FEEDING & SWALLOWING SKILLS IN CHILDREN WITH DOWN SYNDROME

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COURSE LEARNING OBJECTIVES

- Identify medical diagnoses and anatomical differences common to children with Down syndrome
- List clinical signs of possible swallowing dysfunction
- Describe therapeutic techniques and modifications for feeding and swallow function

OUTLINE

- Terminology
- Down syndrome definition and characteristics
- Systems involved in feeding
- Medical conditions impacting feeding
- Clinical feeding observations, with oral motor timeline, and modifications
  - Breastfeeding
  - Bottle feeding
  - Cup drinking
  - Spoon feeding
  - Biting
  - Chewing
- Swallowing definition and phases
- Assessment and modifications for swallow function
**TERMINOLOGY**

- Feeding: process for intake of food, including both its gathering and preparation...accomplished by sucking, chewing, and swallowing
- Swallowing: propels food from the oral cavity into the stomach
- Dysphagia: difficulty in swallowing
- Clinical feeding evaluation: review of family, medical, developmental, and feeding history; a physical examination; and an observation of a typical meal
- Videofluoroscopic Swallow Study (VFSS): dynamic assessment of oral, pharyngeal, and upper esophageal phases of a swallow

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**TRISOMY 21 – DOWN SYNDROME**

- Definition
  - Down syndrome is a set of mental and physical symptoms that result from having an extra copy of Chromosome 21
- Physical characteristics
  - Flat face with an upward slant to the eye
  - Short neck
  - Abnormally shaped ears
  - Small mouth and shallow mouth roof - the tongue is actually normal size
  - Deep crease in the palm of the hand
  - White spots on the iris of the eye
  - Poor muscle tone, loose ligaments
  - Small hands and feet

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(www.ndss.org)
MEDICAL CONDITIONS IMPACTING FEEDING

- Hypotonia: affects both external and internal musculature
- Vision: impacts coordination
- Gastrointestinal (GI): pain and discomfort
- Feeding tube placement: impact hunger
- Cardiac: reduces endurance and coordination

HYPOTONIA

- Hypotonia, or low tone, impacts the ability for muscles to react, requiring additional input to body for muscle movements to occur
- Due to hypotonia, sensory feedback loop is compromised requiring more sensory input to achieve desired reaction (e.g., swallow, tongue movement, continued chewing)
VISION

- Inability to use central vision, can impact ability to pick up food or search for food
- Strabismus: can be corrected with surgery, patch therapy, or glasses
- Cataracts: corrected surgically

GASTROINTESTINAL

- Reflux: lower esophageal sphincter (LES) is unable to contract completely closed and stomach contents move back up the esophagus
  - Can result in projectile vomiting
  - Less obvious symptoms can be present, such as arching, tongue showing, fussiness after feeding
- GI motility: slow gastric emptying
- Anatomical abnormalities, such as Hirschsprung’s and duodenal atresia, with surgical interventions used to correct

(www.ndss.org)
FEEDING TUBE:
SHORT TERM SUPPLEMENTATION

- Nasogastric tube (NG tube)
  - Passed through the nose to the stomach
  - Placed temporarily to aid in supplementation
  - Can be bolus or on a pump

- Nasojejunum tube (NJ tube)
  - Passed through the stomach and to the jejunum to decrease reflux and vomiting of feedings due to intolerance
  - Require slow volume, continuous feeds

(Morris & Klein, 2000)

FEEDING TUBE:
LONG TERM SUPPLEMENTATION

- Gastrostomy tube (G-tube)
  - Can take larger bolus size in short periods of time: over gravity, slow push, on a pump

- Jejunostomy tube (G-J tube)
  - Bypassing the stomach requires special formula where nutrition is broken down to help aid digestion
  - Feedings are continuous at low volume and can run 18-24 hours a day

(Morris & Klein, 2000)
CARDIAC

• Congenital Heart Abnormalities
  - Atrial Septal Defect (ASD)
  - Ventral Septal Defect (VSD)
  - Patent Ductus Arteriosus (PDA)
  - Atrioventricular Canal (several deformities)
• Impacts endurance and oxygen saturation levels resulting in decreased alert state and poor oral-motor control

(Harvey, 2009)
It is the position of the American Speech-Language-Hearing Association (ASHA), that speech-language pathologists play a primary role in the evaluation and treatment of infants, children, and adults with swallowing and feeding disorders. Given the high incidence and prevalence of dysphagia, and the potentially severe and even fatal consequences, appropriate diagnosis and management of swallowing and feeding disorders are critical. In addition, dysphagia’s impact on health care economics, quality of life, and caregiver burden is significant. Speech-language pathologists are knowledgeable about normal and abnormal anatomy, physiology, and neurophysiology of the upper aerodigestive tract responsible for respiration, swallowing, and speech. This knowledge, coupled with clinical expertise, allows speech-language pathologists to assume a variety of roles with expertise related to evaluation and treatment of individuals with swallowing and feeding disorders.

**Clinical Observation and Modifications of Feeding Skills**
- Breastfeeding
- Bottle feeding
- Cup drinking
- Spoon feeding
- Biting
- Chewing
SUCKING PATTERNS

- Normal sucking consists of a rhythmical pattern of suck-swallow-breathe (SSB) sequence with a 1:1:1 ratio; however a ratio of 2:1 can also be seen
- Disorganized or dysfunctional sucking patterns impact feeding coordination and increases risk of aspiration

(Meyer-Palmer, 2004)

BREASTFEEDING

- Success is dependent on feeding dyad between mother and infant, such as milk supply, "let down" flow, mother’s experience with breastfeeding, family support, patience
- Some infants are able to breastfeed well when provided supportive positioning
- If infant is able to express milk, but is choking frequently, will need to further assess safety of breastfeeding
**Breastfeeding Positions**

- Positions
  - Football
  - Cradle
  - Cross cradle
- What works best for mother and child are dependent on a lot of factors, including size, flow rate, alertness, stamina, and quality of suck

**Bottle Feeding**

- Sucking reflex dissipates at approximately 3-4 months
- Some infants start decreasing volume of intake at this stage because it is required for the infant to volitionally suck
- Decrease in feeding skills is a red flag that may indicate additional underlying issues affecting development
Bottle Feeding: Modifications
- Nipple: may need larger shape such as NUK
- Bottle: gravity pressure bottle to reduce air intake
- Positioning: more support of infant's body to conserve energy
- Viscosity change: assist with better timing of swallow

Cup Drinking
- Open cup drinking can be introduced as early as 6 months and is characterized by wide jaw excursions with excessive liquid loss. Pattern regresses to the earlier in/out tongue movement to retrieve the liquid.
- By 12 months, pattern is more coordinated with tongue remaining in mouth under the cup to assist with stability. Jaw stability is also seen in both open and closed positions.
- By 15-18 months, more control is seen, with upper lip on sealing closure of the cup and tongue is no longer underneath the cup rim. Teeth can bite down on rim during pause time to swallow and as a way to maintain stability while drinking.

(Morris & Klein, 2000)