Feeding Children with Tracheostomy Tubes: Cup, Spoon and Solids

Ann & Robert H. Lurie Children's Hospital of Chicago
Speech Language Pathology
February 8, 2019

Hillary Valentino, MA CCC-SLP
Katie Walsh, MA CCC-SLP IBCLC

Objectives

• Participants will be able to describe the impact that the placement of a tracheostomy tube has on swallow function.

• Participants will be able to describe 3 different assessments that may be valuable when working with children with tracheostomy tubes (e.g. VFSS, FEES, Speaking Valve Evaluations).

• Participants will be able to describe 2 treatment ideas when given a case example.

Disclosures

• Hillary Valentino and Katie Walsh receive salaries from Ann & Robert H Lurie Children's Hospital of Chicago.
• Hillary Valentino and Katie Walsh have no non-financial disclosures to report.
Common Diagnoses Among Patients with Tracheostomy

Sakai, K., Sheh, & Johnson, 2018

Pediatric Feeding Disorder

Medical  Nutrition  Feeding Skill  Psychosocial

- What else is going on?
- Suck, swallow, bite, chew
- Behaviors and learned responses

Barriers to Typical Skill Development

- Underlying medical comorbidities
- Late onset of feeding
- Prematurity
- Prolonged intubation
- Prolonged hospitalization

Changes with a Tracheostomy

- Breathing and Humidification
- Voice: Speech and Language
- Swallowing and Eating
Breathing and Humidification

<table>
<thead>
<tr>
<th>Natural Airway</th>
<th>Tracheostomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Breathe through mouth and nose</td>
<td>• Air goes directly in to the lungs – no warming, filtering, or moistening</td>
</tr>
<tr>
<td>• Airway warms and humidifies the air</td>
<td>• Unhumidified air can thicken secretions and increase the chance of mucus plugs</td>
</tr>
<tr>
<td>• Nose and cilia are filters for foreign materials</td>
<td>• Suctioning must be done to clear mucus</td>
</tr>
<tr>
<td>• Humidity impacts taste, smell, and speech</td>
<td>• Heat moisture exchange (HME)</td>
</tr>
<tr>
<td>• Mucous is produced by the lungs to clean the air we breathe and then we swallow it</td>
<td></td>
</tr>
</tbody>
</table>

Voice: Speech and Language

Milestones during cup, spoon, and solids

<table>
<thead>
<tr>
<th>Time</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4 months</td>
<td>increased tongue movement; up/down, front/back, oral reflexes decreasing</td>
</tr>
<tr>
<td>4-5 months</td>
<td>oral aversions start to appear as volitional (can appear earlier), increase in thoracic breathing, postural support to sit up</td>
</tr>
<tr>
<td>6 months</td>
<td>munching emerges at 5-6 months, strong active suck, spoon feeding</td>
</tr>
<tr>
<td>9 months</td>
<td>variety of solids in diet, emerging chewing, finger foods, open cup with tongue under lip for stability</td>
</tr>
<tr>
<td>10 months</td>
<td>upper and lower lip movement noted on cup</td>
</tr>
<tr>
<td>12 months</td>
<td>active lip clearing on spoon, emerging diagonal chew, lateral tongue movements begin</td>
</tr>
<tr>
<td>18 months</td>
<td>rotary chew emerges</td>
</tr>
<tr>
<td>24 months</td>
<td>graded biting</td>
</tr>
<tr>
<td>36 months</td>
<td>refining skills, transfers food across midline</td>
</tr>
<tr>
<td>5 years</td>
<td>swallow is adult like</td>
</tr>
</tbody>
</table>
Swallowing and Eating

**Natural Airway**
- Stages of swallowing overlap
- Oral: mastication and bolus transfer
- Pharyngeal: moving bolus through pharynx

**Tracheostomy**
- 70% have problems in oral and/or pharyngeal phase
- Reduced/absent superior excursion
- Laryngeal vestibule moves slower
- Delayed swallows
- Poor secretion management
- Enteral feeding with feeding tubes

Modified Evans Blue Dye Test

- Objective swallowing assessments for children with tracheostomies has been considered as part of a "best practice checklist".
- The use of suctioning post PO may be considered as a screening tool but should not definitively rule out aspiration.

Video Swallow Studies

Speaking Valves
Potential Benefits of a PMV
- Quality of life
- Secretion management
- Improved smell and taste
- Voicing
- Improved postural stability
- Swallow function
- Subglottic pressure
- Hygiene

Passy Muir Speaking and Swallowing Valve
- First trach change and medically stable
- Patient can tolerate cuff deflation
- Patent upper airway
- If vent dependent, medical team feels vent settings are appropriate for PMV placement

Tracoe Phon Assist 1
- First trach change and medically stable
- Patient can tolerate cuff deflation and is not vent dependent
- Airway evaluation per ENT/Pulmonary services
- Cannot tolerate PMV for either physiological or behavioral reasons

Subglottic Stenosis

<table>
<thead>
<tr>
<th>Classification of obstruction</th>
<th>Mean</th>
<th>Tol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>10%</td>
<td>50%</td>
</tr>
<tr>
<td>Grade II</td>
<td>20%</td>
<td>60%</td>
</tr>
<tr>
<td>Grade III</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Grade IV</td>
<td>No detectable lumen</td>
<td></td>
</tr>
</tbody>
</table>

Cormack and Lehane Classification

Passy Muir Valve
- Can be used in-line with the vent
- Appropriate for almost any patient with a patent upper airway
- Redirects ALL air to the upper airway
- Well researched
- Preferred speaking valve

Tracoe Phon Assist 1
- Can not be used in line with the vent
- May be appropriate for patients with subglottic stenosis, particularly with Grade 3
- Redirects at least some air to the upper airway
- Is completely adjustable
- Can be placed all the way open and continuously adjusted for children who behaviorally do not tolerate the PMV
### Treatment: Pharyngeal Dysphagia

<table>
<thead>
<tr>
<th>Domain</th>
<th>Intervention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>Positioning</td>
<td>Supportive/adaptive positional set-ups</td>
</tr>
<tr>
<td></td>
<td>Flow rate/bolus size</td>
<td>Smaller bolus sizes to facilitate bolus formation and the timing of the swallow</td>
</tr>
<tr>
<td></td>
<td>Thickening</td>
<td>Thicker, heavier, and slower liquids can increase organization before and during swallowing</td>
</tr>
<tr>
<td></td>
<td>Expiratory Muscle Strength Training</td>
<td>Strengthens muscles of respiration by increasing force generating capacity</td>
</tr>
<tr>
<td>Sensory/Motor</td>
<td>Neuromuscular Electrical Stimulation</td>
<td>Goal to strengthen and reeducate the muscular system and improve motor control of swallow mechanism</td>
</tr>
</tbody>
</table>

### Treatment: Oral Dysphagia

#### Motor Based Feeding

- **Positioning**
  - Primary Patterns
  - Body Alignment

#### Sensory Based Feeding

- **Oral Stimulation**
- **Sensory Preparation**

### Treatment Strategies

- **Motor**
  - Positioning
  - Flow rate/bolus size
  - Thickening
  - Expiratory Muscle Strength Training
- **Sensory/Motor**
  - Neuromuscular Electrical Stimulation
- **Sensory**
  - Oral Stim
  - Sensory Prep
- **Experiential**
  - Play-based/Stress reduction
  - Whole food blended diet for tube feeds

- **Medical/nutritional management**
Treatment: Oral Dysphagia
Experiential Based Feeding
- Play-based / Stress Reduction Approach
- Whole food blended diet

Case Study: Cici
- We met Cici at 8 months old, she was born at 23 weeks, IVH, hydrocephalus s/p shunt, BPD, severe pulmonary hypertension treated with remodulin, and had very high vent settings.
- She loved her pacifier when we first met her. At first she was gagging with even small tastes of formula. Due to limited progress with tastes of Level 0 Thin Liquid, we switched to tastes of puree at 9 months old.
- At her first session of puree, she did great with small tastes.
- By 10 months old, when she was giving herself tastes in particular she did very well!

Case Study
- Her vent settings came down and she trialed the Passy Muir Speaking Valve at 11 months old.

Case Study: Cici
- We then proceeded with her swallow study. At the swallow study, she was offered puree via spoon, 1 mL boluses of Level 0 Thin, Level 2 Nectar Thick, and Level 3 Honey Thick via spoon or syringe. The test was done with and without a PMV in place.

Questions?

Resources
Resources