Pediatric Swallowing Assessment and Treatment
By Jennifer Dahms, MS, CCC-SLP, BRS-S

Course Objectives
- To identify the cranial nerve innervation for swallowing
- To identify the muscle functioning for normal swallowing
- To identify the aspects of normal swallowing function

Course Objectives, cont.
- To identify abnormal muscle and movement patterns that inhibit functional swallowing
- To identify 3 assessment procedures for objectifying abnormal swallowing
- To list 5 treatment techniques for treating pediatric swallowing disorders
Anatomy and Physiology

- Cranial Nerves associated with swallowing function
  - Cranial Nerve V – elevates the hyoid, nasopharyngeal closure
  - Cranial Nerve VII – some functioning with elevating the larynx and the hyoid
  - Cranial Nerve IX – palatal movement, pharyngeal constriction

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- Cranial Nerve X – mostly responsible for laryngeal closure
  - Cranial Nerve XI – has some innervation with laryngeal elevation
  - Cranial Nerve XII – some impact on hyoid movement

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Anatomy and Physiology, cont.

- Muscles for tongue elevation
  - intrinsic vs. extrinsic

- Muscles for hyolaryngeal excursion
  - anterior belly of the digastric, mylohyoid, geniohyoid

- Muscles for nasopharyngeal closure
  - palatal levator, palatal tensor

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Muscles for pharyngeal contraction
-superior/medial/inferior constrictors

Muscles for epiglottic inversion
-secondary to hyolaryngeal excursion and tongue movements

Muscles for laryngeal elevation
-styloglossopharyngeus
-salpingopharyngeus
-palatopharyngeus

Muscles for airway closure
-lateral cricoarytenoid, interarytenoids

Muscles for PE segment opening
-inferior pharyngeal constrictor, cricopharyngeus
Normal Swallowing Function

- The tongue (tip, blade, tongue root)
  - tip elevation, squeezing bolus, bolus transport

- The nasopharynx
  - elevates for closure

- The pharynx
  - squeezing motion

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Normal Swallowing Function, cont.

- The epiglottis
  - airway closure
  - impacted by tongue movement

- The airway
  - larynx elevates
  - vocal folds approximate

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Normal Swallowing Function, cont.

- The hyoid
  - elevates and pulls forward

- The esophagus
  - peristaltic waves

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Normal Swallowing Function, cont.

- Adult versus Pediatric
  - adult (more space between structures)
  - pediatric (closeness of structures)

Abnormal Swallowing Function

- Drinking style
  - Gulping
  - Piecemeal deglutition

Abnormal Swallowing Function, cont.

- The tongue
  - Tightness
  - Decreased tongue cupping
  - Decreased tongue elevation
  - Decreased posterior tongue strength
  - Decreased range of motion
  - Decreased oral containment
Abnormal Swallowing Function, cont.
- The nasopharynx
  - Nasal regurgitation / backsplash
  - Forced nasal emissions

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Abnormal Swallowing Function, cont.
- The pharynx
  - Residue

- The epiglottis
  - Incomplete inversion
  - Hitting posterior pharyngeal wall

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Abnormal Swallowing Function, cont.
- The airway
  - Laryngeal cleft
    - Decreased hyoid excursion
    - Decreased laryngeal elevation
    - Tracheostomy

- Torticollis

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Abnormal Swallowing Function, cont.
- Tonsils
  - speed bumps

- The esophagus
  - decreased PE segment opening
  - TE fistula
  - GERD
  - Eosinophilic Esophagitis

Assessment of Swallowing
- Video Fluoroscopic Swallow Study / Modified Barium Swallow
  - the “gold standard”
  - radiation exposure
  - looks at the full phases of swallowing

- FEES
  - no view of oral phase; may give some information about the posterior tongue
  - best look at what happens to a bolus post-swallow in terms of residue

Assessment of Swallowing, cont.
- Manometry
  - measures strength of contractions, pressure changes

- Lipid Laden Macrophage
  - measures the fat content of aspirate
Assessment of Swallowing, cont.
- Ultrasound
  - primarily for identifying oral dysphagia
  - could reveal information on oral bolus control that may be affecting the pharyngeal phase
- O2 Saturation Levels
  - looking for desaturations during swallowing
  - not a lot of research on this technique, especially with pediatrics

Assessment of Swallowing, cont.
- Cervical Auscultation
  - listening for changes in pharyngeal sounds related to swallowing
  - screening
- Clinical Observation
  - vocal quality, laryngeal excursion, protective response or lack thereof, overall timeliness of swallow, point of swallow with breathing

Swallowing Treatment
- Postural Changes
  - elevation with bottle feeding, recline in chair/wheel chair
  - head position with children with cerebral palsy
Consistency Changes
- diet level, thickening liquids
- controversy with thickening
- tube placement

Utensil Changes
- bottle systems, cups, straws
Swallowing Treatment, cont.

- Tongue / Hyoid Massage
  - use with oral tightness that relates to decreased bolus control
  - aerophagia

- Tongue Exercises
  - tongue elevation
  - tongue retraction
  - posterior resistive chewing
  - tongue lifting

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Swallowing Treatment, cont.

• Thermal Stimulation
  - to improve swallow response
  - laryngeal mirror vs. spoon

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Swallowing Treatment, cont.

Vibratory Input
  - to improve awareness
  - oral, pharyngeal

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Swallowing Treatment, cont.

- Shaker Exercise
  - Developed by Reza Shaker
  - to improve epiglottic inversion and PE segment opening
  - modifications to pediatrics

- Vital Stimulation
  - E stim based
  - controversial
  - Deep Pharyngeal Neuromuscular Stimulation (DPNS)

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Swallowing Treatment, cont.

- Adult Techniques
  - swallow maneuvers

- Behavioral Strategies
  - best if child is being fed vs. self-feeding

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Swallowing Treatment, cont.

- Drooling
  - not being able to control secretions posteriorly

Research

- Tongue Exercises
  - Sapienz, et al. (2008)
  - Burkhead (2009)

- Thermal Stimulation
  - Miura et al. (2009)
  - vibration with children

Research, cont.

- Sour Boluses
  - Logemann et al. (1995)
  - Miura et al. (2009)

- Vital Stimulation
  - ASHA handout
  - Christiaanse et al. (2011)
Research, cont.

- How do we apply research to pediatrics?
  - functioning
  - plasticity
  - habilitative vs. rehabilitative

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Questions?

- American Speech-Language-Hearing Association. (2002). Knowledge and skills needed by speech-language pathologists providing services to individuals with swallowing and/or feeding disorders [Knowledge and Skills].
References, cont.