

Jenny Thomas, MD, MPH, IBCLC, FAAP, FABM




Dr. Jen 4 Kids

www.drjen4kids.com

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Breastfeeding and the Hypotonic Infant

Jenny Thomas, MD, MPH, IBCLC, FAAP, FABM



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Disclosure

- I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider of commercial services discussed in this activity.
- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.




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ABM Protocols

- 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.
- Primary authors
- Annotated bibliography
- Protocol Committee


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Description of Muscle

- Bulk/mass: physical size of the muscle
- Strength: refers to the amount of force a muscle can produce with a single maximal effort.
 - Muscle strength is measured during muscular contraction.
 - The size of your muscle fibers and the ability of nerves to activate muscle fibers are related to muscle strength.
- Endurance: the ability of the muscle to work at a steady performance rate over time.



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Description of Muscle

Tone:

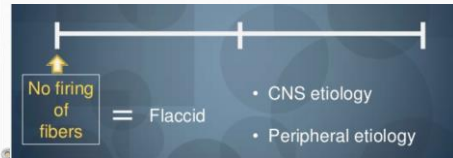
- No muscle stays completely relaxed, and as long as a person is conscious, it remains slightly contracted.
- It keeps the bones in place.
- Enables a posture to be maintained
- It allows a person to remain standing, sitting up straight, kneeling, or in any other natural position.

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Hypotonia

Diminished muscle tone

May or occur with or without muscle weakness



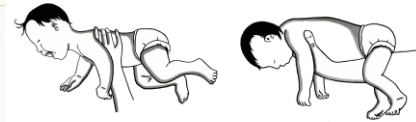
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Hypotonia

- Abnormalities of the central or peripheral nervous system
- Neuromuscular junction
- Muscle, metabolic, endocrine, or nutritional disorders
- Connective tissue disorders
- Perinatal hypoxia
- Chromosomal abnormalities

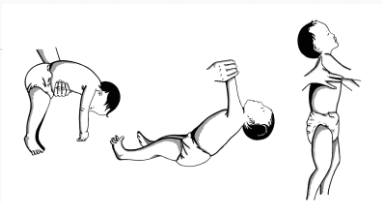


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Courtesy of Jasonbranson.com

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Courtesy of Jasonbranson.com

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Normal swallowing in the infant

- Consists of three components:
 - the suck reflex, which is the delivery system
 - the collecting system, that is, the oropharynx
 - the transport system, that is, the esophagus

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Normal Suck and Swallow

- Successful oral feeding requires that children:
 - Have functional oral sensorimotor and swallowing skills,
 - Overall adequate health (including pulmonary and gastrointestinal function)
 - Central nervous system integration
 - Normal musculoskeletal tone

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Normal Suck and Swallow

- In the newborn suckling infant, respirations and swallowing are intimately related to function and rhythmicity when the tongue, lips, and mandible move synergistically as a composite motor organ.
- Swallowing inhibits respiration

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Normal Suck and Swallow

- The unique suckle reflex of the infant is regulated in the brain stem. It allows the infant a constant flow of milk from a natural or synthetic nipple while maintaining regular respirations.
- The dynamics of the process involve alternating compression of the nipple with development of negative pressure in the oral cavity, which acts as a reservoir while normal respirations are occurring.
- The tongue empties the reservoir into the pharynx at regular intervals and the pharyngeal phase of swallowing occurs with no interruption of the respiratory cycle.

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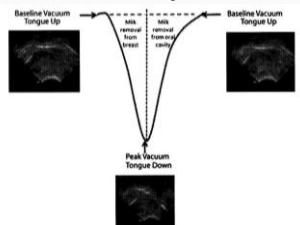
Oral Phase

- The space inside the newborn's mouth that can be filled with air or fluid is very small.
- Full term infants usually are born with sucking pads in the cheeks.
- The tongue and the sucking pads fill the mouth to create a safe oral stage of the swallow
- Results in adequate intraoral pressure, allows the infant to suck.

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The "Suck" – Milk Extraction by vacuum

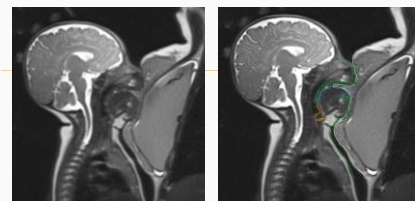
Ultrasound and Intra oral pressure transducers



Geddes: Early Human Dev. 2012

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MRI of Breastfeeding Infant & Mother

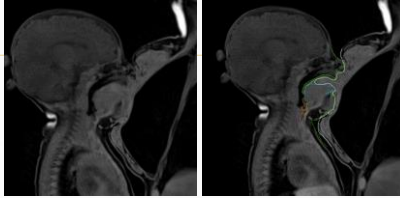


Tongue and nipple "filling" oral cavity – no air space

Nikki Mills: Doctoral Research Project
Functional anatomy of sucking and swallowing in the breastfeeding infant using cine MRI
(Centre for Advanced MRI, University of Auckland)

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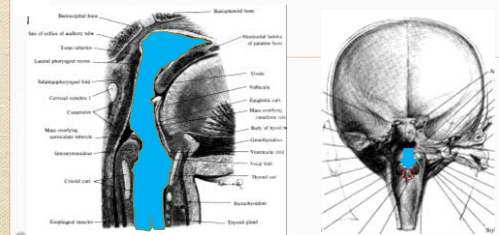
MRI of Breastfeeding Infant & Mother



"Black" shows the air in the nose and pharynx
Obligate nasal breathers – in order to maintain a latch while breastfeeding

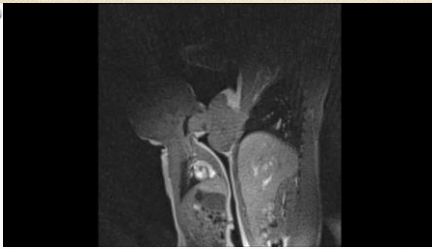
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Optimization of Infant's Nasal Airway (and functional anatomy explanation of "obligate nasal breathing")



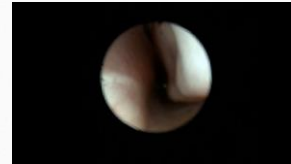
Bosma: Anatomy of the infant head. 1986

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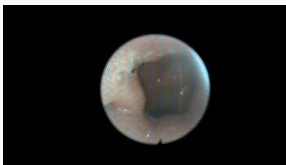
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Endoscopic view of 5 year old's airway



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Pharyngeal squeeze



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Breastfeeding Problems

- Results from abnormal or undeveloped control of the oropharyngeal structures
- Weak suck
- Similar to those experienced by premature infants
- Literature on hypotonic infants is scarce
- Literature on feeding premature infants is not
- Interventions for Trisomy 21, where 90% of the infants have hypotonia have been published

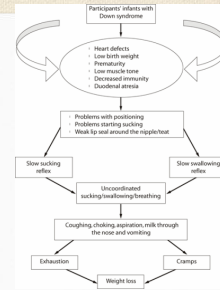
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Breastfeeding Problems

Oral abnormalities for children with Down syndrome

- Malocclusion
- Small mouth
- Large, protruding tongue
- Hypotonia

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Down syndrome & breastfeeding

- **Children with hypotonia need to be breastfed**
- More susceptible to ear, respiratory and other infections
- Developmental delay
- Congenital abnormalities like heart and GI abnormalities

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Heart disease

- Breastfeeding allows better growth
- Shorter hospital stays
- Higher oxygen saturations compared with children formula fed
- Not specifically studied in children with hypotonia or Down syndrome. We're extrapolating again.

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Sucking behavior

- Trisomy 21
- Less efficient than normal term infant
- Decreased pressure, frequency, duration of sucking
- Interrupts movement of tongue
 - When followed over the first year sucking pressure increases by 4 months and again by 8 months
 - Sucking frequency increases by 4 months
 - Improvement in sucking efficient in the first year

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Sucking behaviors

- Mothers report that feeding problems tended to resolve substantially by 3-4 months
- Significant difficulties in the beginning
- Mothers can be supported, maintain a sufficient supply until feeding improves

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No evidence that these babies feed better with the bottle or need a trial with the bottle

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Interventions

Prenatal

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Prenatally

- Healthcare providers should encourage all mothers to breastfeed. Provider encouragement makes a difference
- Get a breastfeeding history
- If the condition is known prenatally, get the help prenatally
- Encourage breastfeeding education
- Check on breast pumps, what needs to get done

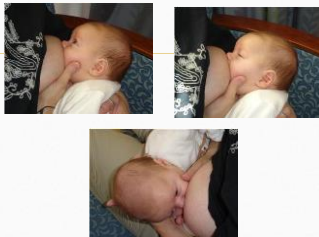
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Postpartum

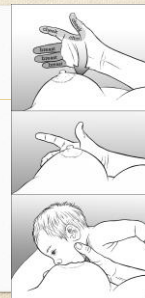
- The first feed should be initiated as soon as the infant is stable
- Kangaroo care should be strongly encouraged
- Someone skilled at lactation assessment should evaluate the infant's ability to latch, suck, and transfer milk
- Provide head and body support
 - Laidback nursing
 - Dancer hand position

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Dancer Hand



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Courtesy of Claudia Grosz

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Other strategies

- Hand compression
- Mothers have options: make them aware of the techniques, aids and ideas
- She can experiment and discover her best ways to meet her and her infant's individual needs.
- Remind the family that this may take extra time

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Interventions

- Frequent assessment: every 8 hours
- Frequent feeding should be encouraged
- Try for 8 to 12 feedings (not every 2-3 hours)
- Skin-to-skin
- Watch intake and assess hydration and jaundice- identify possibility of complications of poor intake

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Interventions

- Test weights, maybe
- Infants with Trisomy 21 may grow more slowly initially than other infants
- There are newly developed growth charts which have been validated

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Interventions

Alternative modes of feeding

Spoon, cup, syringe: low evidence

SNS: not helpful and should not be used. It is designed to help increase mother's milk supply with a baby who has a good suck. A poor latch makes this tool ineffective.

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Supplementation

- If the baby is attempting to suckle, follow each breastfeeding with expressed breastmilk
- Creates more stimulation on the breast and more milk for the baby
- Communicate with the team taking care of the baby; protect her desire to breastfeed

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Protection of milk supply

- Hand expression
- Pumping
- Both: can increase milk volume and the caloric content
- If separation is necessary, then mother should be set up with a hospital grade pump, ideally within the first hour.
- Even if the baby is nursing well, the mother may want to pump as well to build and maintain her supply

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Discharge

- If the baby remains hospitalized, the mother's milk supply should be assessed daily
- Watch the infant's weight gain and supplementation considered when necessary
- Monitor the length of feeds. Max of one hour.
- Keep reminding mother that the information we do have says that these infants get continually better as breastfeeding
- Refer to support groups

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Bad starts

- Children's prior and current oral experiences strongly influence how they approach oral stimulation and feeding.
- Abnormal or aversive responses to oral stimulation occur frequently when the infant has been deprived of positive sensory input to the mouth.
- Some of the babies start off with lots of procedures. Breastfeeding and skin-to-skin can help repair the bad starts.

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Bad starts

- Because many of these children require invasive procedures such as prolonged ventilation, suctioning and tube-insertion, they may develop a belief that the mouth is an unpleasant place.
- They avoid using the mouth to explore and learn because it is uncomfortable. They become wary and watchful of anyone who would approach the mouth. Their attempts to protect or guard the area become deeply ingrained.

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Critical Periods

- During the critical period, a child's experience—sensory, motor, emotional, and intellectual—determines which of these synapses will be preserved, through pruning of the least useful connections.
- In this way, each child's brain becomes better tuned to meet the challenges of his or her particular environment.

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Critical Periods

- Breastfeeding offers a distinct advantage over bottle-feeding when it comes to effective swallowing.
- Although the initial feedings may be brief in duration, success should not be measured by the volume consumed, but by the enjoyment of the baby and mother and the opportunity to practice oral motor skills.

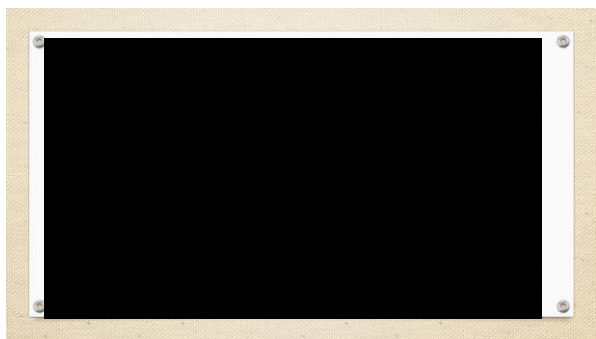
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Why Hypotonic Children Need Breastmilk

- We know that many of the morbidities that infants with hypotonia have can be positively affected by breastmilk. Many have no problems breastfeeding
- No evidence to suggest they feed better with a bottle
- No evidence to suggest that they need a bottle first



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