



Pediatric Dysphagia & Feeding Therapy

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Background

Education

Bachelors of Arts, Psychology, The University of Montana
Clinical Doctorate, Occupational Therapy, Pacific University

Professional Experience

Missoula - based clinic owner/operator merging with Stack Speech Therapy Center 2016 - current
Private Practitioner and owner of Eat.Move.Grow.,LLC 2013-current
Publisher of *Strawbert's Sensational Story* 2014

Related Experience

Advanced Feeding Education

- Sequential Oral Sensory Approach to Feeding, CO
- Feeding Mentorship with Dr. Kay Toomey at the STAR Center, CO
- Beckman's Oral Motor Approach to Feeding, OR
- Intensive Sensory Integration Mentorship at the Star Center, CO
- Doctoral Feeding Internship at Speech and Therapy Services, MN

Background

Education

Bachelors of Arts, Human Biological Sciences, The University of Montana
Masters of Science, Speech Language Pathology, The University of Montana

Professional Experience

Missoula - based clinic owner/operator merging with Eat.Move.Grow. 2016 - current
Private Practitioner 2013 - current
Contractor - Confederated Salish and Kootenai Tribes Early Childhood Services 2013 - 2016
Staff Speech Language Pathologist - St. Luke's Community Healthcare, Ronan, MT 2013 - 2016

Related Experiences

- Barrow's Neurological Institute in Phoenix, AZ.
Trained at a Level I Trauma Center, NICU
- St. Luke's Community Medical Center in Ronan, MT
Clinical swallow evaluations and videofluoroscopic swallow studies
- The University of Montana - Department of Communicative Sciences and Disorders
Adjunct Professor for Neurology and Anatomy & Physiology
- Endo-Education in San Diego, CA
Trained to perform Fiberoptic Endoscopic Evaluation of Swallowing (FEES) with follow-up mentorship in Missoula, MT

True or False

Eating is Easy?

False

Eating is the most complex physical task human beings engage in. It is the only human task which requires every one of our organ systems and requires all of those systems to work correctly. In addition, every muscle in the body is involved (one swallow takes 26 muscles and 6 cranial nerves to coordinate.) Plus, eating is the only task children do which requires simultaneous coordination of all 8 of our sensory systems.

Typical Development - Overview

1. Anatomical features
2. Neurological features
3. Neurophysiological control
4. Progressive suprabulbar input
5. Mature swallow

Typical Development - Feeding & Swallowing

Successful feeding interaction

- Typically developing anatomy
- Proper motor development
- Normal sensation
- Successful coordination of oral pharyngeal structures
- Reinforcing caregiving interaction

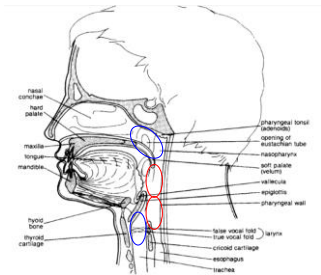
Anatomical Features

Nasopharynx - base of skull to roof of soft palate

Oropharynx - soft palate to valleculae

Hypopharynx - inferior valleculae to cricopharyngeus

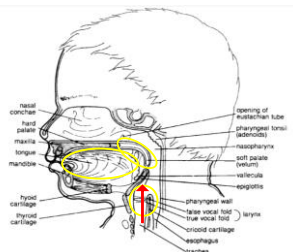
Larynx - anterior hypopharynx via laryngeal aditus



Anatomical Features - differential interpretation

Infant oral & pharyngeal anatomy

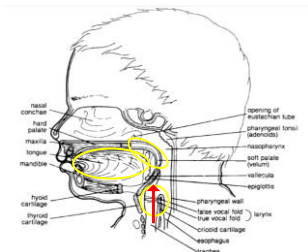
- Tongue, soft palate, & arytenoid mass relatively larger
- Tongue lies entirely in oral cavity



Anatomical Features - differential interpretation

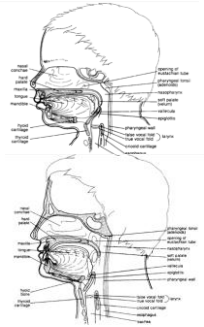
Infant oral & pharyngeal anatomy

- Buccal cavity consumed by fat pad
- Larynx elevated
- Epiglottis extends to and may overlap velum



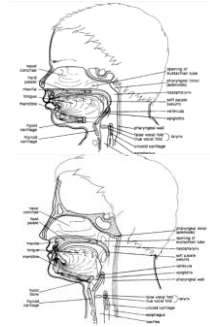
Anatomical Features - Developmental

- Head and neck grow - oral cavity enlarges around the tongue
- Fat pads disappear
- Superior pharynx enlarges around the velum
- Dentition erupt - 6 to 12 mos.



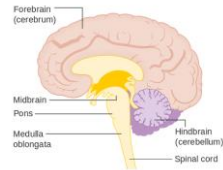
Anatomical Features - Developmental

- Laryngeal vestibule enlarges in relation to the arytenoid mass
- Neck elongates
- Larynx descends gradually
 - c3-c4 prenatally
 - c6 infancy-childhood
 - c7 adulthood



Neurophysiological Control

1. Deglutition - semi-automatic motor action
 - a. Respiratory and gastrointestinal tracts
2. Neural Control
 - a. Afferent fibers (trigeminal, facial, glossopharyngeal, vagus)
 - b. Efferent fibers (trigeminal, facial, glossopharyngeal, vagus, spinal accessory, hypoglossal)
 - c. Medullary swallowing centers (nucleus tractus solitarius, ventromedial reticular formation)
 - d. Pons, limbic-hypothalamic system, cerebellum, prefrontal cortex



Progressive Suprabulbar Input

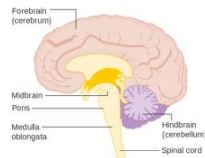
Newborn - reflex-bound

1. Automatic phasic bite - propels liquid into oral cavity with pump-like action
2. Rooting reflex - food seeking response via tactile stimulation to cheek
3. Suck-swallow
4. Gag - protective function stimulated on mid-third of tongue
5. Babinski's - mouth opens, head flexes and rotates to midline
6. Cry - first vocal communication

Progressive Suprabulbar Input

Reflexes - gradually refined and integrated into mature feeding and swallowing skills

1. Initially controlled at the level of the brainstem
2. Encephalization & feeding experience incorporates many reflexive events
 - a. Afferent inputs extend beyond brainstem
 - i. midbrain, cerebellum, thalamus, and cerebral cortex
 - b. Exertion of control from higher levels on brainstem motor center
3. Calendar of disappearance - oral phase
 - a. initiated 3 - 4 months: root, suck-swallow, babinski's
 - b. Completion 6 - 7 months: automatic phasic bite, gag moved to posterior 1/3 of tongue



Progressive Suprabulbar Input

Skill emergence - feeding & swallowing move to a more volitional process

1. Ability to discern physical characteristics of food
2. Manipulate bolus
3. Voluntarily ingest

Mature Swallow

Oral preparation (voluntary)- lips, tongue, teeth, jaw, palate

1. Solid food mastication - food lateralized onto grinding surface of teeth, mixed with saliva, accomplish bolus formation via lingual cupping
2. Liquid deglutition - collected and drawn together via lingual cupping

Oral transport (voluntary/involuntary)- lips, tongue, palate

1. Lips seal
2. Tongue creates central groove, elevates sealing anteriorly against hard palate, projects bolus posteriorly via peristalsis

Mature Swallow

Pharyngeal swallow reflex (involuntary) - velum, pharyngeal constrictors, epiglottis, laryngeal strap muscles, arytenoid mass, upper esophageal sphincter

1. Triggered at the level of the anterior faucial pillars - posterior pharyngeal wall
2. Velum elevates
3. Pharyngeal peristalsis initiates
4. Hyolaryngeal complex elevates and moves slightly anteriorly
5. Epiglottis inverts
6. Upper esophageal sphincter relaxes and opens

Mature Swallow

Esophageal phase (involuntary) - esophagus

1. Bolus enters esophagus
2. Food /liquid moves to stomach

Interdisciplinary Lens

OT's Lens

- Reflex integration
- Suck swallow breathe synchrony
- Core strength
- Seating
- Environment
- Regulation of arousal prior to presenting food
- Sensory
- Routine

SLP's Lens

- Understanding demand speech/cognitive tasks
- Reflex Integration
- Suck swallow breathe synchrony
- Swallow
- Oral motor

What Is Occupational Therapy?

Occupational Therapists are dedicated to helping individuals improve their participation in self-care, play, and academic tasks. Therapists use a holistic and family-centered approach to help children enhance their independence and reach their potential.

Activities of Daily Living	Fine / Gross Motor Skills	Sensory Integration
<ul style="list-style-type: none"> - Grooming/Hygiene - Dressing - Academic Skills - Feeding - Writing - Play Skills 	<ul style="list-style-type: none"> - Endurance - Coordination - Strength - Balance 	<ul style="list-style-type: none"> - Tactile Processing (<i>touch input</i>) - Oral Processing (<i>food or mouth</i>) - Vestibular Processing (<i>movement</i>) - Olfactory Processing (<i>smell</i>) - Visual Processing (<i>light</i>) - Auditory Processing (<i>sound</i>) - Achieving Optimal Arousal
Cognition <ul style="list-style-type: none"> - Attention Span - Memory - Sequencing - Following Directions - Problem Solving 	Social / Emotional Skills <ul style="list-style-type: none"> - Self-Concept - Self-Control - Time Management - Emotional Regulation - Stress Management - Transitions - Social Participation 	



Importance of Healthy Eating

The rapidly developing brain is more vulnerable to nutrient insufficiency yet also demonstrates its greatest degree of plasticity. Certain nutrients have greater effects on brain development than do others. These include **protein, iron, zinc, copper, iodine, selenium, vitamin A, choline, and folate.**



True or False

Eating is the body's number 1 priority?

False!

Breathing is the body's number 1 priority. Without good oxygenation, eating becomes very difficult. We shut off our airway briefly with every swallow and our oxygen level decreases slightly (or we have to significantly increase our respiratory rate to maintain oxygen such that we are burning off any calories we take in).

Postural stability is our bodies' second priority

If either breathing or postural stability are compromised, eating may be resisted.

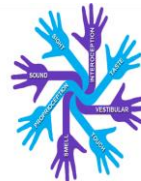
Seating and Positioning

1. overall flexion
2. orientation about midline
3. shoulders symmetric
4. hips flexed 45 to 90 degrees
5. neutral alignment of the head (slight flexion)
6. support (foot and lateral)



Our 8 Senses

Our 8 Senses



The foundation of growth, development, and learning in a child starts with sensory and motor interaction with the world. The brain is built from the bottom up and this starts with movement and sensory exploration. Sensory stimulation and feedback drive the brain, but the motor system drives sensory stimulation—you can't have one without the other.

The Importance of Meeting Milestones



Critical Motor Milestones: Gestation

- Skills:
 - Coordination of suck-swallow-breathe pattern emerges
 - Neuros lay clusters or receptors defining taste buds (sweet, salty, bitter, sour and umami)
- Food:
 - amniotic fluid

Critical Motor Milestones: 4-6 mos.

- Skills:
 - Reflexive sucking is replaced by learned motor patterns (active sucking)
 - Downward/forward growth of mandible creates larger oral space, with tongue no longer filling the oral cavity at rest
 - Anterior/posterior movement is achieved with active movement forward and backwards versus pressure changes (as with bottle/breast feeding)
 - Beginning hand-to-mouth play (independent oral exploration of objects)
- Foods:
 - Offer baby rice or oatmeal cereal (low allergenic response)
 - Introduce baby food purees by first mixing it with a slightly thicker consistency of baby cereal than previously. Alternate introducing a new fruit with a new veggie every 3 days to test for allergy/stomach problems

Critical Motor Milestones: 6-7 mos.

- Skills:
 - **Trunk control** - sufficient for independent sitting for greater than 3-5 minutes
 - Stable head control in sitting (no head bobbing)
 - Spoon use
- Foods:
 - Cereal or plain fruit
 - Plain veggies

Critical Motor Milestones: 7-10 mos.

- Skills:
 - Emerging tongue lateralization begins (still using fingers to position food)
 - Munching (vertical jaw movement) and gnawing develops
 - Lip closure supports movement of food back for a swallow
- Foods:
 - Cereal+fruit
 - Plain veggies, fruit mix or veggie mix
 - Meats mixed with fruits and veggies
 - 1-2 baby food purees
 - **Hard munchables**
 - Meltable hard solid
 - Drink in a cup
 - Mashed table food



Hard Munchables

1. Move the child's gag reflex back
2. Allow practice with lateral movements
3. Jaw strengthening
4. Kinesthetic awareness in the mouth, make cognitive map of mouth boundaries.
5. Change very little in the mouth, to help prepare for foods that do change

Gagging from 8-10 months is normal!

Critical Motor Milestones: 10-14 mos.

- Skills:
 - Active tongue lateralization
 - Rotary chew emerges
 - Changes in taste bud perception
- Foods:
 - Puree or mashed table food
 - Meltable hard solid
 - Soft cubed table food
 - **Mixed textures**
 - Drink in cup
 - Protein, starch, fruits and veggies and drinking from a cup without difficulty



Critical Motor Milestones: 14-24 mos.

- Skill:
 - Efficient finger feeding
 - Practicing utensil use versus effective use for volume (14-18)
 - All oral-motor skills needed to eat any table food presented have been achieved
 - Increasing utensil use (not efficient until after 24 months of age)
- Food:
 - Everything!

OT Intervention Tools

- Bottles
- Utensils
- Environment
- Sensory Activities
- Preparatory Oral Motor Activities
- SOS Approach to Feeding

Modified Bottles

- Straight, long and firm nipples
- Pliability of bottle allows assistive squeeze to increase flow
- Ability to monitor size of bolus being delivered by squeeze is poor
- One- way valve decreases air intake
- Bottle/soft cup unit- used for infants that cannot tolerate intraoral placement of nipple



Spoons

- Flat Firm Spoon
 - Easy for lips to clear the bolus
 - Firmness for providing pressure on the tongue
 - Encourage cupping
 - Lateral placement of puree
- Lip Closure Spoon
 - Encourages lip spread and closure
 - Border cues the lip to come down



Spoons

- Textured spoon:
 - Improve tolerance of texture in the mouth
 - Improve awareness and stabilization
- Vibrating spoon:
 - Improve awareness
 - Increase muscle tone



Environmental Cues to Eating

Environmental cues become conditioning cues for eating

Cues become part of the food – how they recognize preferred foods – this is why children may eat a particular food in one environment but then not in another- they associate eating that food with each of the specific cues within the environment.

Changing Conditioning Cue Complex slowly will help kids eat in all environments:

People – number of people, who is present

Utensils – dishes, cups, silverware, placemats, table cloth, containers

Room – location in home, school, décor, view from chair, type of lighting in the room

Furniture – arrangement, location of child's seat, and others at table

Food – texture, consistency, color, temperature, size, shape, type, odor

Time – day, night, noon

Sensory Activities

- Willbarger Brushing Protocol
- Proprioceptive Input
- Play-doh / Silly Putty / Scented Play-doh
- Funny Foam or shaving cream
- Sand and water tables
- Feathers
- Finding objects buried in beans or rice (uncooked)
- Finger Painting with pudding or fingerpaints
- Messy play in the tub where they can immediately wash off if bothered by it
- Lotion massage to extremities
- Vibrating toys or massagers



Oral Motor Exercises

- Blowing bubbles strengthens muscles of the lips and improves breath control.
- Licking peanut butter from the roof of the mouth or behind the top front teeth improves tongue elevation/lifting.
- Beckman's Oral Motor exercises
- Making silly faces improves strength, coordination and range of motion of the lips, jaw, and tongue.
- Cotton ball races to improve lip strength
- Sucking thickened liquids through a straw to increase soft palate strength

Problem Feeders

- Studies suggest that approximately 20% of children struggle with some type of feeding and/or growth issues during the first 5 years of life.
- This percentage increases significantly with children with autism spectrum disorders and/ or sensory processing disorder.
- These children are found to be even more restrictive and selective based on the type, texture, brand, temperature and color of food, placing them at a higher risk for growth and overall health concerns.



Problem Feeders

- Many problem feeders have a restricted range or variety of foods, usually less than 20 different foods.
- For these children many of the foods in their food repertoire can be lost due to food jags and are not re-acquired after taking a break, often resulting in a decreasing number of foods in a child's repertoire.
- When a new food is presented to problem feeders many times they will cry and "fall apart" or refuse the food completely.

Problem Feeders

- Kiddos that fall into this category will refuse entire categories of food texture or nutrition groups (e.g. purees, meltables, meats, vegetables, soft cubes) and almost always eat different foods at a meal than the rest of the family.
- Many believe that if a child is hungry enough, he/she will eat. This is true for about 94-96% of the pediatric population. For the other 4-6% of the pediatric population who have feeding problems, they will "starve" themselves before placing something in their mouth that scares them.

True or False

False!

Eating is a two step process?

There are actually 32 steps to eating!

Treatment- SOS Approach to Feeding

Systematic desensitization

Increasing a child's comfort level:

- Texture
- Taste
- Smell
- Consistency

Showing children that eating does not have to be:

- Scary
- 2-step process into the mouth, but rather multiple steps exploring and building a positive relationship with food.



Treatment- SOS Approach to Feeding

- Through the correct exploration and exposure children have the opportunity to develop a healthy relationship with different foods.
- According to Dr. Kay Toomey, there is a 32 steps food hierarchy that starts from tolerating the food in the room, interacting with the food, smelling, touching, tasting and eventually, eating the food.
- Food chaining



Questions?

Resources

American Occupational Therapy Association (AOTA). (2007). Specialized knowledge and skills in feeding, eating, and swallowing for occupational therapy practice. *American Journal of Occupational Therapy*, 61, 686-698.

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Till, J.A., Yorkston, K.M., & Beukelman, D.R. (1994). *Motor Speech Disorders-Advances in Assessment and Treatment*. Baltimore: Paul H. Brookes Publishing Co.

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Webb, W.G. (2017). *Neurology for the speech-language pathologist*. St. Louis, MO: Elsevier.