, PhD; Ryan Walker, MD; Casey Rosen-Carole, MD; Marge K. McKenna Benoit, MD

Methods: A prospective cohort study of 100 healthy newborns was examined between day of life 3–7. Surveys were completed by the mother at the time of the initial exam and 2 weeks later. The maxillary frenulum was graded based on the Stanford and Kotlow classifications by two independent reviewers. Inter-rater reliability and relationships between tongue tie, lip tie, and the infant breastfeeding assessment tool (BRAT) were considered.

Conclusions: There was no correlation between maxillary frenulum grade and comfort with breastfeeding, pain scores, or latch. There was also no relationship between tip to frenulum length (tongue tie) and visualized lip anatomy, suggesting that tongue tie and lip tie may not cluster together in infants.

Key Words: Maxillary frenulum, upper lip-tie, ankyloglossia, tongue-tie, frenotomy.
Level of Evidence: 2
Laryngoscope, 131:E1701–E1706, 2021

Clip the Upper Lip Frenulum?

- Don't call it a tie unless clearly interfering with function
- Usually gradually moves upward with age
- No evidence that early clipping prevents wide spacing of upper teeth
- Reasonable reasons to consider clipping:
  - Pain where frenulum meets areola, unchanged with optimal positioning/latch
  - Milk dripping from upper lip
  - Emerged teeth have early enamel changes

    (Milk and solids are trapped by the frenulum against the teeth)

Frenotomy = incision of the frenulum

Scissors vs laser??

- Anterior Tongue Tie laser surgery
  - Many providers recommend exercises to prevent reattachment after laser
  - NO evidence this is useful or needed

Pre and Post Posterior Frenotomy via Laser

Credit to Kristen Berning DDS

Pediatric Grooved Director ~ 4 inches

MeisterHand MH18-1417 Miltex 18-1392

Miltex Premium 5-314

24% Sucrose?

(+ a Silver Nitrate Stick or gel foam)


Restrain the baby's arms well


©IABLE


Leeper


Leeper
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Leeper
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Before

©IABLE

Hold gauze under tongue while taking to mom to bf

©IABLE

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Gina Weissman DMD, RN, IBCLC

©IABLE

Submucosal

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Reid N & Rajput N. Acute feed refusal followed by Staphylococcus aureus wound infection after tongue-tie release. Journal of Paediatrics and Child Health. 2014; 50:1030-1031

Complications following frenotomy for ankyloglossia: A 24-month prospective New Zealand Paediatric Surveillance Unit study

Matthew Hale, Nikki Mills, Liza Edmonds, Patrick Dawes, Nigel Dickson, David Barker and Benjamin J Wheeler

Knowledge Gaps

- Indication for frenotomy other than breastfeeding difficulties?
- Best age to perform frenotomy?
- Best tool to perform frenotomy?
- Need adjuvant therapy to lingual frenotomy (body work, etc)?
- Effect of neonatal lingual frenotomy on speech and articulation later in life (prospective follow-up study needed)
- Aftercare of tongue-tie release to prevent scarring helpful/harmful?
- Indications and Efficacy of lip tie frenotomy?

More reading material

- Genna CW, Saperstein Y, Siegel SA, Laine AF, Elad D. Quantitative imaging of tongue kinematics during infant feeding and adult swallowing reveals highly conserved patterns. Physiol Rep. 2021;9:e14685
- Slagter, K.W., Raghoebar, G.M., Hamming, I. *et al.* Effect of frenotomy on breastfeeding and reflux: results from the BRIEF prospective longitudinal cohort study. *Clin Oral Invest* (2020). https://doi.org/10.1007/s00784-020-03665-y

Conclusions: Tongue and Lip Tie

- Tongue function should always be taken into consideration when considering a lingual frenotomy
- Nearly 100% of infants have an upper lip frenulum
- We need a lot more research on the indications and methods re: frenotomy

The Fussy Term Breastfed Infant

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COI

- I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity
- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

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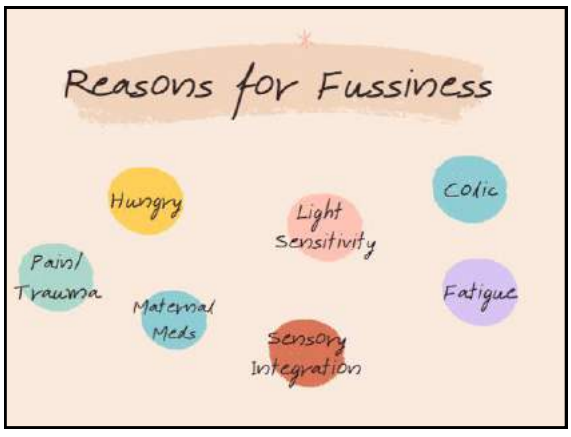
Objectives

- Recite at least 5 reason why a term breastfed infant may be fussy
- Define colic, and explain 2 possible theories for colic
- Describe the effect of probiotics for colic



COLIC

Image from Pexel

What is Colic?

Crying For:

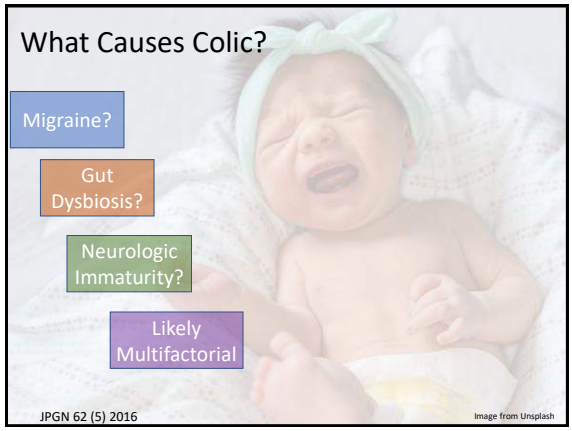
- 3 hours/day
- At least 3 days/week
- Infant is less than 3 months old

Wessels' Criteria Pediatrics 1954; 14:421-35

What is NOT Colic?

- Crying All Day
- Not feeding or gaining well
- Infant is any age

What Causes Colic?



- Migraine?
- Gut Dysbiosis?
- Neurologic Immaturity?
- Likely Multifactorial

JPGN 62 (5) 2016

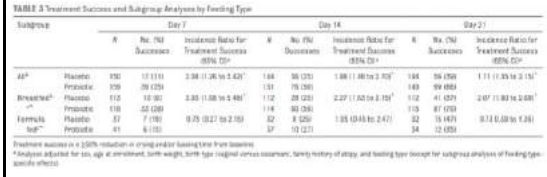
Image from Unsplash

What Interventions Help Colic in Breastfed Infants?
2016 Meta-analysis of many studies

Maternal Dietary Elimination	• Not well studied • No evidence of effect
Simethicone (gas drops)	• Not consistently effective
Fennel (gripe water)	• Modest evidence of being mildly effective • Studies are not strong
Lactobacillus Reuteri (probiotic)	• Most effective therapy • Works for bfed, not formula fed infants • HMOs in bmilk are food for L Reuteri

JPGN 62 (5) 2016

L Reuteri and Colic



Meta analysis of 4 double-blind trials including 345 infants with colic
- 174 probiotic, 174 placebo
- NNT for day 21 success was 2.6 bfed infants
- Not effective for formula fed infants

Pediatrics 141(1) Jan 2018

B Infantis and Colic

- Historically the dominant intestinal bacteria in bfed infants
  - Levels have declined in developed nations
- Human milk HMOs are prebiotic for B. infantis
- B infantis increases mRNA expression of intestinal epithelial tight junctions
  - Enhances intestinal barrier function
  - Promote maturation of dendritic cells in intestinal Peyer's Patches

BMC Pediatrics (2017) 17:133

IMPRINT Study

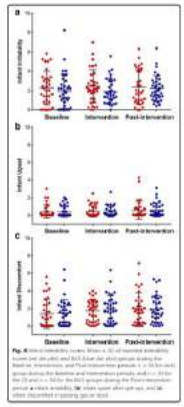
34 dyads BI and lactation support

34 dyads lactation support

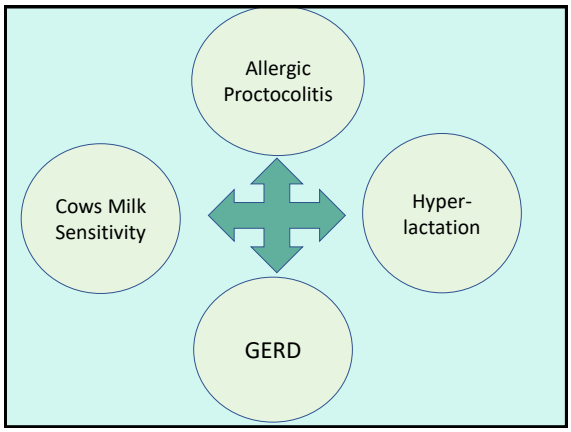
Received B. Infantis days 7-27 of life

No probiotic

Questionnaires on Days 3-4, 7,15,22,33,61 about infant health, GI sx, stools, fevers, illnesses

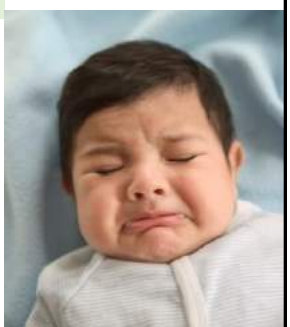


BMC Pediatrics (2017) 17:133

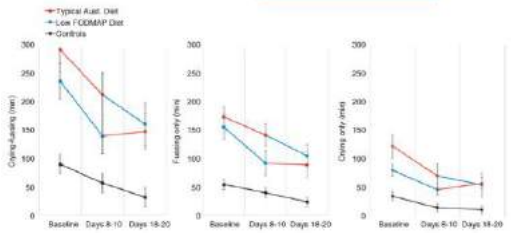


Effect of Maternal FODMAP Diet on Infant Colic

- FODMAP= fermentable oligosaccharides, disaccharides, monosaccharides and polyols
- Colic = > 3hrs/day, >3 days/wk, >3wks
- Dyads with colic randomized to a low FODMAP vs typical Australian diet
  - Blinded, with all foods brought to dyad
  - Control group didn't have colic, and kept their regular diet



Aliment Pharmacol Ther 2018; 1-13



- Initial drop in crying for typical diet thought to be due to typical improvement in colic over time
- Improvement in crying and fussiness were more consistent with low FODMAP diet

Infant Gastroesophageal Reflux (GERD)

- Gastroesophageal reflux (GER) is normal in infants
  - ~50% spit up at least 1x/day
  - Peaks at 2-4 mo
  - Genetic risk
- Gastroesophageal reflux becomes GERD (a disease) with infant symptoms
  - Fussiness, e.g. poor sleep, fidgety during feeding, cannot lie flat at night
  - Poor feeding
  - Insufficient weight gain

Unsplash.com

J Pediatr 2014;90:105-18

Maternal Diet and GERD

- Several well-designed studies have demonstrated worsening of GERD due to infant cows milk protein allergy
- Literature supports recommendation to strictly eliminate dairy from maternal diet for 2-4 weeks
  - Estimated ~56% of infants with GERD will improve
- No evidence for elimination of other maternal food proteins
- Other substances can contribute
  - Caffeine
  - Herbal galactogogues

J Pediatr 2014;90:105-18

Management Strategies for Infant Gastroesophageal Reflux (GERD)

- Loosen the diaper
- Burp after feeding
- Keep upright for 30-60 min after feeding
- Pace bottle feed!
- Manage hyperlactation

Unsplash.com

J Pediatr 2014;90:105-18

General Fussiness

- Only 5% of crying is thought to be medical
- Crying babies increases the risk of fatigue, depression in new mothers (Midwifery 27(2) April 2011)

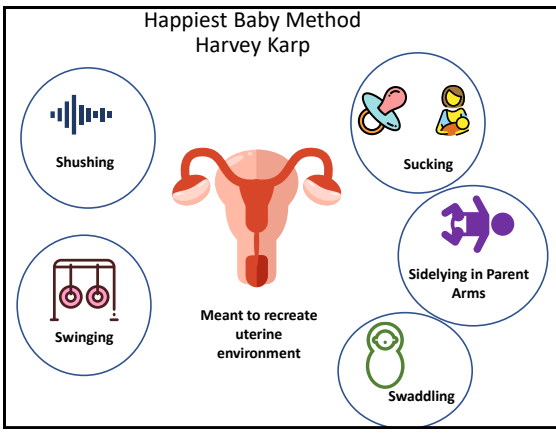
Moller, de Vente, Rodenburg. PLOS One April 24, 2019

Crying in the First 3 Months

- In the first 3 months of life, infants are very sensitive to extra-uterine life
- By 3 months
  - more independent, longer sleep cycles
  - Increased socially-oriented behavior (eye contact, smiing)
  - More self-regulatory
    - No longer regulate their respiratory sinus arrhythmia to their mother's

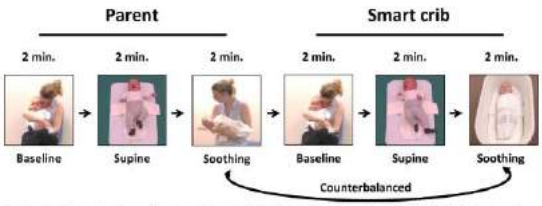
Moller, de Vente, Rodenburg. PLOS One April 24, 2019

Happiest Baby Method
Harvey Karp

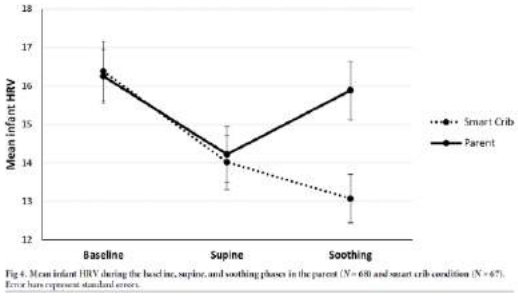


Parental vs Mechanical Soothing

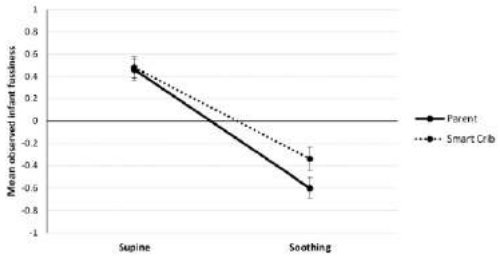
69 term infants and a parent, recruited from the community in Amsterdam
Infants ranged from 3.99-27.19 weeks



Moller, de Vente, Rodenburg. PLOS One April 24, 2019

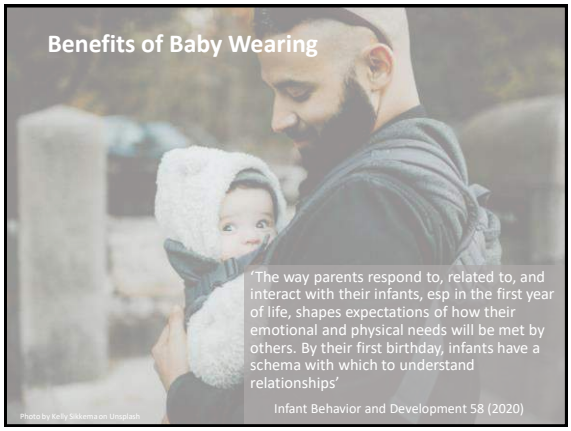


Heart rate variability associated with increased parasympathetic activity



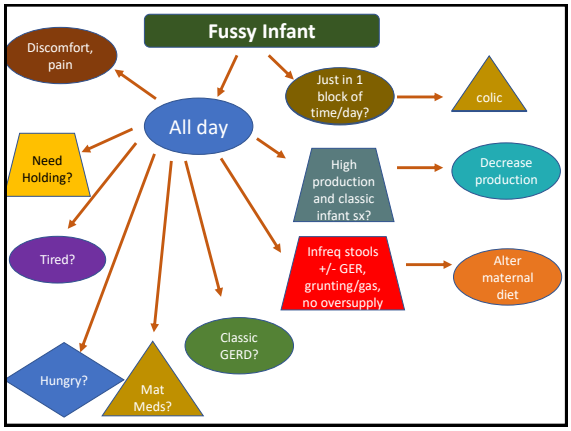
The older the infant, the less effect of parent soothing
Younger infants responded much more to parent soothing than crib soothing
No difference in crib soothing based on infant age- young and older infants responded the same

Bottom Line:
Parental soothing and smart crib with movement and white noise can soothe babies

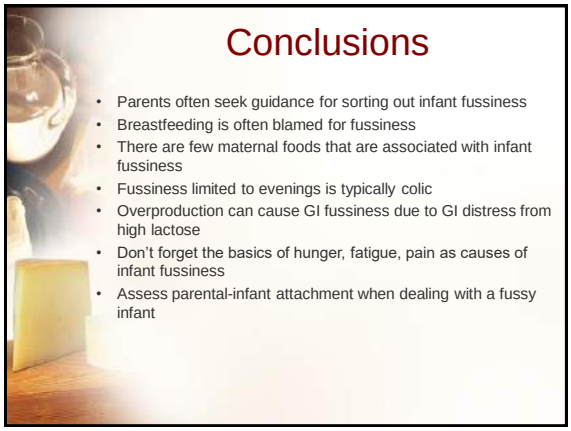


Promotion of Attachment Thru Baby Wearing

- Skin to Skin is well documented to promote attachment between parent and infant
- Baby wearing daily for 3 mo among adolescent mothers was associated with more secure infant attachment - Williams, Infant Behavior and Development 58 (2020)
- Mothers of insecure infants dislike close physical contact with their infants, and may have an aversion to physical contact- Weiss et al Infant Behavior and Development 23 (2000)



Claudia is an 8 week old breastfeeding infant who is fussy all day long. Mom states that the infant nurses every 2-2.5 hours, but she cries and fusses after feeding, and needs to be constantly held. These sx are not limited to a certain time of day, such as the evening.
Mom has insufficient glandular tissue, so nurses and pumps, providing about 50% of calories from her breastmilk, and the rest from a cows milk based formula.



Strategies for Pre-Conception and Prenatal Counseling for Busy Providers

IABLE
Institute for the Advancement of Breastfeeding & Lactation Education

Lauren Hanley, MD, IBCLC, FAOCG, FABM

Conflicts of Interest

Objectives

- Identify 2 sources of supporting evidence for prenatal counseling for breast/chestfeeding support
- List 3 ways to incorporate support into clinical practice for pregnant patients and patients of childbearing potential
- Identify a risk factor warranting early intervention for lactation support

What Can Prenatal Education Do?

- Increases rate of initiation
- Increases exclusivity
- Increases duration
- Increase confidence
- Increase self-efficacy

- How do we educate?
  - Individual > Group
  - Ideal: Interactive and Personalized
  - Mixed methodology, using multiple teaching strategies
  - Recurrent education > One time intervention

Technology Based Education

- Technology based = great alternative to clinician based
- Pate et al and Huang et al both showed:
  - Tech based/ Web based improved exclusivity, duration, knowledge and self-efficacy
- Computer based = positively viewed
  - Participants like it
  - Especially with enhanced graphics and text
- For practices that are "too busy" consider electronic options while patients are waiting
- Text messaging or communicating with app based technology
- Facebook or other social media support group options

Technology Based Education

- Computer/Smartphone based:
  - Milky Mama – Breastfeeding 101 for expectant parents
  - Lactation Link – free and paid classes and webinars, eConsults
  - Milkology – courses and library for parents
  - Medela Breastfeeding University – free class series covering range of topics
  - MilkWorks – online evidence based lactation library
  - Stanford Newborn Nursery – educational handouts and videos
  - Social Media – virtual support groups like La Leche League, KellyMom, the Leaky Boob, etc.
  - Apps – MommyMeds, LactMed, iBreastfeed, LatchMe, Nancy Mohrbacher Breastfeeding Solutions
- SMS/Text systems - Educational Messages Service, Prevention Pays, and others

Top 5 Reasons Women Stop Breastfeeding

1: Believe the baby is too hungry
2: Perceiving an inadequate milk supply
3: Difficulty with latch
4: Painful breasts or nipples
5: Returning to work

- Prenatal education can address these issues and prevent early discontinuation!

BREASTFEEDING MEDICINE
Volume 10, Number 10, 2015
© Mary Ann Liebert, Inc.
DOI: 10.1089/bfm.2015.29016.ros

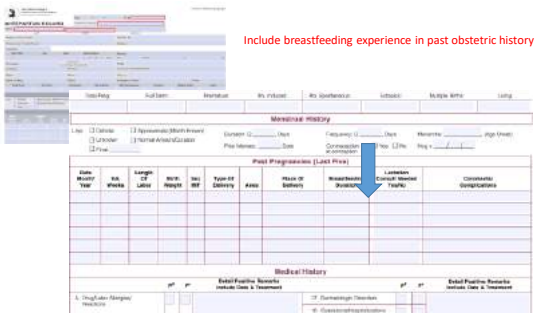
ABM Protocol

ABM Clinical Protocol #19: Breastfeeding Promotion in the Prenatal Setting, Revision 2015

Casey Rosen-Carole,[1] Scott Hartman,[2] and the Academy of Breastfeeding Medicine

A central goal of the Academy of Breastfeeding Medicine is the development of clinical protocols for managing common medical problems that may impact breastfeeding success. These protocols serve only as guidelines for the care of breastfeeding mothers and infants and do not delineate an exclusive course of treatment or serve as standards of medical care. Variations in treatment may be appropriate according to the needs of an individual patient.

Taking a Lactation History



Include breastfeeding experience in past obstetric history

https://www.acog.org/About-ACOG/ACOG-Departments/Patient-Records

Taking a Lactation History

- Almost every pregnant patient CAN breast/chestfeed
- Not every new parent can EXCLUSIVELY breast/chestfeed
- Realistic goals can be achieved and should be defined
- Expectations should be based on detailed history and likely etiology of previous experience
- Optimize childbirth plans (recognizing that things don't always go as expected)
- Coordination of care and monitoring of infant growth plans prospectively

Considerations…

- Background, ethnicity, gender identity, past trauma, and culture of patients and families
- Social supports? Or Lack of? Can play significant role in decision making
- Review importance of exclusive human milk feeding, assimilation of immigrant populations and current feeding beliefs/practices may differ from what science tells us
- Respect cultural traditions and taboos: sensitively educate about which of these may be detrimental.
- Assess literacy and try to educate in native language using interpreter services, try to use diagrams and pictures when possible
- Be aware of **own cultural attitudes and implicit bias** when counseling
- Understand financial framework, work constraints, family leave issues

Open Ended Questions

- "Have you thought about how you plan to feed your baby?"
- "What are the reasons you want to breastfeed your baby?"
- "Can you think of anything that might get in the way of reaching your goal?"

Taking a Breastfeeding History: Antepartum Education (1st trimester)

- **Early Pregnancy visit (Routine care):**
  - Discuss decision (partner / family present)
  - Review benefits / reinforce + decision / encourage exclusivity
  - Not breastfeeding- explore reasons for decision/ attitudes
  - Use open ended /positively framed questions
  - Prior breastfeeding experience? (with prior delivery Hx)

Taking a Breastfeeding History: Antepartum Education (1st trimester)

- **Early Pregnancy visit ("At Risk" history):**
  - Prior breastfeeding experience did NOT meet goals (exclusivity and / or overall duration)
  - Prior insufficient milk supply (subjective vs objective)
  - Prior poor infant growth, was supplementation recommended by a HCP?
  - Prior infant medical condition (hypoglycemia, jaundice)

Taking a Breastfeeding History

"At risk" factors include the following:

- Maternal medical condition that may affect supply (PCOS/insulin resistance, infertility, type II diabetes, obesity)
- Maternal medical conditions that may require medications / mother–infant separation (eg, diabetes, hypertension, depression, or anxiety)
- Review medications (for pregnancy and lactation—safety profiles may be different)
- Address pregnancy-specific concerns that may affect breastfeeding:
  - Previous preterm birth and risk of recurrence
  - Potential effect of multiple gestation
  - Previous cesarean delivery (plan for trial of labor versus elective repeat cesarean). Review possibility of skin to skin in operating room

15

Taking Breastfeeding History

Antepartum education: "At risk" factors

- **Previous breast surgery** (explore type of procedure, indication, and realistic expectations).
- Peri-areolar incision is of greater concern.
  - **Reduction mammoplasty (most concerning)**
    Greater risk of breastfeeding difficulties (especially low supply)
    Explore type of reduction (nipple translocation versus pedicle technique)
  - **Augmentation mammoplasty**
    Explore reason for placement to evaluate for failure of breast development
  - **Previous lumpectomy or breast biopsy**
    Especially if significant disruption to ducts or nerves
  - Treatment for breast cancer such as radiation therapy, surgery, or both
  - Nipple piercing or any associated infection or scarring
  - History of breast trauma, burns, or childhood chest tubes, or any combination
  - History of chest wall radiation or head radiation for childhood cancer
  - Mastitis or breast abscess (recurrence risks)

16

Taking a Breastfeeding History: Antepartum Education (1st trimester)

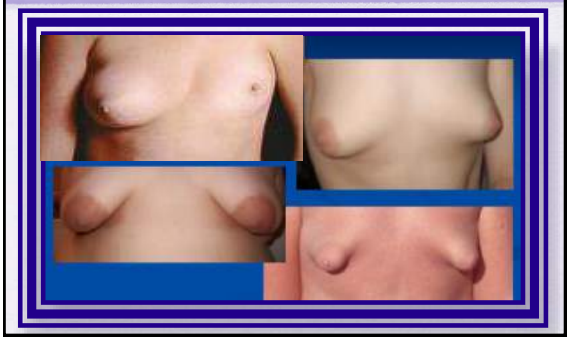
- **Early Pregnancy visit ("At Risk" history):**
  - Consider referral for prenatal consult if available
  - Example: I didn't make enough milk last time…
  - History: look for details that could contribute to this concern
    - assess risk for recurrence
    - Provide prospective guidance to avoid recurrence and close monitoring to diagnose promptly if it does recur

Physical Exam

Breast exam with special attention to:

- Breast masses (exam earlier in pregnancy potentially more sensitive d/t breast proliferation)
- Inverted nipples, accessory breast tissue, polythelia
- Breast scars (explore prior surgery: biopsy, augmentation, reduction and location of incisions)
- Severe asymmetry (1 cup size difference common)
- "Tubular" widely spaced nipple with scant midline tissue
- Supportive, preemptive breastfeeding guidance (avoidance of early bottle nipples, pacifiers and close monitoring of supply, as appropriate for concerning findings)

Shape matters more than size!



Mammary Hypoplasia

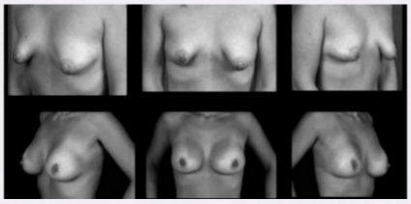


Figure 4. Tuberous type IV [This 22-year-old lady with bilateral tuberous type 4 breasts had severe breast constriction, for which bilateral parenchymal scoring and tissue expansion was performed initially, followed by 305 cc implants placements and bilateral nipple areola complex reduction. The result 22 months postoperatively was rated "very good".]

The Breast Journal, Volume 17 Number 4, 2011 391–398

Taking Breastfeeding History

At Risk: Important to Teach:

- Almost every woman CAN breastfeed
- Not every woman can EXCLUSIVELY breastfeed
- Realistic goals can be achieved
- Expectations should be based on detailed history and likely etiology of previous experience
- Optimize childbirth plans (recognizing that things don't always go as expected)
- Coordination of care and monitoring of infant growth plans prospectively

21

Second Trimester

- Breastfeeding role models
- Breastfeeding classes
- Support groups
- Connection with WIC if applicable
- Office based learning
- Medication and supplement use: Compatibility with breastfeeding?

Third Trimester

- Options for pain mgmt during labor
- Pediatrician/Family Medicine provider chosen
  - Is he/she supportive of breastfeeding?
- Skin to skin at time of birth (in OR or L&D room)
- Anticipatory guidance for:
  - Engorgement
  - Normal physiologic weight loss
  - Nighttime feedings
  - Hunger Cues
- Close follow up for baby after discharge
- Lactation support options post delivery (Step 10)

Third Trimester

- Review the Ten Steps to Successful Breastfeeding (is your hospital implementing some, most, or all of them?)
- Discuss support of breastfeeding in setting of planned or unplanned Cesarean birth
- Review importance of close follow up post discharge for the baby with his/her health care provider for weight check and assessment of successful breastfeeding
- Ensure knowledge of post discharge resources for breastfeeding support

Third Trimester

- Basics to integrate:
  - Role of supply/demand
  - Feeding on cue
  - Frequency of feedings
  - Exclusivity
  - Latch
  - Avoidance of bottles, pacifiers
- Consider doula care

Antenatal Hand Expression

- DAME study (Diabetes and Antenatal Milk Expressing) , Lancet 2017
- Multicenter 2 group unblinded RCT , 635 women enrolled
- Singletons 34-37 wks gestation, low risk diabetic population
- Hand expression 2x/day starting at 36 wks compared to usual care
- Primary outcome was NICU admission
- Each arm had 3 admissions
- Expression group: respiratory indication
- Control group: encephalopathy indication

- No harm in antenatal expression. SAFE
- Increased EBF at 24 hrs and through hospital stay,
- Effect was not sustained to 3 months

Third Trimester: Work/School Considerations

- Review the Law
- Encourage working with HR prior to delivery to ensure accommodations will be in place upon return
- Template of a letter for women to use for their employers outlining the recommendation to breastfeed/provide breastmilk for the first year of life and beyond

ACA Coverage of Pumps

You may be able to get help with breastfeeding at no cost

Health insurance plans **must** provide breastfeeding support, counseling, and equipment for the duration of breastfeeding. These services may be provided before and after birth.

This applies to Marketplace plans and all other health insurance plans, except for grandfathered plans.

Coverage of breast pumps

Your health insurance plan **must** cover the cost of a breast pump. It may be either a rental unit or a new one you'll keep. Your plan may have guidelines on whether the covered pump is manual or electric, the length of the rental, and when you'll receive it (before or after birth).

But it's up to you and your doctor to decide what's right for you.

https://www.healthcare.gov/coverage/breast-feeding-benefits/

Office Details/Decor

- Educate ALL staff to protect, promote and support breastfeeding
- No formula literature or samples present in waiting room
- Signage that conveys that breastfeeding is "welcome here"
- Space to breastfeed while waiting for appointments
- Space to express and store milk for staff of office
- Art on the walls that supports and encourages breastfeeding

Source: US Breastfeeding Committee

Preconception Care

- Discussion of medications and their impact during pregnancy and breastfeeding
- Substance Misuse/abuse counseling for women of reproductive age
- Discussion about lactation during breast exams (good opportunity)
- Pediatric providers can discuss physiologic function of breasts when early adolescents have breast growth
- Studies show that decisions are often made before pregnancy.
- Half of pregnancies are unintended thus important for culture change
- Integration of basic lactation into school curricula (NY, Indiana and Ontario starting in Kindergarten!)

Exposure of HS Girls to Breastfeeding

- High School girls are who are exposed to breastfeeding or were breastfed are more interested in learning about breastfeeding and more likely to consider breastfeeding themselves
- Survey administered to 100 teenagers in two suburban high schools in the United States
- 79% of the girls expected to have children, but only 52% planned to breastfeed.
- Girls who were breastfed were more likely to plan to breastfeed (83% vs. 35%), as were girls with exposure to breastfeeding (62% vs. 45%)
- Girls exposed to breastfeeding were more likely to see breastfeeding as beneficial to both the mother (45% vs. 24%) and the infant (86% vs. 60%)
- Have more interest in breastfeeding education (31% vs. 17%)

Leffler, D. U.S. High School Age Girls May be Receptive to Breastfeeding Promotion, 2000, JHL

Conclusions

- HCP have unique opportunity to shape informed decision making.
- Clear messages about the benefits of breastfeeding or risks of not breastfeeding should be conveyed.
- Education throughout the pregnancy and even before pregnancy and in young women improves breastfeeding rates.
- Know the law and help to teach it!
- Use the pump benefit if it's appropriate for your patient.

Prenatal Counseling Case

- 31 y/o G2P0101 presents to establish prenatal care at 12 weeks gestation
- She reports having "difficulty with breastfeeding" her first baby.
- First baby born at 36 wks after IOL d/t Pre-eclampsia
- Long labor culminating in Cesarean delivery

- What questions should we ask to learn about her lactation concerns?

Questions?

- What was her breastfeeding goal?
- How long and to what extent did she provide breastmilk?
- Was there maternal/newborn separation after the birth?
- Did skin to skin contact occur?
- What medications did she receive in labor?
- How did feedings go in the first 24-48 hours?
- Prenatal history? Any other complications during the pregnancy?
- How did things go after discharge?
- Any community lactation support?
- Parental leave?
- Return to work/Pumping?
- Family/partner support?

Answers…

- She had a family centered cesarean delivery, with a clear drape and delayed cord clamping on the abdomen while the parents observed the baby.
- Apgars assigned at the warmer by the pediatrics team, weight and measurements done and baby placed on mother's chest at about 10-12 minutes of life

Answers…

- History of GDM, diet controlled
- Received IV Magnesium during labor and for 24 hours post partum
- Goal was to breastfeed for one year, hopeful to EBF
- Job: works in marketing, has 3 month leave and plans to pump upon return to work. There is a "multipurpose" conference room she was planning to use.

Initial feeding

- Some difficulty with latching. Nurses told her nipples were "flat"
- Baby needed blood sugars per protocol since mother had GDM
- Ultimately shield introduced in first 24 hrs and baby was supplemented with some formula d/t low blood sugar
- In house for 4 days and at discharge, baby had lost 10% and was getting 15-30cc formula after each feed

At home…

- Was doing "triple feeds" and was exhausted. Husband back to work at 2 weeks and could not keep up schedule
- Baby never latched without shield and baby "seemed to prefer the bottle" and seemed to be frustrated at the breast
- Ultimately stopped attempting to breastfeed at one month but kept pumping for 3 months.

Issues:

- Are prenatal providers "equipped" to take this history and support women who don't meet their goals or have history which puts them "at risk"
  - TIME
  - KNOWLEDGE
- How is this documented and followed up?
- What kind of guidance should we give her?
- Do busy prenatal providers have the time/knowledge to delve into this?
- Strongly consider antenatal consult if have access.

Thank you!

Torticollis and Other Feeding Problems

- Conflict of Interest to disclose- None
- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required.

Objectives

- Identify 3 infant anatomic issues, other than tongue tie, that can cause difficulty with breastfeeding
- Discuss strategies to help infants with anatomic issues to succeed at breastfeeding
- Name 3 suggestions for dealing with breast or bottle refusal

Infant Related Structural or Functional causes of Feeding Problems

- Torticollis
- Fractured Clavicle
- Cleft lip/Cleft Palate
- Hypotonia/Trisomy 21
- Recessed Chin
- Nipple/mouth mismatch
- Laryngomalacia

Torticollis

- Latin for "twisted neck"
- May be from positioning in the uterus or from a difficult birth
- Head is twisted to one side with chin turned to the other
- Baby has difficulty turning head in the other direction
- Can cause flattening of the head

Torticollis

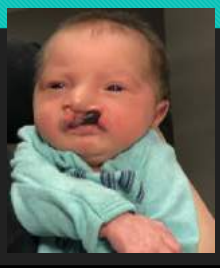
- May have clear preference for one breast
- May need to try different positions
  - Football hold for one breast and cross cradle or cradle for the other?
  - Baby prone on their reclining mom, baby hugs breast either lying or sitting on mom's thigh; let them keep tight side down & allow baby to maintain head tilt, then just move sideways to other breast
- PT critical early; consider craniosacral Tx/ bodywork

Fractured Clavicle

- Most common birth injury
- Most common symptom is pain
- Often fussy on one breast
- Be creative with positioning

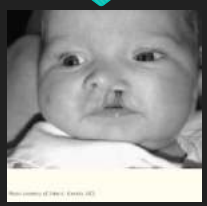
https://radiopaedia.org/cases/birth-trauma-right-clavicle-fracture-1?lang=us

Cleft Lip/Cleft Palate



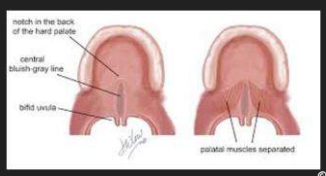
- Cleft lip and palate may occur together or separately
- Cleft palate may involve the soft palate, the hard palate, or both

Isolated Cleft Lip



- May be only a notch in the lip or extend into the nostril
- Isolated cleft lip usually not a problem for breastfeeding- can lay finger across the defect

Physical exam important



https://acpa-cpf.org/wp-content/uploads/2018/10/ACPA_booklet_Submucous.pdf

MUST do a suck exam

Cleft Palate

- Often cannot maintain latch well
- Usually cannot remove milk well

Cleft Palate

There is limited evidence and expert opinion suggesting that modification of positioning can improve the efficacy of breast emptying:

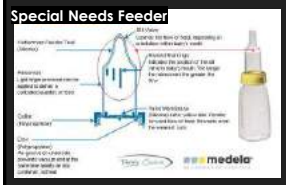
- Holding the baby more upright
- Giving the breast full support so that it remains in the mouth
- Maximizing the amount of breast in the mouth to "fill the cleft"
- Gentle breast compressions to keep the milk flowing for the baby

Cleft Palate

- Depending on the extent of the cleft, both suction AND compression during nursing may be impacted
- Breastmilk even more valuable due to the prevention of upper respiratory infections and ear infections
- Nursing directly at the breast is known to help with oral anatomy development
- The baby will usually have difficulty emptying a traditional bottle or handling flow from cups or syringes
- Special bottles have been designed to help…

Cleft Palate bottles

Special Needs Feeder

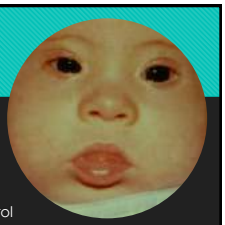


Dr Brown's Specialty Feeding System

Pigeon Nipple with one-way valve

Cleft Lip/Palate Nurser by Mead Johnson

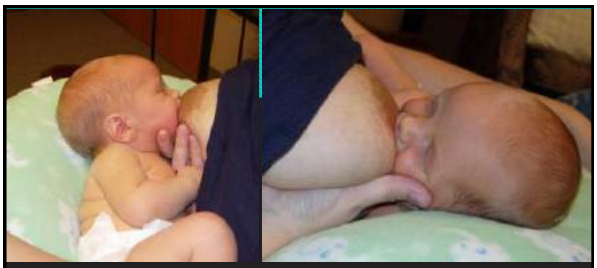
Trisomy 21 / Hypotonia



- In addition to hypotonia, babies with Trisomy 21 often have malocclusion and small mouths with large, protruding tongues
- Breastfeeding difficulties arise from abnormal or underdeveloped oropharyngeal structure control
- Little research has been done regarding assisting breastfeeding
- Julia's Way – Parent resource: www.juliasway.org

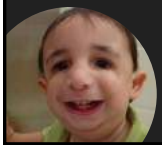
Trisomy 21

- Studies in **healthy infants** indicate benefits of breastmilk to decrease the risk of infections, increase growth when cardiac disease present, decreased risk of malocclusion, increased neurodevelopment
- There is no evidence that babies with hypotonia feed better from a bottle
- There is evidence that sucking efficiency improves over time
  - Babies usually suckle better by 4 months and even better by 8 months
- Challenging to breastfeed the hypotonic infant, but many can do so
- Observe for dysphagia or other swallowing issues



"Dancer's Hand" Hold- pressure on cheeks

Recessed Chin



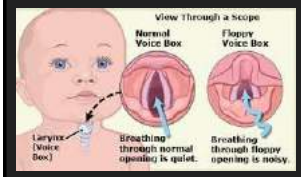
- Can be subtle or more severe
- Subtly recessed chins will have limited impact on breastfeeding
  - Asymmetric positioning helpful
- More significant retrognathia may occur with certain syndromes
  - Treacher-Collins syndrome
  - Pierre-Robin syndrome
  - Stickler Syndrome

Recessed Chin

Nipple/Mouth Mismatch

- May be more common with multiparous mothers – some report nipples larger with each baby
- MUST pump and supplement until baby grows into the nipple

Laryngomalacia



www.kidshealth.org

- Congenital softening of the laryngeal tissues
- Most common cause of inspiratory stridor in the newborn
- Often worse when baby is supine or on the side
- Work on positioning to allow for keeping the airway open
- If baby is struggling with latch or gain, further work-up is needed

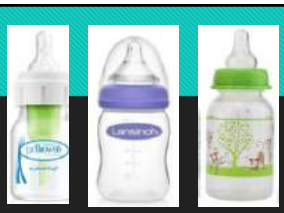
Nursing Strike

- Causes: Back to work, travel, any stress
- Bottle preference
- Illness or injury in baby
- Recent change in routine
- Reacting strongly to a bite
- Sudden decrease in milk supply
- Fast flow in a young baby (<6 weeks)

Nursing Strike Solutions

- Pretend like you do not care!
- Skin to skin, offer early and often, do not force
- Offer when waking up/falling asleep
- Stand up, walk/dance
- Older/distracted baby? Dark/quiet room
- Warm bath (need a helper adult)
- Go to a support group/LLL meeting (peer pressure)
  - MilkWorks.org has a handout in the Breastfeeding Information Center

Bottle Preference



- Use SLOW flow bottle
  - Dr Browns Premie
  - Parent's Choice from Walmart
  - Lansinoh
- Pace the bottle AND **do not let any milk flow for first ~30 seconds**
- If baby has NEVER latched to bare breast, a nipple shield may help the transition, but NOT necessary if baby has successfully breastfed recently – address FLOW

Bottle refusal - Ideas

- Try anyone but mom to give bottle
- Try offering before baby starving
- Try different positions – facing out sitting up,laying down on side
- Try walking around/swaying
- Wait for baby to open wide first
- Wrap bottle in something that smells like mom
- Try different temperatures of milk
- Try different shapes and flows of nipples
- Check for odor in pumped milk
- Spoon/cup/sippy cup
- Reverse cycling (Baby eats much more often through the night)

BEST strategy is to AVOID by offering a bottle between 3-4 weeks of age if KNOWN baby will need to take one.

MilkWorks.org has a link to the IABLE handout in BIC, and you can access at IABLE www.lacted.org

Conclusions: Infant Related Feeding Problems

- Careful, complete evaluation of the mother AND the baby is required to identify causes of breastfeeding problems
- Address the individual issues identified
- Focus on positioning and latch
- Support and encourage!

Induced and Re-Lactation

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1

- Conflict of Interest to disclose- None
- To earn continuing education recognition points (CERPS) for IBCLE, attendance for the entire course and a completion of an evaluation is required.
- For CMEs, please keep track of the hours you have attended, and completion of an evaluation is required

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Objectives

1. List 4 major topics of discussion that should be incorporated when counseling a mother who desires induced lactation.
2. Describe 2 typical protocols for breast development.
3. Explain how to counsel on establishing a milk supply after breast differentiation.
4. Identify key aspects of dyad support after the infant is born.

3

Definitions

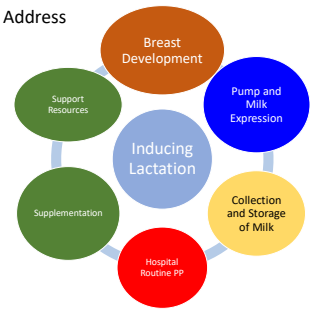
- Induced Lactation
  - Initiating lactation without birthing
  - Adoption or Surrogacy
  - Desire to provide breastmilk for another family/adult
  - Lesbian parent or transgender parent where both want to breastfeed
- Re-lactation
  - Bringing back a milk supply after losing it or weaning
    - Maternal illness
    - Formula intolerance
    - Change of heart
    - Adoption

Induced Lactation

- Why do mothers seek this?
  - To be part of the mothering process
  - Healthy for the mother
  - Bonding
  - Nutritional/healthy for the infant
  - To feed the baby at the breast rather than using a bottle
- Exploration of this option
  - Goals – is it primarily about the milk or feeding at the breast or both?
  - Expectations
    - Not easy, takes hard work
    - Often small volumes
    - Supplementation with breastfeeding
- Obtain Health History

5

Major Topics to Address



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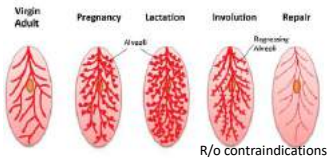
Breast Development



Options for Breast Development:
- Combined OCP or Progesterone
  - Skip placebo week
  - 1-6 months of preparation
- Medication to increase PRL
- Consider goats rue or metformin

R/o contraindications for hormones
- HTN- use progesterone only
- Migraines with aura
- H/o DVT, stroke, thrombophilia
- Breast cancer
- Mood instability/depression (?)
- Age > 35 (assess for other risk factors)
- Smoker

Anticipatory Guidance on Expectations

- Nulliparous mothers are expected to have least milk volume
  - Inability to take hormones for breast development adds to this challenge
- Multiparous mothers are expected to have more milk
  - Inability to take hormones may decrease volume

Other Considerations for Breast Development

- H/o PCOS, type 2 DM, or morbid obesity
  - May see less breast development
- Duration of hormonal breast prep depends on when they anticipate bringing infant home
  - Try to stop 6 weeks before she starts breastfeeding
- The combination patch has higher levels of estrogen
- More likely to be successful without hormonal prep:
  - Weaned in the last year
  - Multip
  - H/o high supply
  - Can still express drops of milk

Discuss Options of Meds to Increase PRL

Domperidone
- Not approved in the USA
- May prolong the QT
- Avoid some meds/foods
  - Fluconazole, erythromycin, grapefruit
- Possible GI side effects

Metoclopramide
- Inexpensive and available in USA
- May cause neurologic and psych s/e
  - Short term
  - Long term
- Other s/e of fatigue, dizziness, dystonic reaction

Pumping and Milk Expression- 2nd visit

- Choose a pump during the breast development stage
  - Some insurances will cover for induced lact
  - Hands free option might help pump more often
- See back 3-4 weeks before pumping starts
  - check flanges, show how pump works
- Review pumping details
  - When to start
  - When hormones stop
  - Ideally 6 weeks before having infant
- Frequency, duration
  - Every 1-3 hours with no more than one 5 hour break at night

What to Take After Stopping Hormones (or if No Hormones)?

- Domperidone or metoclopramide
- Goats rue or metformin
- Add galactogogues that pt desires to try Considerations:
  - Moringa leaf 1000-1500mg tid
  - Shatavari 800-1000mg tid
  - Torbangun
  - Fenugreek 1200-1300mg tid
  - Blessed Thistle
  - Milk Thistle
- Add one by one, to see effectiveness

Collecting and Storing Expressed Milk

- Expression will SLOWLY increase!
- Manage expectations
  - Expect calls/messages of disappointment
  - Lots of encouragement needed
- Collect drops using a TB syringe or other w/butterfly, needle clipped off
- Place in tiny container, date, freeze
  - 11ml, 30ml containers
- Add cooled droplets from next expression
- Bring to the hospital for use immediately after birth

13

Counsel on Hospital Routine in 3rd Visit

- Learn hospital routine/policies on adoption, surrogacy, and nursing
  - Meet/talk to LC
- Skin to Skin
- Frequency of nursing/pumping
- Infant sleep cycles
- Rooming in
- Hospital routines for blood sugar testing, supplementation
  - Bring thawed milk
- Infant feeding cues
- Risk of NAS if has this hx and adopting
- Consider a newborn care class

From Global Health Media

14

Supplementation

- Donor Human Milk
  - Banked donor human milk
  - From a close friend/relative
- Options for supplementation
  - Spoon for first few days
  - Finger feeding- for first week or so
  - Cup
  - At the breast
  - Bottle
    - Teach paced bottle feeding

15

Typical Scenarios

- First few days
  - Infant may not need supplementation
  - Supply may markedly increase with infant at the breast
  - Need to be watched carefully to determine when to supplement
- At discharge
  - Very close follow-up, consider scale, or weight checks/transfer weights
  - Decide on supplementation method
    - Work in progress, day by day, week by week

16

Inpatient and Outpatient Support

- Contact LC at the birthing hospital
  - Share feeding plan, progress report
- Find outpatient support
  - Often need to stay in the state for a few weeks
- Close follow-up when back home
- False sense of security
  - Risk of over-confidence re milk supply
- Milk supply may very gradually increase over time

17

If Adoption or Surrogacy Falls Through

- Discuss plans for future- when to expect an infant
- Consider a holding pattern if milk supply has been established
  - Decrease pumping to 3-4 times a day

18

Induction for a Transgender Female

- Increase baseline estrogen and progesterone meds (if on them)
  - Start estrogen and progesterone if not on them
    - Check for contraindications
- Add spironolactone to block androgens
- Add domperidone or metoclopramide to increase PRL
- Consider adding goats rue
- After 2-6 months, lower estrogen and progesterone to baseline, and start pumping.
- Add other galactogogues

Reisman T, Goldstein Z (2018) Case report: induced lactation in a transgender woman, *Transgender Health* 3:1, 24–26

Induction for a Transgender Male

- May or may not have had "top surgery"
- Generally considered chest feeding, even if no breast re-assignment
- Stop testosterone
- Induce as discussed for cisgender females

"Where's the Mother?" *Stories from a Transgender Dad May 24, 2016 by Trevor MacDonald*

20

Common Reasons for Re-lactation

- Ill infant/child
- Nursing strike
- Maternal health issues
- Change of heart/mind
- Maternal-infant separation
- Lost supply due to mismanagement
- Formula intolerance

Evaluate History of Not Breastfeeding

- Will underlying reason for weaning interfere with success?
- Is mom's goal realistic? Evaluate barriers
  - Meds
  - Time
  - Mental Health
- Is she looking for permission to not relactate?

Greatest Barriers

- Lack of dedication
  - Not committed
  - Has the will but not the way
- Lack of social support
- Financial
- Mental Health
- Physiologic

Relactation: Expectations and Timeline

- It's important to set realistic expectations
- Talk about time and energy involved
- Success will depend on maternal history and health, the relactation strategy and access to resources
- Need a plan, and end-time, when to re-evaluate for results

Relactation: Nurse or Pump

- This will depend on mother's desires and availability
- Initially, both will probably be necessary due to low supply
- If nursing, supplementing will probably still be necessary. If possible, doing this at the breast will add extra stimulation for the breast and encourage the baby to nurse.

Relactation: Supplementing at the Breast

Relactation and Induced Lactation: Expressing Breastmilk

- Proper pump use should be taught
- Discussion of stimulation v. expression phases or how to create this, cycle length if pump has this option
- Sizing flanges
- Hands free pumping
- Hands-on pumping
- Duration of pumping/power pumping
- Preventing pump related trauma
- Proper cleaning
- Try to observe/demonstrate pump use in the office

Bringing Baby Back to Breast

- Infant Led Latch
- Supplemental Nursing System
- Dream Feeds
- Family Expectations
  - Believe in the baby!

In Summary

- Plan on at least 3 visits for induced lactation before birth
  - First- Review of goals, expectations, and decision on breast development, educational resources, what pump to purchase.
  - Second- One month before stopping hormones, review pump, proper flange fitting, collecting and storing milk
  - Third- 2-4 weeks before infant is due, review supplementation strategies
- Arrange close follow-up for dyad after birth where they will be
- Follow closely with you after they return
- Relactation: similar visits/follow up plan

29

Induced and Re-lactation Resources

- Book- Breastfeeding Without Birthing by Alyssa Schnell
- https://www.sweetpeabreastfeeding.com/index.html by Alyssa Schnell
- http://www.asklenore.-info/breastfeeding/induced_lactation/gn_protocols.shtml -protocols for inducing lactation
- WHO: Relactation: review of experience and recommendations for practice- 1998 http://www.who.int/maternal_child_adolescent/documents/who_chs_cah_98_14/en/
- Kellymom- has a list of references https://kellymom.com/ages/adopt-relactate/relactation-resources/

30

Tandem Nursing and Weaning

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Conflicts of Interest

- The AAFP has reviewed Comprehensive Clinical Breastfeeding Medicine Course for Physicians and Other Providers and deemed it acceptable for up to 27.25 In-Person, Live (could include online) AAFP Prescribed credit. Term of Approval is from 06/01/2021 to 06/05/2021. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
- This course has been assigned 27.25 (L) Continuing Education Recognition Points (CERPs) by IBLCE. Long Term Provider #CLT117-04.

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Objectives

- Describe 3 reasons for premature weaning.
- Describe 2 ways that parents can decrease the frequency of pumping or nursing in order to wean.
- Describe 2 ways to encourage a child over age 2 to wean.
- Identify 2 issues to address with a pregnant nursing parent.
- Explain strategies on how to tandem nurse.

The Meaning of Weaning

- Addition of complementary foods
- Substituting formula for breastmilk or breastfeeding
- Decrease frequency of nursing, but not pumping
- Actively and continually decreasing the number of breastfeeds or pumpings per day, until done

The Decision to Wean

- Sometimes weaning is a health recommendation
  - Cancer treatment
  - Maternal meds
  - Recurrent mastitis + C Dif
- Usually patients make the decision to wean
  - They should not be coerced by others to wean

Parent-led Weaning

Source: United States Breastfeeding Committee

- Wean by dropping feedings
- Wean by stopping nursing and just pump

8

Dropping Feedings

- Drop one feeding, give formula or stored milk
- Pump only to comfort as needed
- Once comfortable, drop another feeding at another time of day
- When down to last feeding, may need to pump a day or two later

9

Weaning by Pumping Alone

- Take the baby off the breast, and just pump
- Gradually increase interval of time between pumping sessions, and only pump to comfort
- After dropping last pumping, may need to pump several days later

10

Which Weaning Method is Preferred?

- Traveling
- Working long hours
- Rapid weaning
- Oversupply
- Baby refuses to nurse

- Those who just nurse
- Slow wean/partial weaning
- Toddler/older child

11

Overproduction and Weaning

- Stop galactogogues
- Increased risk of plugs and mastitis if feeds/pumps are dropped
- Gradually increase time between pumpings
- Try to decrease volume expressed
- Add lecithin to decrease plugs
- Consider a medication to decrease supply
  - COC
  - Pseudoephedrine
  - Sage
  - Peppermint
  - Cabergoline

TABLE 12

Nursing Strikes and Refusal

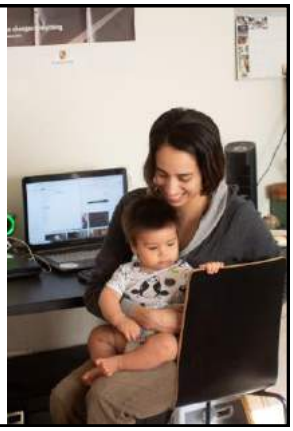
- If refusal before ~6 months, often can be brought back to the breast
- If refusal after 6 months, much harder to resume nursing
- Barriers:
  - Distraction, milk flow issues, bottle preference
  - Motor activity
  - Complementary feeding
- Solutions:
  - dream feeding
  - Bathing together
  - Feeding while distracting, e.g. reading, rocking, singing

Child- Led Weaning

- Typically older babies and children
- Parent continues to nurse whenever the baby or child wants to nurse
- There may not be a concrete plan or date for weaning

Toddler Nursing

- Variety of nursing styles
  - Toddlers drive nursing pattern
    - Frequency varies
  - Parent determines nursing pattern
    - They decide when nursing can happen
- Educating parents about options often helps them to nurse longer
  - They learn that they can be in charge!



Weaning Toddlers

- Start with a nursing routine
- Start by dropping the easiest nursing times
  - Distract with playing, toys, treats
  - Separation from toddler
  - Change routines at home
  - Anticipatory guidance for children over 2

17

Breastfeeding During Pregnancy

- Milk supply drops during pregnancy
- Most nursing infants wean by 2nd trimester
- No evidence for increased risk of preterm birth in low risk mothers
- Possible increased risk of low birth weight
- Possible increased risk of maternal nutritional compromise
- Important for expectant parent to receive nutritional eval and recommendations

Women and Birth June 2017

Breastfeeding During Pregnancy (BDP)

- 15-50% of mothers in low income countries BDP
  - Stats not available in wealthier populations
    - 1988-1994, 5% of breastfeeding mothers were pregnant
- BDP in low resource countries assoc with:
  - Lower weight gain in pregnancy
  - Lower maternal fat reserves
  - Higher risk of maternal anemia
  - No higher risk of miscarriage
- Current study researchers felt that previous studies were not detailed enough to determine if BDP can increase risk of miscarriage

National Survey of Family Growth

- National US data collected via survey during 2002, 2006-2010, 2011-2013, and 2013-2015
- Collect data from all genders on relationships, fertility, contraception, demographics
- Study includes 11,189 pregnancies in which BDP could have occurred, mothers aged 15-44
- They measured:
  - Pregnancy loss up to 20 weeks gest
  - Whether bfeeding during pregnancy
  - Whether complementary foods given with bfeeding
- Controlled for interpreg interval, h/o miscarriages, S/E data

Perspectives on Sexual and Reproductive Health 2019, 51(3)

Tandem Nursing

- Nursing an infant/toddler during pregnancy and beyond
- Continues for as long as desired
  - Toddler often nurses after the baby
  - Toddler can help maintain supply
  - Toddler stays healthier
  - Typically no concerns about infant growth

A mother asks you how to wean her 18 month old toddler, who is currently breastfeeding in the am, before naps, at bedtime and about 4 other times a day. The toddler loves to nurse. She will not let anyone else but mom put her to bed at night.

How do you counsel this mother?

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Any questions for this mother?

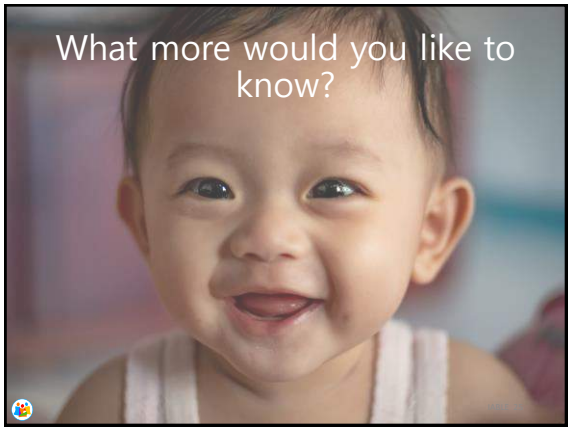
IABLE 22

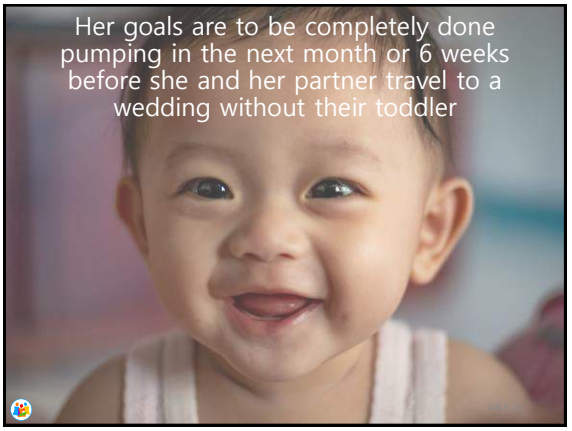
More history:
She wants to wean slowly, with the goal of nursing twice a day, in the morning and before bed.
She does not need to pump if away from the toddler for 6-7 hours. She is currently working at her job from home, so has access to the toddler whenever. Her partner does the daycare.

IABLE 23

A mother contacts you for help with weaning She is 8 months postpartum, exclusively pumping for the last 5 months since she went to work. She expresses 6 oz (180ml) every 3 hours in the day, and at night the longest break is 5 hours, when she expresses 10 oz (300ml). She was advised to pump every 4 hours to start weaning, but when she does this, she develops plugs, and has had 3 episodes of mastitis in the last 5 months. She wants your advice.

IABLE 24





Conclusions

- Guidance on weaning strategies is appreciated and beneficial to parents.
- Those who nurse during pregnancy need guidance on appropriate calories and their infants need monitoring of growth.