

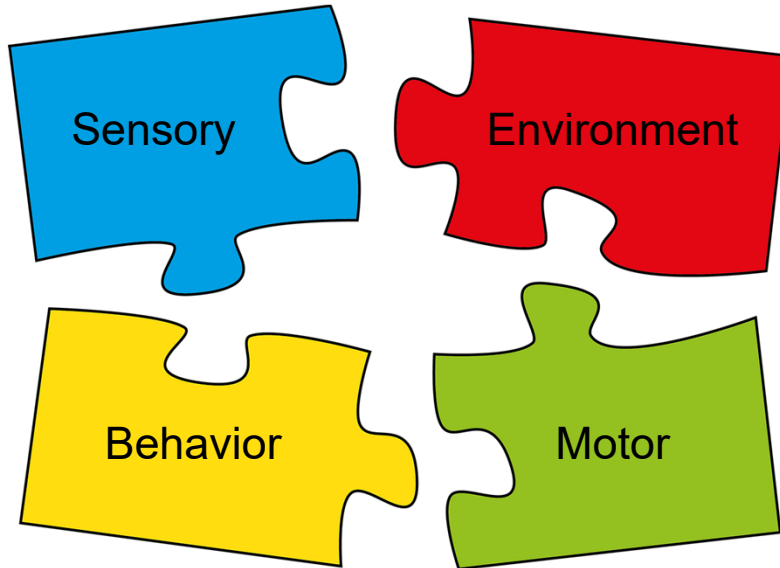


Feeding and Swallowing Assessment of the Pediatric Ketogenic Diet Patient

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10/28/19



Feeding is a Puzzle



Sensory Processing and Modulation

What is it?

How does this impact feeding?

What is sensory processing?



- How we interact with our world
- Continuous three step process:



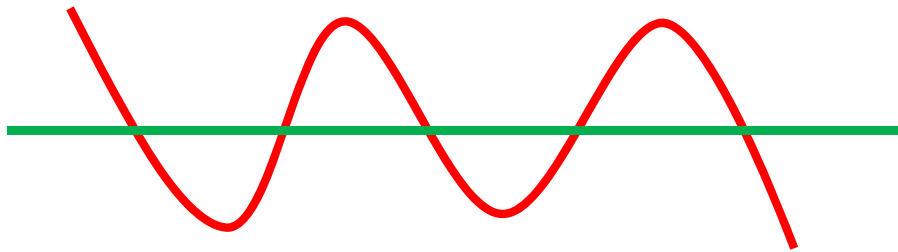
- Could have impairment with any step of process

Process between your body, brain, and the world.

What is sensory modulation?



- Ability to stay balanced or regulated
- Self-control during the ups and downs of the day



- Red line: NOT modulated
- Green line: modulated

Sensory Systems



System	Location	Function
Visual	Eyes	Sight
Olfactory	Nose	Smell
Gustatory	Tongue	Taste
Auditory	Ears	Sound
Tactile	Skin	Touch
Proprioceptive	Bones and Joints	Body Awareness
Vestibular	Inner Ear	Balance, Movement, and Gravity

Gustatory System



- Tasting ability
- Taste of food
 - Type, intensity, mixed
- Texture and temperature
- Closely related to smell



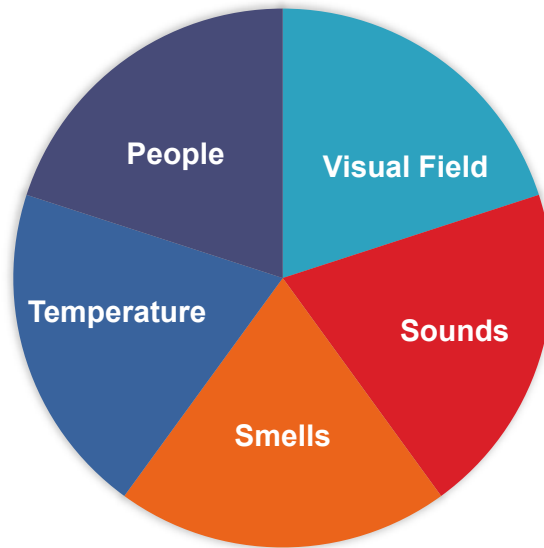
- CN VII: Facial nerve in brainstem
- CN IX: Glossopharyngeal nerve in medulla oblongata
- CN X: Vagus nerve in medulla oblongata

Environmental Factors

What is included in the “environment”?

What factors can limit feeding?

What's included in the environment?



- People: Who is present? Who is missing?
- Visual Field: What color is the food, table, utensils, and plates/ bowls? What distractions are present (i.e. screens, windows, other foods/ people)?
- Sounds: What noises are occurring?
- Smells: What does the food and room smell like?
- Temperature: Is the room hot, warm, or cold? Is there airflow?

What environmental factors can limit feeding?



“Environmental Overload”

- People: lots of new or unfamiliar people, family may be scattered, sitting in different spots around the table
- Visual Field: lots of people, lots of dull colors on table, lots of items on table, lots of different foods present
- Sounds: talking, live music or DJ
- Smells: lots of perfumes, body odors, and foods/ drinks
- Temperature: hot from so many people, may have fan blowing

Behavioral Components

What is considered “behavior”?
What types of behavior impact feeding?

What is behavior?



- How you conduct yourself at any given time
- Can be positive or negative
- Includes ability to communicate
- Every behavior has a reason

Behavioral Limitations



- ❑ Throwing food
- ❑ Rigid or ritualistic eating preferences
- ❑ Social eating
- ❑ Anxiety
- ❑ Tantrums/ meltdowns



Throwing food – usually indication of difficulty, dislike, being done, or communication attempt

Rigid/ ritualistic eating preferences – needs specific set-up or plate/utensil/cups

Social eating – eats differently with peers in the community than with family at home

Anxiety – stomach too upset to be able to eat, could lead to nausea or vomiting

Tantrums/ meltdowns – could be result of any of the above issues

Oral Motor and Positioning

What is the optimal feeding position?

What are normal chewing and
swallowing skills?

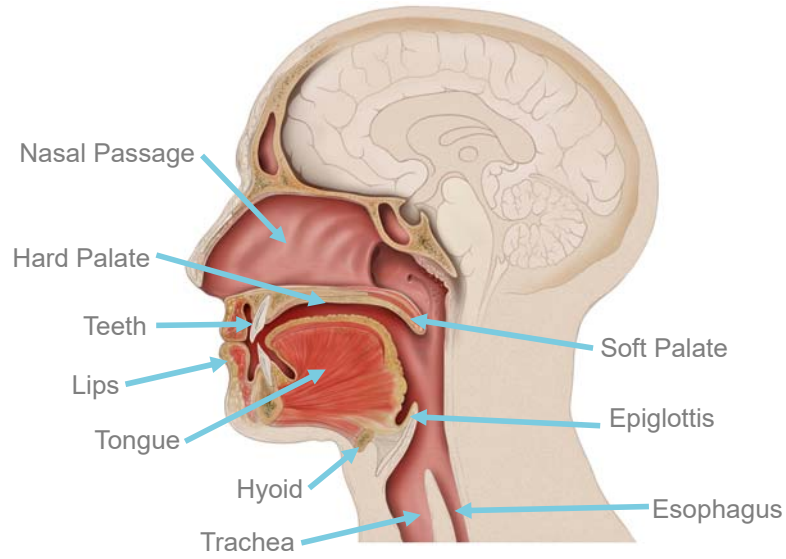
Optimal Feeding Position

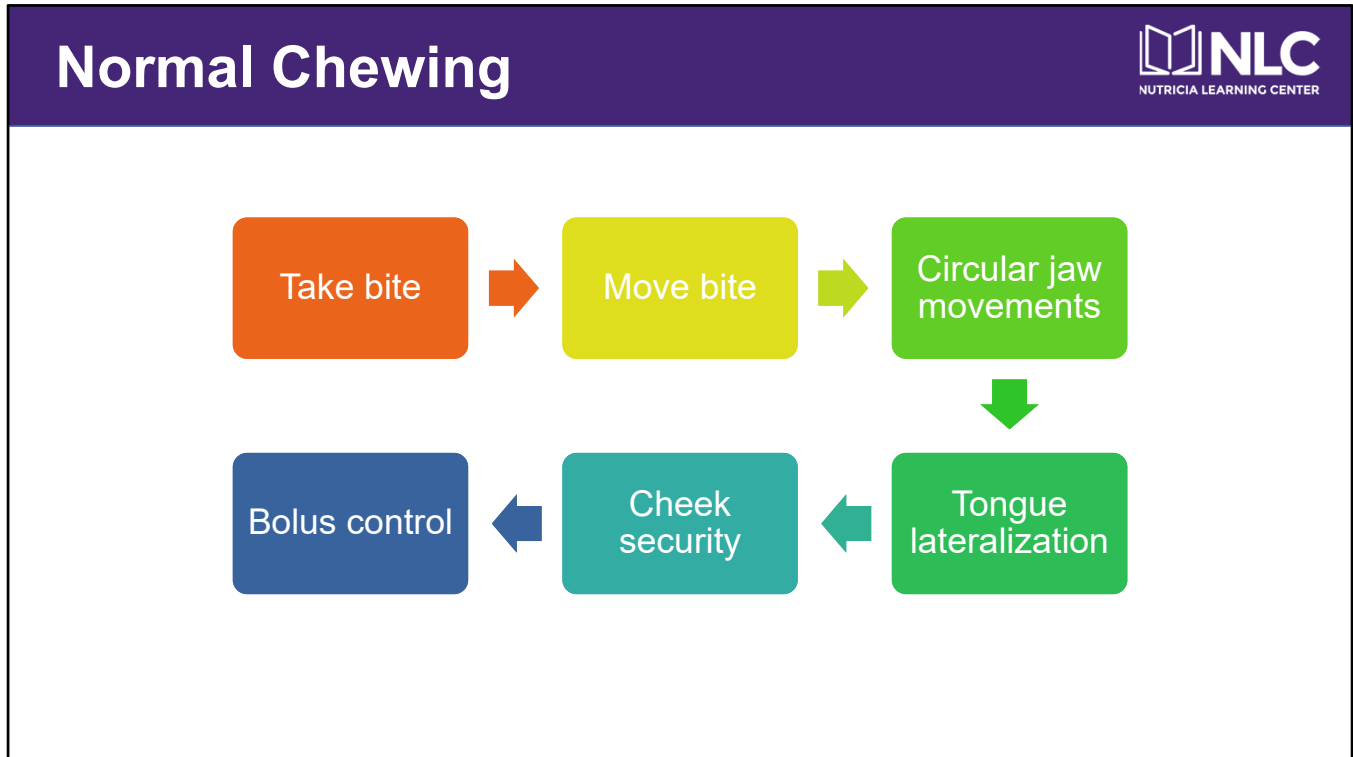
- ❑ 90, 90, 90
- ❑ Neutral neck and chin
- ❑ May need to provide supportive devices to achieve
- ❑ May have to be adapted to fit the child's needs



- Most physically supportive position
- Allows gravity to assist with digestion and swallowing
- Reduces risk of aspiration, choking, or digestion issues

Typical Mouth and Neck Anatomy





1. Take bite – using front or lateral teeth
2. Move bite – using tongue to relocate bite over lateral teeth
3. Circular jaw movements – may be vertical if young, should progress to diagonal then rotary, lower jaw does movement against upper jaw surfaces
4. Tongue lateralization – tongue moves food from one side of mouth to the other
5. Cheek security – cheek tightens to hold food over lateral teeth
6. Bolus control – food slowly forms into ball for ease of transition to swallowing

Signs of Abnormal Chewing



- ❑ Chewing with front teeth only
- ❑ Only vertical chewing after 1 year age
- ❑ Difficulty transitioning to higher level foods
- ❑ Limited tongue ROM
- ❑ Low muscle tone in cheeks
- ❑ Food spread throughout oral cavity
- ❑ Attempting to swallow food whole
- ❑ Pocketing food
- ❑ Spitting food out

Munching vs. chewing

Should start to develop diagonal and rotary chewing around 1 year age

Tongue should elevate, protrude to lick lips, and touch lateral teeth

Possible Reasons:

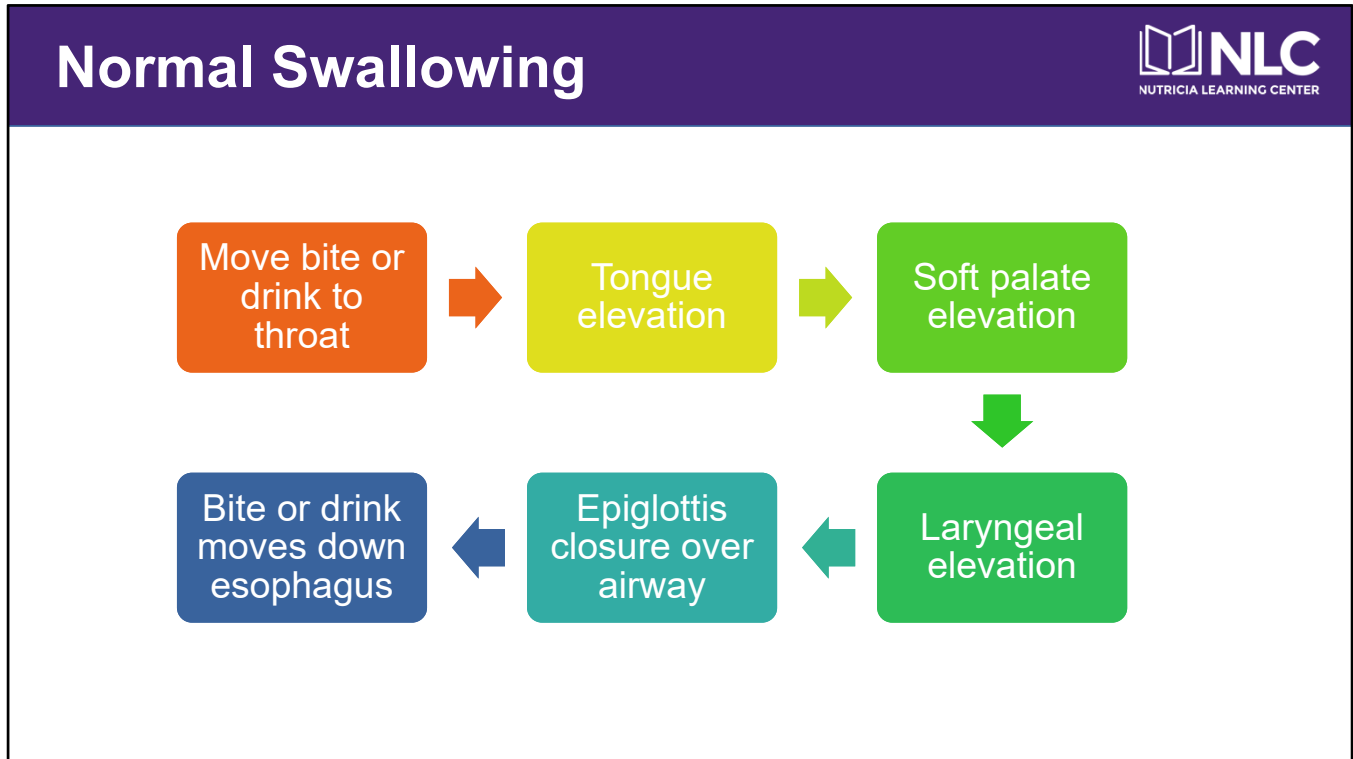
Muscle weakness

Poor muscle coordination, delayed activation

Poor oral awareness

Poor positioning or posture

Anatomical issue – teeth/ jaw alignment, tongue tie, height and width of palate



Peristalsis process, similar to bowel movements

System of positive and negative pressure

1. Move bite or drink to throat – completed by tongue and cheek coordination
2. Tongue elevation – initiates positive/ negative pressure system
3. Soft palate elevation – closes over passageway into nasal cavity
4. Laryngeal elevation – hyoid bone move up and forward, pulling attached muscles
5. Epiglottis closure over airway – domino effect from laryngeal elevation, protects against aspiration
6. Bite or drink moves down esophagus – peristalsis down into stomach

Signs of Abnormal Swallowing



- ❑ Coughing, choking, or gagging
- ❑ Persistent congestion
- ❑ Reddening of eyes or face
- ❑ Runny nose or watery eyes
- ❑ Frequent respiratory illness or low grade fevers
- ❑ Food or liquid coming out of nose
- ❑ Limited oral intake
- ❑ Poor weight gain
- ❑ Avoiding thinner food consistencies or liquid

Make sure to get a baseline understanding of child's typical presentation
 Current illness could be misperceived as swallowing issue

Possible Reasons:

Muscle weakness

Poor muscle coordination, delayed activation

Poor oral awareness

Poor positioning or posture

Anatomical issue – cleft palate, laryngeal cleft, posterior tongue tie

Swallow Studies and Thickener

What does a VFSS show?
What type of thickener should be
used?

VFSS (Video Fluoroscopy Swallow Study)



- ❑ Assesses swallow safety
- ❑ Use VARIBAR® solution
 - ❑ Not "keto-friendly"
- ❑ Performed by radiologist, SLP, and OT

"Keto-friendly" but not for VFSS



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Children already on Keto diet cannot complete a VFSS, needs to be completed before initiation of diet

Unaware of any "keto-friendly" barium solutions on the market

Radiologist – turns on/off machine

SLP – watches video and actively verbalizes what is occurring to the team

OT – feeds child and prepares foods/ liquids

Thickener Recipes – Simply Thick®



Thickness Level	Ratio
Nectar	4oz liquid + 6 grams gel (1 nectar packet)
Honey	4oz liquid + 12 grams gel (2 nectar packets or 1 honey packet)
Spoon Thick/ Pudding	4oz liquid + 24 grams gel (4 nectar packets or 2 honey packets)

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Nectar Foods – Stage 1 puree mixed with oils/ butters

Honey Foods – Stage 2 puree mixed with oils/ butters

Spoon Thick/ Pudding – sugar free jello, smashed avocados

Clinical Swallowing Evaluation



- Completed by OT or SLP
- Foods to trial
 - ▣ Purees
 - ▣ Meltable solids
 - ▣ Soft solids
 - ▣ Mechanical solids

Usually ask a keto dietician to provide me with recipes for foods to trial
 Consider list from previous slide

Purees – baby foods, yogurt, smashed table foods

Meltable Solids – puffs, cheetos, veggie straws

Soft Solids – soft cooked veggies without skin (carrots, potatoes), cheese

Mechanical Solids – pasta, breads, meats

Important Reminders



- Know who addresses feeding (SLP vs OT)
- Familiarize yourself with local resources
- Ensure proper VFSS procedures and equipment are being used

Thank you!

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General G-Tube Guidelines



- ❑ Failed VFSS or clinical swallow assessment
- ❑ Ongoing respiratory concerns
- ❑ Failure to thrive/ poor growth
- ❑ Minimal alertness

****This slide was added after the webinar based on questions received.**

Ultimately the decision is made by the attending doctor (PCP, Neurologist, etc).

If any of the above items are of concern, then a G-tube should be strongly considered.

G-tubes allow a child to receive the quantity of nutrition that is needed while not having to worry about the quality of the oral eating. Then a child can work in therapy to address the quality of the feeding to ensure safety with returning to oral feeds over time.