NAS and Feeding Difficulties

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International Board Certified Lactation Consultant
Certified Neonatal Therapist
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Objectives

1. Participants will be able to identify signs/symptoms of distress in infants who are exposed to substances in utero.

2. Participants will be able to determine methods for implementing successful feeding/breastfeeding in these infants/families.

3. Participants will be able to discuss members and their roles on the interdisciplinary team.
How do they go hand in hand?

Feeding and Neurodevelopment
Feeding is a

- time to continue to develop positive motor and sensory neuro-pathways
- the most complex task an infant is asked to do
- critical element of patient care
- a time for family and infant to build a relationship

Positive feeding experiences during infancy lead to positive relationships with food and meal times for child and families throughout life.
*******THIS SHOULD NEVER JUST BE CONSIDERED A CARE TASK*******
Professionals should foster the parent-infant relationship during feeding by

- Supporting and guiding the parents and infant to have a **positive** feeding experience
- Facilitating parent-baby attachment/ “dance of attachment”
- Empower the parents to
  - Understand the infant’s behaviors
  - Trust in establishing the parent-infant bond

A **lack** in continuity of the feeding approach and communication can **adversely** affect the baby’s overall feeding experiences leading to **decreased** PO intake and longer hospital stay

Shaker, 2013
Experience vs. Volume

- When an infant is learning to oral feed, the *experience* is more important than the volume of PO accepted
- Perfect, consistent infant practice leads to faster learning
- Feeding is a developmental skill
- The goal is to have infants become successful feeders NOT just successfully feeding (for one meal for example)

Slow and steady WINS the race

* Ewing & Seitz, 2014
Signs of Stress or Discomfort

Major stress cues

* Coughing/Choking
* Change in color
* Bradycardia
* Breath holding or apnea
* Stridor
* Decreased O2 saturations
* Multiple swallows
* Moderate drooling

Minor stress cues

* Irritable/frantic
* Disorganized/ difficulty latching
* Respiratory fatigue
* Tachypnea or increased WOB
* Nasal flaring/blanching
* Gulping
* Minimal drooling
* Anterior loss

Shaker, 2014
REMEMBER

Clocks have batteries

Babies have brains
Breastfeeding Basics
Benefits to NICU infant

- Even more important: benefits of preterm milk in NICU
  - Length of stay – reduced from 88 days to 73
  - Oxygen therapy – reduced from 33 days to 19
  - Sepsis – 22% of infants on formula vs. 19%
  - NEC – reduced by up to 86%
  - Infections – ear reduced by 50%, respiratory tract by 72%, gastroenteritis by more than 50%
  - Readmissions – reduced by 60%
Why should SLPs care about breastfeeding?

* “The American Speech-Language-Hearing Association (ASHA) has long accepted the prevention of communication disorders as one of the profession's primary responsibilities.”
  * GI, Respiratory, Otitis media (Ip et al., 2007), IQ* (Belfort et al., 2013)
* “Developmentally supportive” care
  * “…support the infant's physiological stability, self-regulation, behavioral organization, and developmental progressions…”
  * Babies are more stable at the breast (Bier et al., 1993; Chen et al., 2000; Goldfield et al., 2006)
* ASHA Practice Recommendations
  * Clinicians providing pediatric dysphagia services should have knowledge and skills to assess and treat breastfeeding as well as bottle feeding.

Blake, McComish, Crais, & Thoyre, 2014
The Feeding Dream Team

Lactation Consultant

* Assessment and evaluation
  * Adequate milk supply
  * Infant latch
    * Knowledge on frenulum and tongue tie
* Intervention
  * Provide instructions and education to increase milk supply
  * Positioning for nursing

Speech-Language Pathology

* Assessment and evaluation
  * Pre-feeding readiness
  * Oral swallow function
    * Oral mechanism exam
    * Latch
    * Transfer of milk
  * Pharyngeal swallow function
    * Stress cues
    * Instrumental swallow assessment
* Intervention
  * Promote infant feeding readiness
  * Positioning for nursing
  * Tools (nipple shield)
  * Provide education to parents and support staff
Assessment and Interventions

- Pre and Post-feeding weight
- Provides a guide as to amount of milk a baby is receiving during nursing
- Flow Rate/respiratory
- Positioning
Digital Scale to Grams
Supplemental Nursing System (SNS)

- A device that allows baby to receive extra milk at the breast.
- May be used
  - Baby
    - with weak suck
    - Transitioning from bottle to breast
  - Mother with decreased supply
  - Mother’s milk has not “come in” yet
Bottle Feeding Basics
Bottle Feeding

- Bottle feeding may alter self-regulation of intake, contributing to later obesity
  - Because the adult is in charge
  - Infants are not allowed to self-pace
  - They become over eaters
  - An infant at the breast can take as much or as little, and stop at their own pace
- No bottle nipple is most like the breast
Bottles and Breastfeeding

- Be aware of certain nipple shapes
  - Orthodontic nipple
  - Nipples with abrupt change from nipple to base
- Make bottle feeding more like breastfeeding
  - Mimic breastfeeding by letting baby pause and rest periodically while bottle feeding
  - Allow baby to have burst on bottle just like on breast, then take a pause for catch up breathing, simulating a let down
  - Continue allowing burst cycles and rest cycles throughout bottle feed; can leave bottle in the mouth just like a breast would be, just pausing for rests
Nipple Types

* Dr. Brown’s  

NUK
Nipple Types Continued...

* Tommee Tippee

NUK Orthodontic Bottle Nipples

- **Angled top:** Reinforces correct tongue positioning
- **Hourglass shape:** Allows lips to close properly, minimising air intake
- **Feeding hole against palate:** Allows milk/feed to mix with saliva & aid digestion
- **Asymmetrical shape:** Encourages proper jaw positioning
- **Vent helps reduce colic and prevent nipple collapse**

NUK® Orthodontic
Beware of Advertising Tactics. . . .
Slow Flow Nipple

* Easier for infant to manage flow thus will accept more PO
* Increased breathing stability
* Babies show less signs of stress
* More similar to breast flow rate
* Helps in maintain physiologic stability during feeding
* Myth: “infant is working too hard”
  * Research indicates it is not the work of sucking that fatigues the infant but work of trying to breathe when the flow rate is beyond the infant’s capacity.

Chang et al 2007; Eishima, 1991; Lau, 1997; Al-Sayed, Schrank and Thach, 1997
MILK FLOW RATES

- Milk flow varied significantly between different types of nipples, from 2.1 mL/min (Enfamil Cross-Cut) to 85.3 mL/min (Dr. Brown’s Y-cut).

### Mean Milk Flow Rate (mL/min)

<table>
<thead>
<tr>
<th>Nipple Type</th>
<th>Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similac Standard</td>
<td></td>
</tr>
<tr>
<td>Similac Slow</td>
<td></td>
</tr>
<tr>
<td>Similac Premature</td>
<td></td>
</tr>
<tr>
<td>Playtex Ventaire Slow</td>
<td></td>
</tr>
<tr>
<td>Pigeon Standard</td>
<td></td>
</tr>
<tr>
<td>Pigeon Slow</td>
<td></td>
</tr>
<tr>
<td>Pigeon No Drip</td>
<td></td>
</tr>
<tr>
<td>Parents Choice Slow</td>
<td></td>
</tr>
<tr>
<td>Nuby Medium</td>
<td></td>
</tr>
<tr>
<td>NUK</td>
<td></td>
</tr>
<tr>
<td>NUK Slow</td>
<td></td>
</tr>
<tr>
<td>Medela Calma</td>
<td></td>
</tr>
<tr>
<td>Medela Wide Base Slow</td>
<td></td>
</tr>
<tr>
<td>Medela Special Needs Feeder</td>
<td></td>
</tr>
<tr>
<td>MAM</td>
<td></td>
</tr>
<tr>
<td>The First Years Gumdrop</td>
<td></td>
</tr>
<tr>
<td>Fisher-Price</td>
<td></td>
</tr>
<tr>
<td>First Essentials</td>
<td></td>
</tr>
<tr>
<td>Enfamil Standard</td>
<td></td>
</tr>
<tr>
<td>Enfamil Slow</td>
<td></td>
</tr>
<tr>
<td>Enfamil Preemie</td>
<td></td>
</tr>
<tr>
<td>Enfamil Cross-Cut</td>
<td></td>
</tr>
<tr>
<td>Dr. Brown’s Y-cut</td>
<td>85.3 mL/min</td>
</tr>
<tr>
<td>Dr. Brown’s Level 3</td>
<td></td>
</tr>
<tr>
<td>Dr. Brown’s Level 2</td>
<td></td>
</tr>
<tr>
<td>Dr. Brown’s Level 1</td>
<td></td>
</tr>
<tr>
<td>Dr. Brown’s Preemie</td>
<td></td>
</tr>
<tr>
<td>Difrax</td>
<td></td>
</tr>
<tr>
<td>Bionix Level 5</td>
<td></td>
</tr>
<tr>
<td>Bionix Level 4</td>
<td></td>
</tr>
<tr>
<td>Bionix Level 3</td>
<td></td>
</tr>
<tr>
<td>Bionix Level 2</td>
<td></td>
</tr>
<tr>
<td>Bionix Level 1</td>
<td>2.1 mL/min</td>
</tr>
</tbody>
</table>

Note. Nipples are color coded according to brand.

Nipple Flow Rate
(Pados et. al, 2015)
Elevated Side-lying Position (ESL)

Benefits:

- Increased O2 saturations
- Less HR variability
- RR closer to baseline
- More regular intervals between breaths are noted
- Easier for infant to organize and control fluid in oral cavity to prepare for swallowing
- Left side down allows for improved stomach emptying
- Right side down after the feed has been shown to reduce reflux.

Clark et al, 2007; Park et al, 2014
Caregiver positioning tips for ESL

* Sit comfortably in a chair so that your feet are flat on the floor
* Support swaddled infant with infant’s head in caregivers left palm and infant’s spine along caregiver’s forearm. Be sure infant’s shoulders, hips, and knees are aligned.
* Caregiver should use a pillow or cross his/her legs to support the infant in the elevated position.
Assessment during every feeding

- View infant as a co-regulatory partner with his/her own agenda
- Revisit the “Dance of attachment”
- Provide neuroprotective supports
- Watch infant closely for change in state and stress cues

Jadcherla, 2012; Vandenberg & Ross, 2008
Neonatal Abstinence Syndrome (NAS)
Effects of Drug Exposure on Fetus

- Active metabolites enter CNS of Fetus causing neuronal cell injury or death
- Physiologic brain changes
- Impact on cognitive and behavioral development
- Vasoconstriction and decreased blood supply
- Placental abnormalities, IUGR, preterm delivery
<table>
<thead>
<tr>
<th>Neurologic Excitability</th>
<th>Gastrointestinal Dysfunction</th>
<th>Autonomic Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tremors</td>
<td><strong>Reflux-Vomiting Poor Feeding</strong></td>
<td>Frequent Yawning or Sneezing</td>
</tr>
<tr>
<td>High-Pitched Crying</td>
<td><strong>Dysfunctional Suck/Swallow</strong></td>
<td>Increased Sweating</td>
</tr>
<tr>
<td>Hypertonia</td>
<td>Poor Weight Gain</td>
<td>Temperature Instability</td>
</tr>
<tr>
<td><strong>Increased Wakefulness</strong></td>
<td>Diarrhea</td>
<td><strong>Tachypnea</strong></td>
</tr>
<tr>
<td>Irritability</td>
<td>Dehydration</td>
<td>Lacrimation</td>
</tr>
<tr>
<td>Hyperactive DTRs</td>
<td>Acidosis (metabolic)</td>
<td>Mottling</td>
</tr>
<tr>
<td>Exaggerated Moro Reflex</td>
<td></td>
<td><strong>Nasal Stuffiness</strong></td>
</tr>
<tr>
<td>Seizures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Breastfeeding and NAS

* Mothers in a methadone treatment program are encouraged to breastfeed if they are not
  * HIV positive
  * Abusing sustenance
  * Free of disease or infection that could contaminate breast milk
* Environment
  * Calm, quiet place free of distractions
  * Low or natural lighting
* Positioning
  * Swaddle with arms at midline
  * Collaborate with PT/OT as able for organization
* Collaborate with Lactation consultant and MD

Maguire, 2013
Bottle Feeding and NAS

- **Environment**
  - Calm, quiet
  - Low or natural light

- **Positioning and organization**
  - Swaddle tightly
  - Elevated Sidelying
  - Collaborate with PT/OT

- **Bottle type**
  - Slow flow nipple
    - Hyperactive suck reflex
NAS and Scoring/Management
Types of NAS

Opioids causing NAS in exposed infants include:

- Alcohol: FAS
- Methadone
- Heroine
- Neurotin
- Crystal Meth
- And many, many more

**Agonists**
- Diamorphine (Heroin)
- Fentanyl
- Hydromorphone
- Meperidine (Pethidine)
- Methadone
- Morphine (including prodrug Codeine)
- Oxycodone
- Propoxyphene

**Mixed agonists-antagonists**
- Buprenorphine
- Butorphanol
- Nalbuphine
- Pentazocine
Onset of withdrawal symptoms

- Onset of withdrawal depends on the half-life of the drug, duration of the addiction, and time of last maternal dose prior to delivery. On average, observation period for symptoms to appear is 3 days.
- Drug Approximate time to onset of withdrawal symptoms
  - **Barbiturates** 4-7 days but can range from 1-14 days
  - **Cocaine** Usually no withdrawal signs but sometimes neurobehavioral abnormalities (decreased arousal and physiologic stress) occur at 48-60 hours
  - **Alcohol** 3-12 hours
  - **Heroin** Within 24 hours
  - **Marijuana** Usually no clinical withdrawal signs
  - **Methadone** 3 days but up to 5-7 days; rate of severity of withdraw cannot be correlated to dose of maternal methadone
  - **Methamphetamines** Usually no withdrawal signs but sometimes neurobehavioral abnormalities (decreased arousal, increased physiologic stress, and poor quality of movement) occur at 48-60 hours
  - **Opioids** 24-36 hours but can be up to 5-7 days
  - **Sedatives** 1-3 days
  - **SSRIs** Several hours to several days—withdrawal linked with 3rd trimester use
**Modified Finnegan Neonatal Abstinence Score Sheet**

- **Scoring of NAS**
  - Finnegan scoring (tool to quantify severity of NAS) *(See last page for Finnegan Scoring System)*
  - **Begin scoring within 2 hours of life**
  - **Continue scoring every 4 hours**
- **Used to determine initiation of pharmacologic therapy**
About the Finnegan:

- Originally developed in 1975; “Modified” in 1986
- 200 term, opiate exposed newborns
- Assessed from the beginning of one feeding til the beginning of the next feeding, Q 3-4 hrs
  - Challenging with breastfed neonates
- Recommended: start scoring at 2 hours of age; if score= 8, continue to score Q2 hrs until less than 7
- OPQC treatment protocol: begin treatment for 2 consecutive scores of >8 or one score ≥12.
Scored Items

Central Nervous System
- Excessive Crying (2-3)
- Sleep (1-3)
- Hyperactive Moro (2-3)
- Tremors (1-4)
- Increased muscle tone (2)
- Excoriation (1)
- Myoclonic jerks (3)
- Convulsions (5)

Gastrointestinal System
- Excessive sucking (1)
- Poor feeding (2)
- Regurgitation (2)
- Projectile Vomiting (3)
- Stools (2-3)

Autonomic Nervous System
- Sweating (1)
- Fever (1-2)
- Frequent Yawning (1)
- Mottling (1)
- Nasal Stuffiness (1)
- Sneezing (2)
- Nasal Flaring (2)
- Resp rate (1-2)
Finnegan Tool

Start Finnegan scoring within 24 hours of birth
Monitor score every 3–4 hours

2 Consecutive scores ≥ 12 or 3 consecutive scores ≥ 8

Yes
Is the mother on opioids?

No
Continue to monitor scores at every 3–4 h intervals, when scores consistently ≤ 8, observe for 3–5 days more

Are the scores increasing?

No

Yes

Continue to monitor scores at every 3–4 h intervals, when scores consistently ≤ 8, observe for 3–5 days more

Are the scores increasing?

No

Yes

Start phenobarbital: 16 mg/kg
Maintenance dose: 5 mg/kg/day in two divided doses
Increase/decrease the dose by 10 % or 1 mg
Monitor phenobarbital level
Add other medications, if levels are high

Start morphine 0.05 mg/kg/dose
Increase/decrease the dose by 10 % or 0.05 mg
Change the dose every 24–48 h
Rescue dose: if scores are ≥ 12 for 2 consecutive times
Maximum dose: 1.3 mg/kg/day
Add phenobarbital/klonidine if maximum dose reached

For scores consistently ≥ 12: increase the dose
For scores between 9 and 11: no change in the dose
For scores consistently ≤ 8: decrease the dose

Discharge Plan
Pediatrician follow-up in 2 days
Home visiting referral
Anticipatory guidance

When the infant is off morphine for 2 days, when scores consistently ≤ 8 h for 2 days, and when the infant is cleared medically and socially.
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Score</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom 1</td>
<td>3</td>
<td>2023-01-01</td>
</tr>
<tr>
<td>Symptom 2</td>
<td>2</td>
<td>2023-01-02</td>
</tr>
<tr>
<td>Symptom 3</td>
<td>1</td>
<td>2023-01-03</td>
</tr>
</tbody>
</table>

**Finnegan Neonatal Abstinence Scoring Tool (FNAST)**

*Finnegan Tool*
NAS Assessment Tools

- Finnegan Neonatal Abstinence Scoring Tool
- Neonatal Withdrawal Inventory (NWI)
- The Neonatal Narcotic Withdrawal Index
- The Neonatal Drug Withdrawal Scoring System (Lipsitz)
- Ostrea Tool
- Neonatal Drug Withdrawal Scoring System (NDWSS)
## Comparison of Tools

<table>
<thead>
<tr>
<th>Scale</th>
<th>Finnegan</th>
<th>Neonatal Withdrawal Inventory (NWI)</th>
<th>Neonatal Narcotic Withdrawal Index (NNWI)</th>
<th>Lipsitz</th>
<th>Ostrea</th>
</tr>
</thead>
<tbody>
<tr>
<td>N DOL</td>
<td>Term neonates up 28 DOL</td>
<td>80 term neonates</td>
<td>24 hours old, 50 FT methadone exposed vs 40 FT non-exposed</td>
<td>41 neonates 35-40 GA</td>
<td>196 neonates 37 GA</td>
</tr>
<tr>
<td>Scored items Withdrawal assessed</td>
<td>31 Items Scale 1-5</td>
<td>7 Items Scale 0-4</td>
<td>7 Items + “other” Scale 0-2</td>
<td>11 Items Scored 0-3</td>
<td>6 Items Rank order</td>
</tr>
<tr>
<td>Opiates</td>
<td>Opiate (methadone, heroine)</td>
<td>Opiate (Methadone 40-65 mg/day, +/- heroine)</td>
<td>“narcotic addicted mothers”</td>
<td><strong>Opiate (methadone &gt; or &lt; 20 mg/day; heroine)</strong></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Comprehensive Complex Originally developed as clinical research tool</td>
<td>Tx at score of 8 Established inter-rater reliability, sensitivity, specificity</td>
<td>Tx for 2 scores 5+ in 24 hrs Established reliability, inter-rater reliability</td>
<td>Highly subjective (yes/no, normal/abnormal) Compared healthy term and near term to NAS</td>
<td>No guidelines for therapy Not comprehensive</td>
</tr>
</tbody>
</table>
Narcan Training

- Especially if you are going to be working in a NICU graduate clinic or with outpatient babies after discharge
- Look for local support groups for families
- Network with area to continue providing support
When SLP Needs to see?

- Should really be seeing all of these populations
PEP Classes

- 12 week course for mothers with drug exposure
  - Child birth
  - Breastfeeding
  - NAS
  - HANDS and WIC
  - Nutrition/SLP/PT
  - Domestic Violence and Security
  - Infant Massage
  - Safe Sleep and Hospital Tours

- Be Mindful
- Car Seat Safety/Birth Control
- Child Safety
- PT/SLP/Dietician
- Provided familiar face and confident
- Prenatal yoga classes
- NAS meetings
- Support groups
- What is in your community?
Psychosocial Aspects

- No judgment!
- Mother needs assistance as much as baby
- Be there to support
Questions???

- Contact:
  - amber.valentine1@bhsi.com
  - References upon request