Dysphagia in Children with Neurodevelopmental (and Acquired) Disorders
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Disclosures
Jennifer Casteix, MS, CCC-SLP
Relevant Financial Relationships:
– Employed at the University of Arizona
– Receives a Speaker’s fee for today’s presentation

Relevant Nonfinancial Relationships:
– Member, ArSHA
– Member, ArSHA Pediatric Feeding and Swallowing Committee that developed survey

At the Arizona Speech-Language-Hearing Association’s (ArSHA) 2014 Annual Spring Conference in Tucson, the new Pediatric Feeding and Swallowing special committee was announced. In our effort to identify a community of providers and facilitate professional development/advocacy in this service area, we invite you to participate in the following short survey. The results from this committee project will be presented at the ArSHA 2015 Spring Conference with no individual identities associated with the data.

Committee Members:
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Executive Director; Feeding Matters

Survey results
Biggest mentorship needs:
• Developing a safe swallowing plan
• Work environment that supports addressing feeding and swallowing issues
• Compensatory strategies

Refresher
Neurodevelopmental Disorders

The neurodevelopmental disorders are a group of conditions with onset in the developmental period. The disorders typically manifest early in development, often before the child enters grade school, and are characterized by developmental deficits that produce impairments of personal, social, academic, or occupational functioning.

DSM 5

Examples

- Intellectual Disabilities
- Global Developmental
- Communication Disorders
- Motor Disorders
- Childhood-Onset Fluency Disorder (Stuttering)
- Social (Pragmatic) Communication Disorder
- Autism Spectrum Disorder
- Attention-Deficit/Hyperactivity Disorder
- Specific Learning Disorder

Swallow Development

- Fetal Period (9 wks+)
- 10-11 weeks
  - Pharyngeal swallow
- 18-24 weeks
  - Suckling begins
- 26-29 weeks
  - Lungs
- 34 weeks
  - Suckle & swallow can sustain nutritional needs

Development of Chewing

- Four Patterns of Development
  - Stereotypical vertical pattern
  - Nonstereotypical vertical pattern (6 mo)
  - Diagonal rotary pattern (15 mo)
  - Circular rotary pattern (3-6 yrs)
- Biting and chewing accomplished with no teeth during transitional period using the “molar tables”
  - Described as “munching”
- Sensory input of teeth may contribute to development of CNS control of feeding process

12 Cranial Nerves

I: Olfactory: smell (S)
II: Optic: vision (S)
III: Oculomotor: eye (M)
IV: Trochlear: eye (M)
V: Trigeminal: speech (M&S)
VI: Abducens: eye (M)
VII: Facial: speech (M&S)
VIII: Vestibulocochlear: hearing & balance (S)
IX: Glossopharyngeal: speech (M&S)
X: Vagus: speech (M&S)
XI: Accessory: speech (M)
XII: Hypoglossal: speech (M)
Dysphagia: characterized by dysfunction in the oral, pharyngeal, and esophageal phases of the swallow.

Arvedson, et al, 1994

25-45% of all children will have feeding and/or swallowing difficulties
33-80% of children who are developmentally delayed will have feeding and/or swallowing difficulties

ASHA

Feeding Red Flags in Young Children
1. refusing food or liquid
2. failure to accept different textures of food (e.g., only pureed foods or crunchy cereals)
3. long feeding times (e.g., more than 30 minutes)
4. difficulty chewing, coughing or gagging during meals
5. excessive drooling or food/liquid coming out of the mouth or nose
6. difficulty coordinating breathing with eating and drinking
7. increased stuffiness during meals
8. gurgly, hoarse, or breathy voice quality

Feeding Red Flags in School Age
1. prolonged and/or stressful mealtimes
2. coughing and throat clearing when eating and drinking or from accumulation of saliva
3. wet breath sounds and/or gurgly voice quality associated with swallowing
4. spillage of food and liquid from the mouth
5. drooling

Videofluoroscopic Swallow Study
• Defines oral and pharyngeal phases
• Defines esophageal transit time and basic motility
• Delineates aspiration related factors
  — Before, during and after swallows
  — Texture specificity
  — Physiologic reasons for aspiration
  — Estimate of risk

Arvedson, 2012
FEES in children

- Make bedside evaluations possible
- Define some aspects of pharyngeal physiology
- Can evaluate handling of secretions
- Can complete sensory testing

Arvedson, 2012

DeMatteo et al, 2005

Speech-language Pathologists: Clinical assessments were correlated with VFSS in identifying aspiration on liquids but not solids.

Weir et al, 2011

Cohort of 300 children with feeding difficulties:
- 34% had oropharyngeal aspiration. Of those, 81% had silent aspiration
- Children with neurologic impairment more likely to have silent aspiration compared to children with just GI or metabolic issues

Gosa et al, 2011

- There is no good research to show that thickening liquids and thicker solids is the best way to support children with oropharyngeal dysphagia.

Survey results

Biggest mentorship needs:
- Developing a safe swallowing plan
- Work environment that supports addressing feeding and swallowing issues
- Compensatory strategies

Work Environment

ASHA 2014 Schools Survey
- 14% of the school (SLPs) polled serve students who have dysphagia.
- 25.2% of SLPs who serve preschoolers work with children with dysphagia

ASHA 2015 Health Care Survey: Private Practice
- 12% of time in pediatrics feeding swallowing

ASHA 2015 Health Care Survey: Peds Hospitals
- 31% of time in pediatrics feeding swallowing
 Roles and responsibilities in the school setting include, but are not limited to:
(a) identifying and treating students with dysphagia,
(b) writing IEP dysphagia goals
(c) developing accommodations,
(d) consulting with medical professionals, and
(e) collaborating with teachers, caregivers, paraprofessionals, and cafeteria staff.
(f) The SLP typically serves as the lead on a feeding and swallowing team (ASHA, 2007).

IDEA 2004
Regulations: Part 300 / A / 300.8 / c / (9) Other health impairment means having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that--
(i) Is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette syndrome; and
(ii) Adversely affects a child’s educational performance.

AZ Dept of Ed Health and Nutrition Services
Special Dietary Needs Manual
1. Students must be safe while consuming food and drinks at school. This means access to appropriate programming, personnel, food, and procedures that promote safe swallow.
2. Proper nourishment and hydration is needed in order for students to access the curriculum.
3. Keeping students healthy (free from aspiration pneumonia or other illness related to poor nutrition) maximizes their school attendance.
4. Students must develop skills for eating efficiently during meals and snack times so that they can complete these activities with their peers safely and in a timely manner (ASHA).

Interprofessional or Interdisciplinary team model

Arvedson and Homer, 2006
5 areas that you want to assess prior to starting:
• Airway
• Nutrition and hydration status
• Gastrointestinal status
• Neurodevelopmental status
• Responsiveness to oral feeding attempt

Arvedson and Homer, 2006
Intervention can include:
• Posture and positioning
• Dietary changes
• Utensil modifications
• Oral sensorimotor therapy
• Broad-based sensory approaches
• Caregiver education and training
• (Environment)
**Down Syndrome**

O'Neill and Richter, 2014

- 57% (116/201) of children in their cohort with DS had pharyngeal dysphagia, many demonstrated silent aspiration.
- Upper aerodigestive anomalies common:
  - Adenotonsillar hypertrophy
  - Laryngomalacia
  - Upper airway obstruction

**Contributors to dysphagia**

- Delayed initiation, poor coordination, poor sequencing of oral motor movements
- Grading jaw movements
- Low tone
- Weak lips and tongue
- Delayed initiation of pharyngeal swallow
- Big tongue compared to small jaw
- Esophageal motor problems: decreased peristalsis along with LES opening

**Arvedson and Homer, 2006**

Intervention can include:
- **Posture and positioning**
- **Dietary changes**
- **Utensil modifications**
- Oral sensorimotor therapy
- Broad-based sensory approaches
- Caregiver education and training
- (Environment)
In children with ASD, "food refusal based on texture, food neophobia, and rigidity around mealtimes were the most common problematic behaviors reported."

ASHA

Martins, Young, and Robson, 2008

When matching for same age peers and siblings, small statistical increase in chance of feeding difficulties seen. Behaviors are somewhat similar between ASD and typical. It’s more the frequency of the behaviors.

• Biggest problem: adapting to change

Schreck and Williams, 2006

• Found that many of the children in their study had families with food selectivity
Twachtman-Reilly et al, 2008

Addressing Feeding Disorders:
- Enhance predictability with social story
- Define task expectations, time, how much
- Target repetitive behavior patterns, decrease food selectivity by allowing choices, give specific instruction on eating process to decrease oral stuffing

Twachtman-Reilly et al, 2008

Addressing Feeding Disorders
- Oral desensitization
- Child friendly foods
- Combining new foods with familiar ones
- Selecting new foods that look/feel like familiar
- Peer modeling
- Seating
- Follow eating with preferred activity

Work by Kay Toomey, PhD

Tolerates ↔ Interacts with ↔ Smells

Tastes ↔ Eats

What works for you?

Cerebral Palsy
Both oral and pharyngeal phase of swallow significantly affected in children
Texture plays a part, can be different for each child
One study, of the children who aspirated, 97% had silent aspiration

67% of preschool aged children across levels and types of CP showed clinical signs of pharyngeal dysphagia reported by parents and clinicians:
- Coughing: single cough not discriminatory
- Multiple swallows
- Gurgly voice
- Gagging

In children with CP at Levels IV and V and lower IQ scores, 76% of students showed signs of moderate to severe dysphagia. Interestingly, parents did not report much feeding difficulty.

... is currently insufficient high-quality evidence from randomized controlled trials or quasi-randomized controlled trials to provide conclusive results about the effectiveness of any particular type of oral-motor therapy for children with neurological impairment.
What works for you?

Traumatic Brain Injury

TBI – CDC stats

Causes:
- Falls account for about 40% of all TBIs; disproportionately affect children and older adults
- Unintentional blunt trauma is second leading cause
- MVAs are third

Scale:
- GCS score of 3-8: Severe TBI
- GCS score of 9-12: Moderate TBI
- GCS score of 13-15: Mild TBI

Modified Glasgow Coma Scale for Infants and Children

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<thead>
<tr>
<th>Item</th>
<th>Infant</th>
<th>Score</th>
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<tr>
<td>Eye opening</td>
<td>Spon.</td>
<td>1</td>
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<tr>
<td></td>
<td>To speech</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>To pain only</td>
<td>3</td>
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<tr>
<td></td>
<td>No response</td>
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Best verbal response

- Confused
- Incomprehensible sounds
- No response

Best motor response

- Movements spontaneously and purposefully
- Withdraws to touch
- Stares at response in pain
- Abnormal flexion posture to pain
- No response

*If patient is intubated, unconscious, or uncooperative, the most important part of this scale is motor response. Motor response should be carefully evaluated.
Morgan et al, 2003; Morgan at al, 2009

- Incidence of dysphagia in pediatric patients:
  - Across all levels of injury: 3.8-5.3%
  - 68-76% for severe (GCS score of 3-8)
  - 15% for moderate (GCS score of 9-12)
  - 1% for mild (GCS score of 13-15)

### References

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<thead>
<tr>
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<th>Title</th>
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