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Typical Feeding Development: An Overview

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Typical Feeding Development

AN OVERVIEW

Disclosures

- Dr. Rhonda Mattingly receives a salary from her employer for her positions as Associate Professor and Director of Clinical Education the University of Louisville. She also received a stipend from SpeechPathology.com for this presentation.

Course Objectives

- List the 3-step hierarchy of functions important to human beings in relation to feeding.
- Name 3 ways developmental readiness influences feeding progression.
- Describe 3 ways in which relationships impact feeding development.

Comprehensive Approach

Feeding Development

- Feeding is related to developmental readiness
- Multisensorial, multifactorial, multidimensional processes
- Basic milestone timeline but based on alignment of all systems

The Senses and Feeding

- Sight
- Sounds
- Smell
- Touch
- Taste
- Vestibular
- Proprioception

Hierarchy of Feeding

- Breathing
- Postural Support
- Eating

Environmental Factors

- What is available to a child/family?
- What sources of nutrition are affordable?
- What is a child's experience with tastes?
- What is a child's health status?
- What is the status of a child's hunger?
- What social norms dominate a child's life?
- What nutritional needs does the child have?

Relationships and Feeding

- Feeding is based on observation, experience, interaction
- Reciprocal process between the child and caregiver
- The feeding relationship is dependent on an infant's overall development
- The feeding relationship is supportive to an infant's overall development

Best Case Scenario

- Association of hunger to "time to eat"
- Communication of hunger is expressed
- Caregiver recognizes and responds
- "All done" is communicated
- Caregiver responds with cessation of feeding

Caregiver-Child Relationship

Typical Feeding Development

- Division of responsibility (Satter)
- Infants
  - Parent is responsible for what infant consumes
  - Infant is responsible for how much (and everything else)
- Infant transitioning to family food
  - Parent is responsible for what (become responsible for when/where)
  - Infant is responsible for how much and whether
- Toddlers-through-adolescents
  - Parent is responsible for what, when and where
  - Child is responsible for how much and whether

Typical Feeding Environment

- Baby/child present during family meals
- Baby/child plays with water/food/utensils/cups/dishes
- Baby/child observes family preparing food/eating food/enjoying food

Neurophysiological Development

Homeostasis	Attachment	Individuation
1-3 months	2-6 months	6-36 months
State regulation	"Falling in love"	Separation and differentiation
Parent provides safe and comfortable environment	Affective engagement and interaction	Behavioral organization and control
Neurophysiologic stability	Infant's emotional/physical needs reinforced	Parent supports autonomy and provides daily structure
Reflex feeding transitions to self-regulation of hunger		Emotional needs/Physical needs

Neurophysiological Development

Homeostasis	Attachment	Individuation
Feeding Related Cues-Arousal, crying, rooting, sucking	Reciprocity between child and caregiver	The age of the individual
Hunger-satiation patterns emerge	Feeding Related Cues-Anticipation, social pauses/satiety pauses, preference for feeder, attention seeking	Exploratory play, self feeding emerges, speech and language development, follows simple directions, responds to "no"
Positive feeding interaction perpetuates future positive experience		

Temperament Theory

- Categories of personality styles that persist through life
- Personality styles based on activity, adaptability, intensity, mood, persistence, distractibility, regularity, responsivity, approach/withdraw
- Relates to how individuals manage in relationship to novel situations

(Thomas et. al., 1970)

Temperament Categories

Easy	Slow to Warm	Difficult
Approach to novelty:	Approach to novelty:	Approach to novelty:
Positive mood	Withdraws	Withdraws
Adaptable	Low mood	Low adaptability
Regular	Low activity	High intensity
Active	Moderate to low intensity	Low regularity
Low intensity	Cautious	Negative mood

Quick Anatomy Refresher:

Anatomy

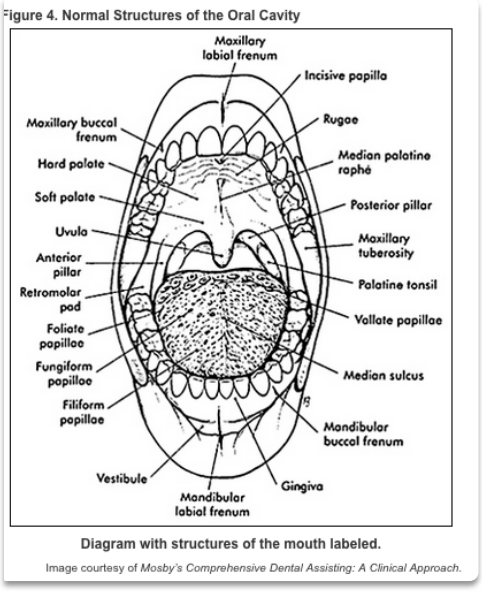
- Oral cavity
- Pharynx
- Nasopharynx
- Oropharynx
- Hypopharynx
- Larynx

Say "ahhh"

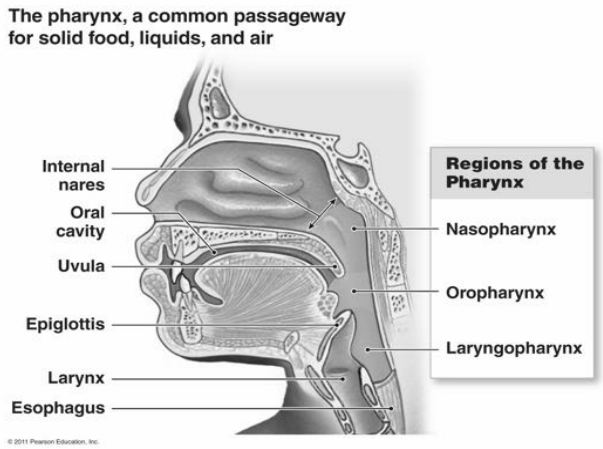
Oral Cavity

- Lips
- Mandible
- Maxilla
- Floor of the mouth
- Cheeks
- Tongue
- Hard palate
- Soft palate
- Anterior faucial arches
- Posterior faucial arches

Oral Cavity



Pharynges



Anatomical Differences

Infant vs Adult

Infant

- Potential Oral Cavity
  - Tongue fills mouth
  - Tongue rests more anteriorly
  - Sucking pads (up to 4-6 months)
  - Relatively smaller mandible
  - Obligatory nose breathers

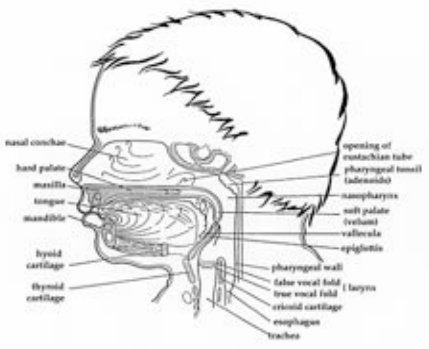
Adult

- True Oral Cavity
  - Tongue does not fill mouth
  - Tongue rests slightly farther back than infant
  - Sucking pads are gone
  - Mandible is proportional

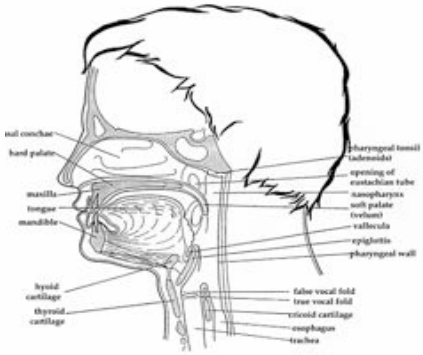
"A Picture is Worth A Thousand Words"

(Morris)

- **Infant**



- **Adult**



Esophagus

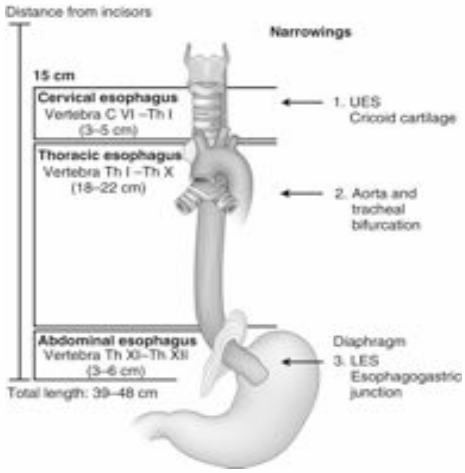
- Muscular tube lined with mucosa
- Cricopharyngeus (upper esophageal sphincter) (UES)
- Gastroesophageal sphincter (lower esophageal sphincter)

Where is the Esophagus?

- Anterior to the cervical vertebra
- Posterior to the trachea
- Between the carotid arteries
  - Recurrent laryngeal nerves flank the esophagus in the tracheoesophageal groove

Esophagus Visual

(Oh & DeMeester, 2016)



Typical Esophageal Function

- Consists of automatic peristaltic wave which carries bolus to the stomach
- Skeletal muscles in cervical esophagus propels food more quickly than the smooth muscles in the thoracic esophagus
- Primary wave goes from UES to LES in one contraction
- Esophageal phase occurs after each separate pharyngeal phase when there is a definite time delay between swallows

Typical Gastrointestinal Function

- Typical pattern of gastric motility and emptying is the end result of functional and complex interactions
- Food volume, viscosity, separate food content impact gastric function
- Acid clearance in distal esophagus

Reflexes, Phases & Norms

Phases of Swallowing

- Oral Preparatory Phase-Preparing food/liquid in the oral cavity to form a bolus
- Oral Transit Phase-Propelling bolus through oral cavity to posterior
- Pharyngeal Phase-Initiating the swallow, bolus moves through pharynx
- Esophageal Phase-Moving bolus through the esophagus

Typical Reflexes Associated w/Feeding

- Root Reflex-Stimulus presented near infant's mouth resulting in head turn toward stimuli and mouthing/rooting
- Suck Reflex-Sucking in response to stimuli within oral cavity
- Suck/Swallow-When liquid is moved into the mouth infant sucks/swallows
- Tongue Thrust-When lips are touched infant protrudes tongue
- Gag-Solid object propelled forward and outward of infant's mouth

Important Milestones

- Sucking develops in utero ~ 15-16 weeks gestation
- Swallowing develops ~ 14-17 weeks gestation
- Fetus swallows approximately 15 oz of amniotic fluid per day
- Suck, swallow, breathe synchrony emerges between 32-34 weeks
- Synchrony stabilizes ~ 37 weeks

Newborn

Milestones

Motor	Language/ Social	Oral-Motor/Feeding	Food/Liquid Intake
• Physiological flexion • Strong grasp reflex	• Cry/vowel-like sounds primarily on exhalation • Clicks/fricti on noise	• Strong gag, root, phasic-bite-release • Suckles/sucks when hand comes to mouth • Sucks liquid from bottle and/or breast	• Exclusively accepts breast milk and/or formula

1-2 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Movement becoming more deliberate • Roles from side-to-back • Bicycles w/legs when excited • Hold objects briefly • Follows objects w/eyes	• May begin to respond to interaction w/cooing and light squeals • Holds eye contact w/caregiver • Beginning to smile	• Sucks liquid from bottle and/or breast • Semi-recline posture during feeding	• Exclusively accepts breast milk and/or formula

2-3 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Keeps head in mid-position in supine • Raises head/chest in prone • Sits w/support on lap	• Presents w/different cries • Coos in response to interaction w/caregiver	• Sucks liquid from bottle and/or breast • Gaze w/caregiver during feeding	• Exclusively accepts breast milk and/or formula

3-4 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Orientation of head, eyes, hand-to-midline initiated • Supports self on forearms in prone • Rolls from side-to-side on stomach • Claps hands	• Babbles randomly	• Begins to place hands on the bottle when feeding	• Breast milk and/or formula • May begin puree and cereal

5-6 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Increased head/neck control • Tracks visually • Sits w/support • Rolls over • Hands to mouth	• Rhythmical babbling	• Spoon feeding introduced • Cup drinking introduced • Holds own bottle w/both hands	• Breast milk and/or formula • May begin puree and cereal • May begin lumpy solids if began puree earlier

6-9 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Sits independently • Hand and toys to mouth • Crawling begins • Pincer grasp emerges • Begins finger feeding • Object permanence • Reaches • Head/neck/trunk control	• Jargon	• Posture is more upright during feeding • Lips close on spoon • Accepts puree from spoon • Lingual lateral movement • Munching pattern begins • Extracts liquid from cup • Attempts to help w/the spoon	• Breast milk and/or formula • Lumpy solids w/improved ability to manage harder lumps • Finger foods begin (pieces of cereal, teething crackers, pieces of cooked pasta)

9-12 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Pulls-to-stand • Cruises • First steps • Attempts to spoon feed self • Pincer grasp more refined • Increased mobility in shoulders/arms	• Verbalizes 1-2 words • Recognizes own name • Imitates familiar sounds/sound combos • Vocalizes desire to change activities • Understands simple directions	• Drinks from a cup held by caregiver Accepts greater variety of textures (food) • Increased finger feeding • Rotary chewing • Purposefully reaches for spoon	• Breast milk and/or formula • Fruit cut into pieces • Bite-size cooked vegetables • Combination foods (mac and cheese, casseroles) • Cheeses

12-18 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Gross and fine motor skills maturing • Walking independently • Climbs stairs (1-step at a time) • Runs • Grasps objects and releases on request	• Vocabulary of 5-20 words Shakes head "no" • Asks "what's that?" • Asks for "more"	• Grasps spoon w/both hands for self-feeding • Holds/drinks from cup with both hands • Holds and tips bottle independently	• Whole milk • Dairy • Fruits • Cooked vegetables • Small pieces of meat and other proteins • Juice

18-24 Months

Milestones

Motor	Language/Social	Oral-Motor/Feeding	Food/Liquid Intake
• Kicks a ball • Walks backwards or sideways • Rides on small wheeled toys • Attention and play skills improve	• 2-word utterances • Uses 50 difference words • Makes animal sounds • Uses words to express wants/needs • Understands the word "no"	• Primarily self-feeds • Chews and swallows a wide range of textures • Oral movements are more efficient	• Whole milk • Dairy • Fruits • Cooked vegetables • Small pieces of meat and other proteins • Juice

24-36 Months

Milestones

Motor	Language/ Social	Oral-Motor/Feeding	Food/Liquid Intake
• Runs without falling and can avoid obstacles • Pedals a tricycle	• Uses 3-word phrases frequently • Uses negation	• Holds cups w/one hand • Uses open cup without spilling • Places food on spoon with fingers • Uses fork to poke food • Wide range of solid foods	• Low-fat milk • Dairy • Fruits • Meat • Combo foods • Fruits and/or vegetables • Juice

Self-Feeding

Milestones

Age (Months)	Skill
6-9	• Both hands used to hold bottle • Finger feeding begins
9-12	• Finger feeding easily managed solids
12-18	• Grasps soon w/whole hand • Holds and drinks from a cup w/2 hands • Holds and tips bottle
24-36	• Holds and drinks from a cup using one hand • Uses fingers to fill spoon • Uses a fork
36+	• Helps w/simple meal preparation (stirring, scooping, pouring, setting table)

Summary

Early Experiences and the Brain

- Most regions of the brain contain all of the neurons they will have by birth
- Ongoing process of wiring/re-wiring connections among neurons
- New synapses are formed through use/others that are unused are pruned away
- Over-pruning can occur when a child is deprived of normally expected experiences

Emotional Development and the Brain

- Infants have fundamental task of determining whether needs are met
- When adults are responsive the infant perceives them as a source of safety
- Infants who feel safe/secure can focus on exploring which allows the brain to develop

Early Experiences, the Brain and Eating

- Positive early experiences and Feeding
  - Communication acknowledged and needs met by caregiver = Safety/Security
  - Safety-Security = Infant/child who is free to experiment, explore, and practice
  - Experimentation, exploration, and practice = Reinforcing neuronal connections and overall function

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Feeding Development: Disrupted

Factors that can Impact Typical Development

- Medical Diagnoses & Complications
- Developmental Diagnoses
- Temperament
- Psychosocial Diagnoses/Issues
- Nutrition Problems
- Environmental Factors

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