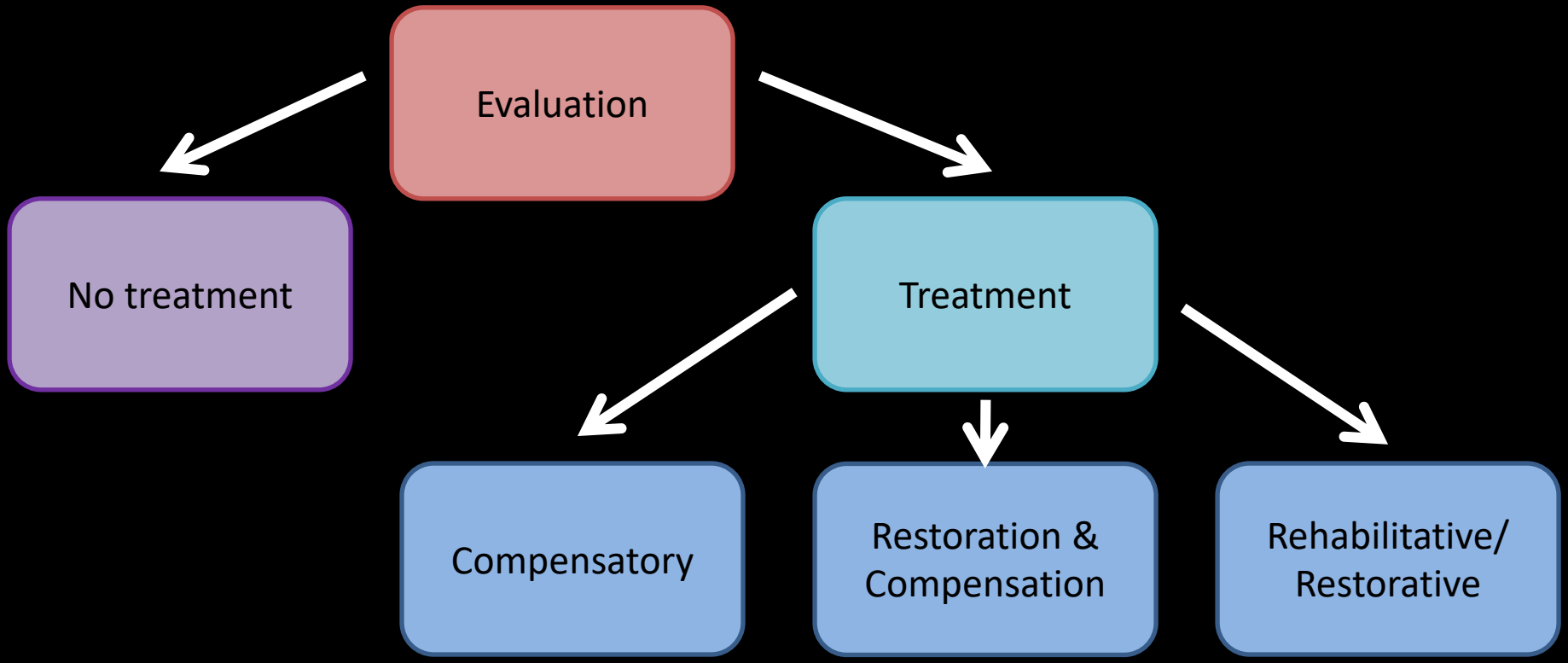
Dysphagia Treatment: Compensatory Interventions

James Curtis, MS, CCC-SLP, BCS-S


Evaluation
No treatment
Treatment
Compensatory
Restoration & Compensation
Rehabilitative/ Restorative

Goals of Compensation

- Short-term fix to physiologic impairments in an effort to reduce *frequency* and/or *severity* of signs of dysphagia (immediate and ancillary)

Who needs compensations

- Acute onset
  - Achieve *safest* but *least restrictive oral intake diet* while awaiting for spontaneous or rehabilitative recovery

Who needs compensations

- Acute onset
  - Achieve *safest* but *least restrictive oral intake diet* while awaiting for spontaneous or rehabilitative recovery

- Chronic care
  - Maintain safest but least restrictive oral intake *when restoration is not indicated* (palliative & hospice)
  - *While awaiting restorative gains* (active rehab therapy)

Types of Compensations

Postures

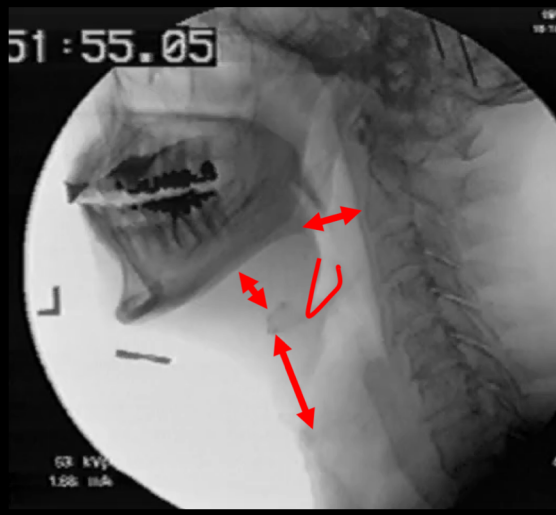
Maneuvers

Diet

Others

Postures

Chin Tuck (Cervical Flexion)



- Instruction: “Take a sip and hold it in your mouth, tilt your chin to your chest, then swallow”
- Structural Changes
  - Alters vallecular shape (but not size)
  - Decreases BoT-PPW, HL, and Hyoid-Mandible distances
- Reported Findings
  - Facilitates oral bolus containment and laryngeal inlet narrowing
  - Increased timeliness and duration of laryngeal vestibule closure
  - Increased magnitude and duration of oropharyngeal contraction
  - Reduced UES resting pressure
  - *Increased latency of pharyngeal contraction**
  - *Reduced magnitude of hypopharyngeal contractile pressure**
  - *Reduced duration of UES relaxation**

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(Bülow et al., 1999; Bülow et al., 2001; Balou et al., 2014; Young et al., 2015; Pauloski et al., 2008)


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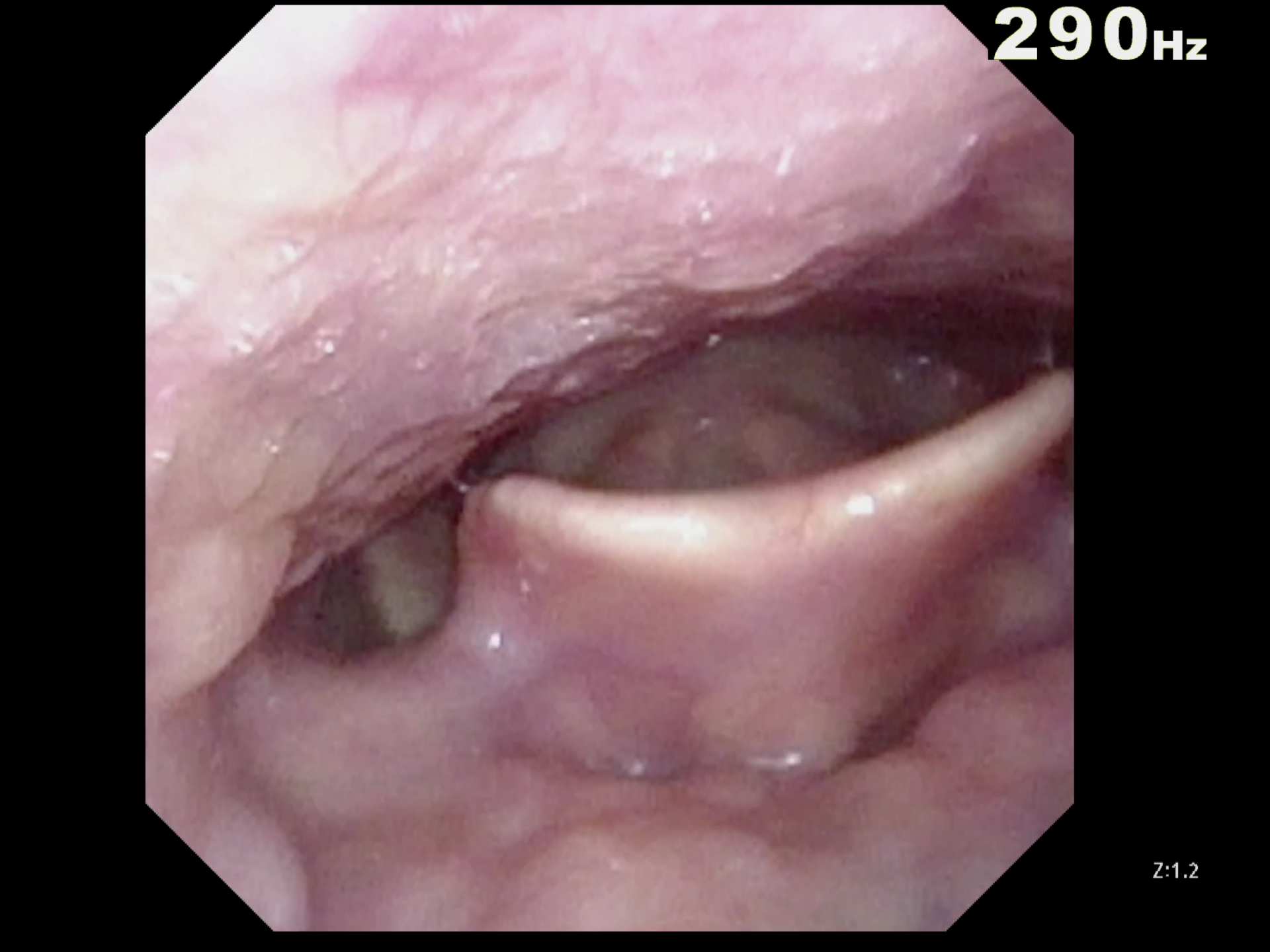
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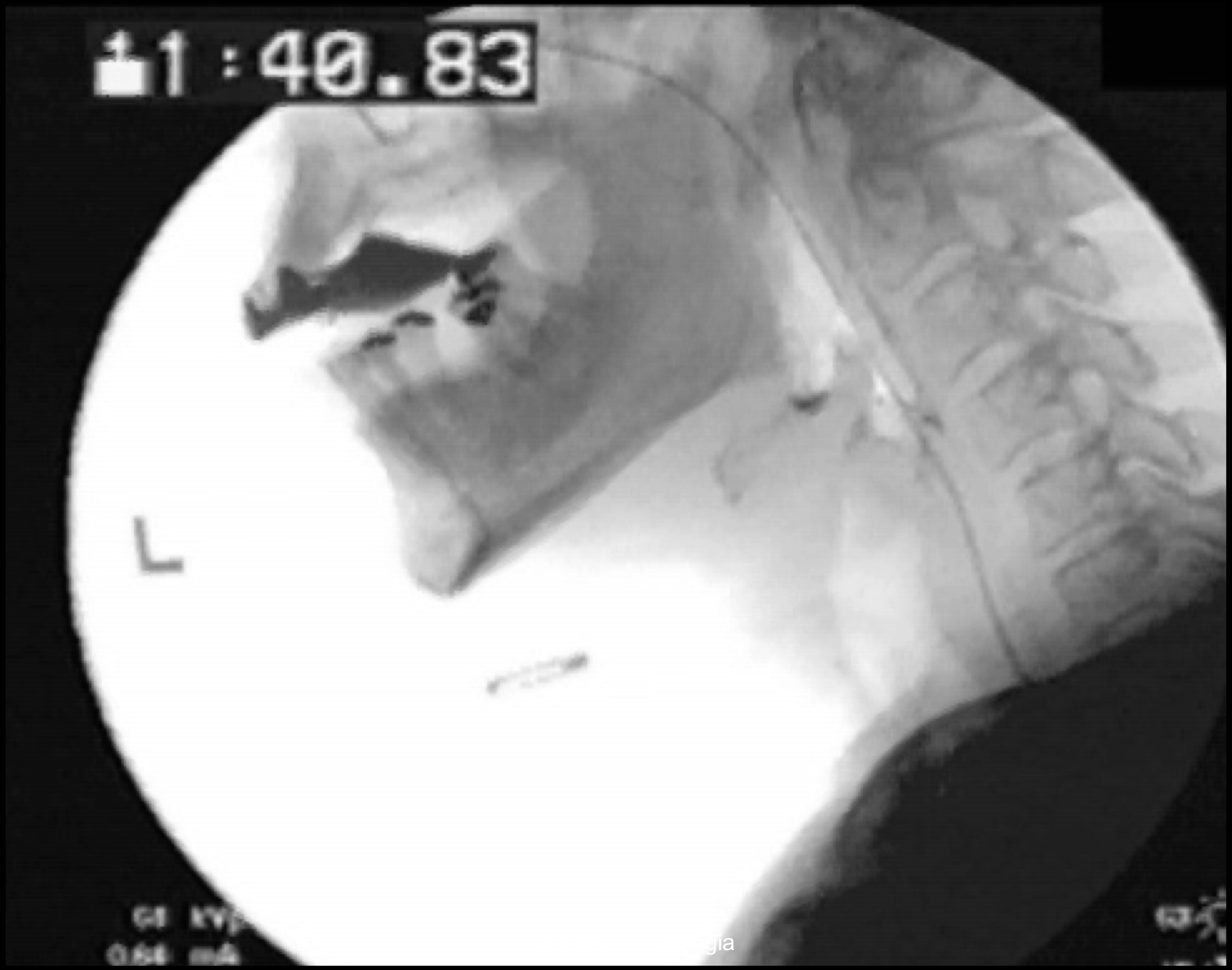
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Head Turn (Cervical Rotation)

- Instruction: “Turn you head to the left/right, and swallow”

- Structural Changes
  - Narrows the side of pharynx to which the head is turned (i.e., “closes off the bad side”)
  - May (thru posturing) pull UES open to greater extent

- Physiologic Changes
  - May increase extent and duration of PES opening (CVA)
  - May decrease PES resting pressure
  - May increase duration of PES relaxation
  - May decrease latency of pharyngeal contraction onset
  - May decrease magnitude and duration of pharyngeal contraction*

Logemann et al., 1989; Ciucci et al., 2014; Pauloski et al., 2008


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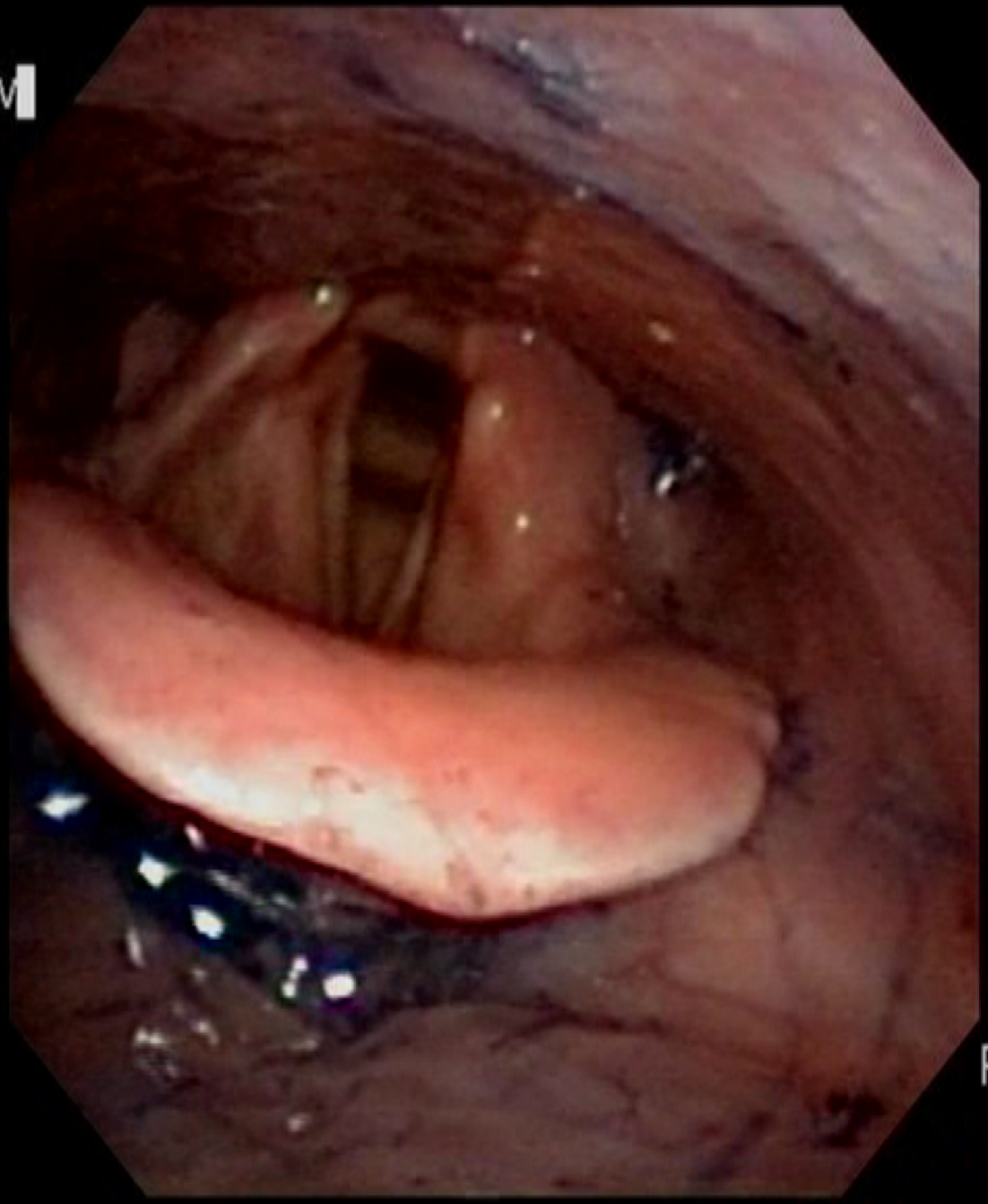
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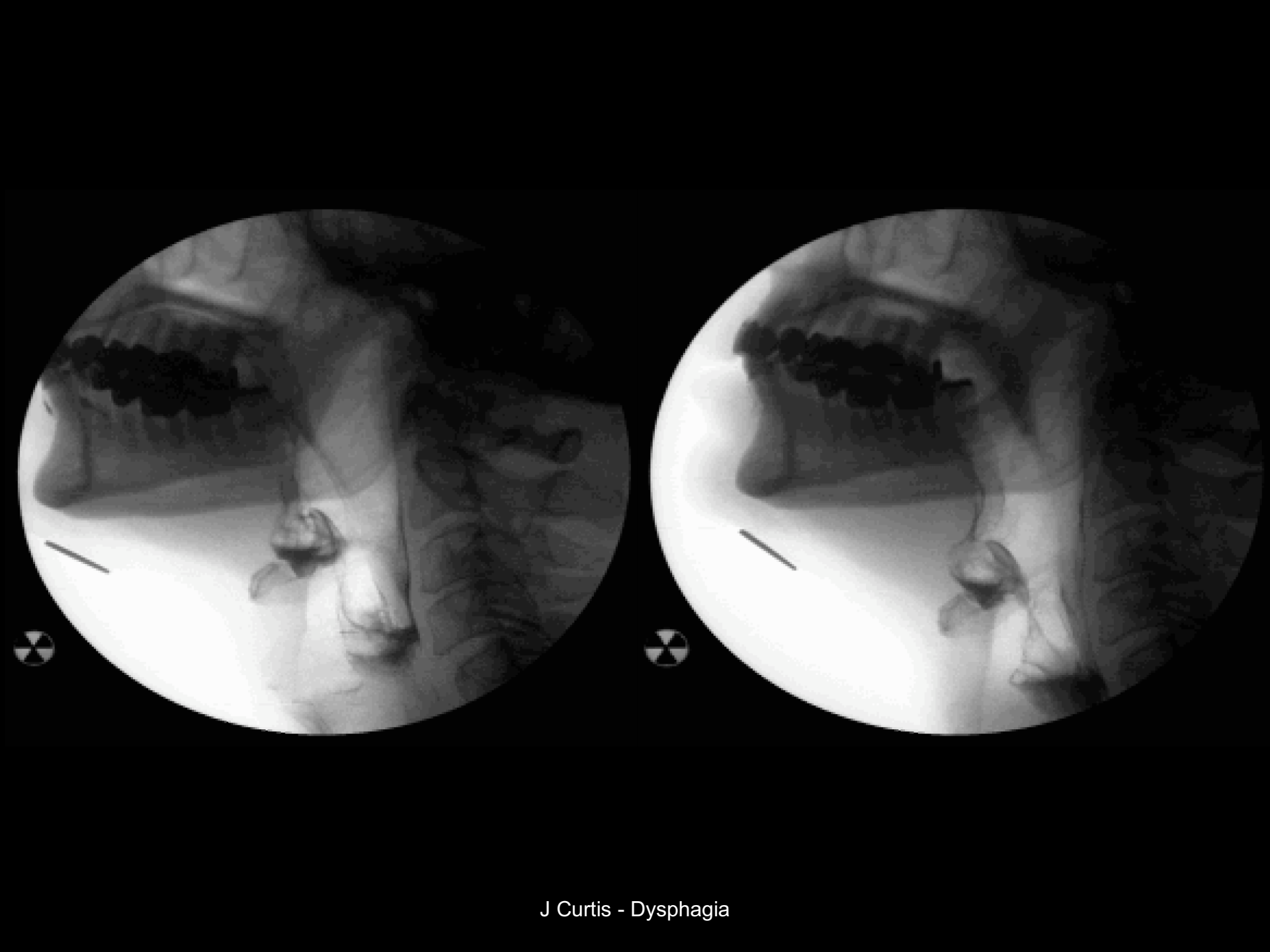

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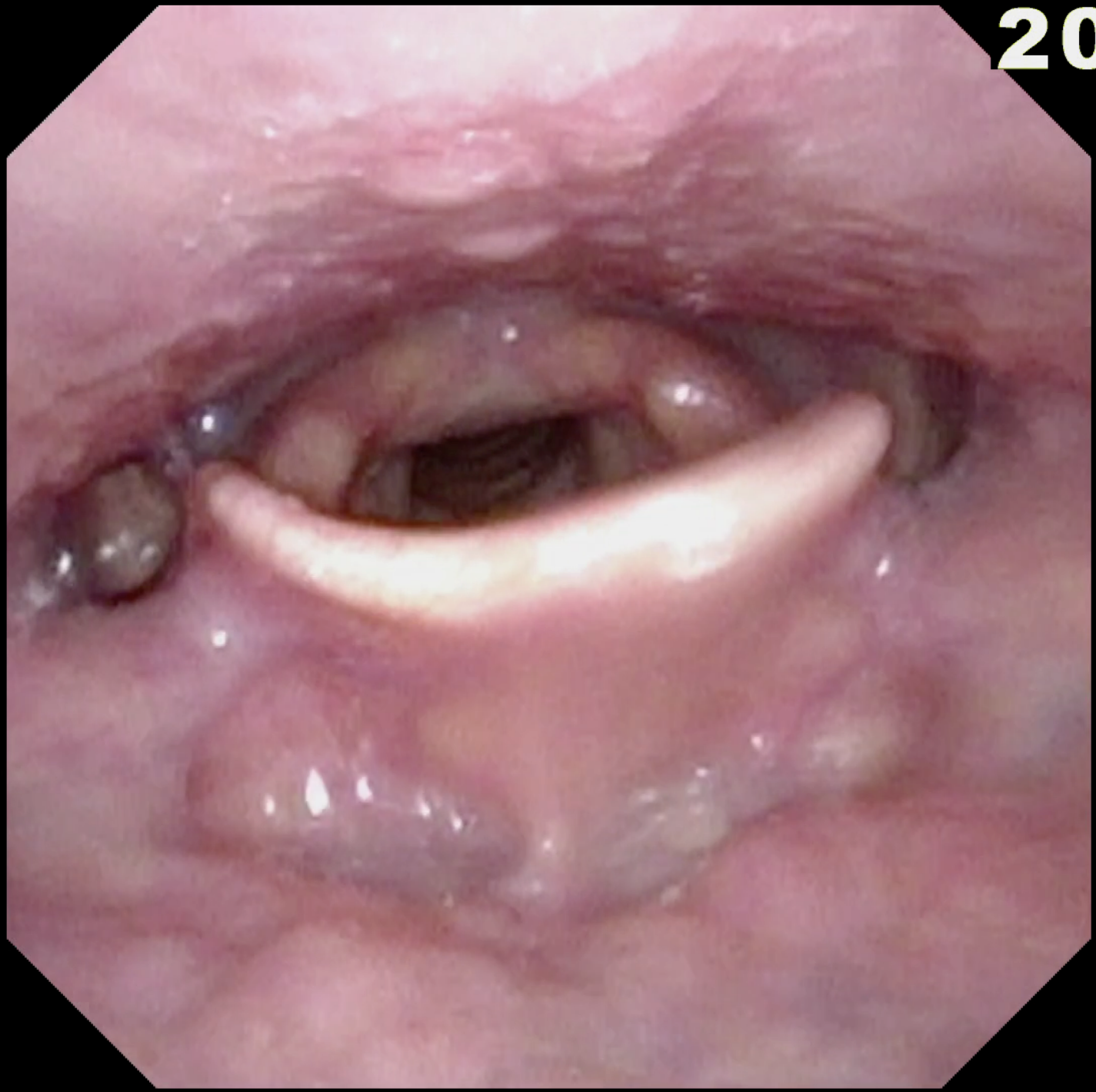
Head Tilt (Lateral Cervical Flexion)

- Instruction: “Take a sip and hold it in your mouth, tilt your head to the left/right, then swallow”

- Utilizes gravity to drain bolus to stronger side of oral cavity and pharynx, thereby diverting it away from the weaker side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Chin Up (Cervical Extension)

- Instruction: “Take a sip and hold it in your mouth, tilt your chin up to the ceiling, then swallow”

- Structural Changes:
  - Increases size of pharyngeal cavity
  - Increases size of laryngeal cavity

- Utilizes gravity to
  1. Prevent anterior labial leakage
  2. Drain bolus posteriorly from oral cavity into oropharynx/pharynx


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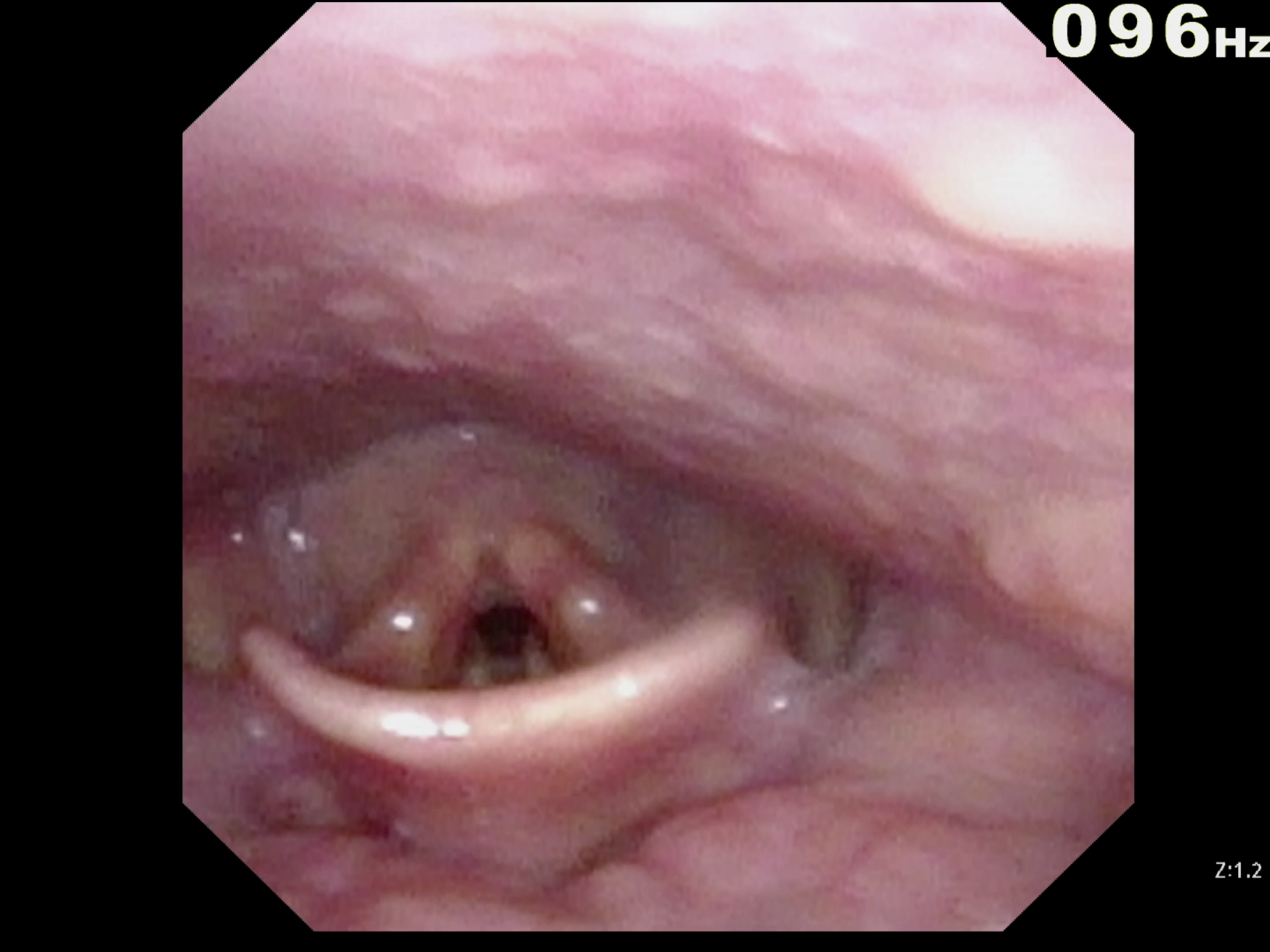
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Postures - Contraindications

- Head stabilization devices
- Physical constraints
- Movement disorders
- Severe cognitive impairment

Maneuvers

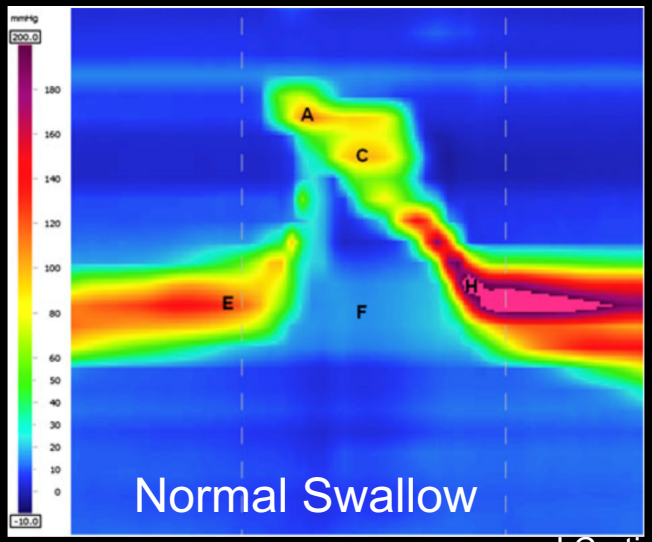
Extra Swallows

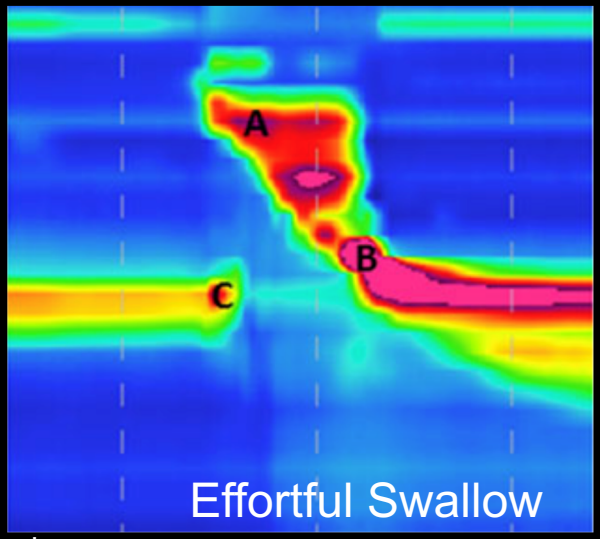
- Instruction: “Swallow 2-3 times for every bite and sip”

- Used to reduce and eliminate pharyngeal residue by using additional swallows to clear residue from the pharynx

Effortful Swallow

- Instruction: “Swallow hard, as if swallowing a golf ball”
- May increase extent & duration of pharyngeal pressures, LCD, HMD, UESOD, PTT, and amplitude of esophageal peristalsis
- May decrease depth (but not frequency) of penetration
- *May increase latency of pharyngeal pressure onset and STD**
- *May decrease anterior hyoid excursion, laryngeal elevation, pharyngeal shortening, and hypopharyngeal bolus clearance**





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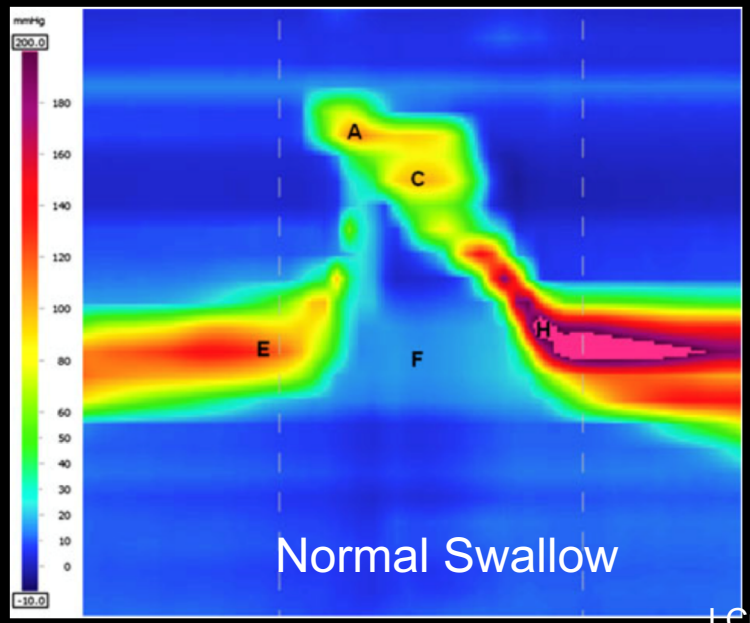
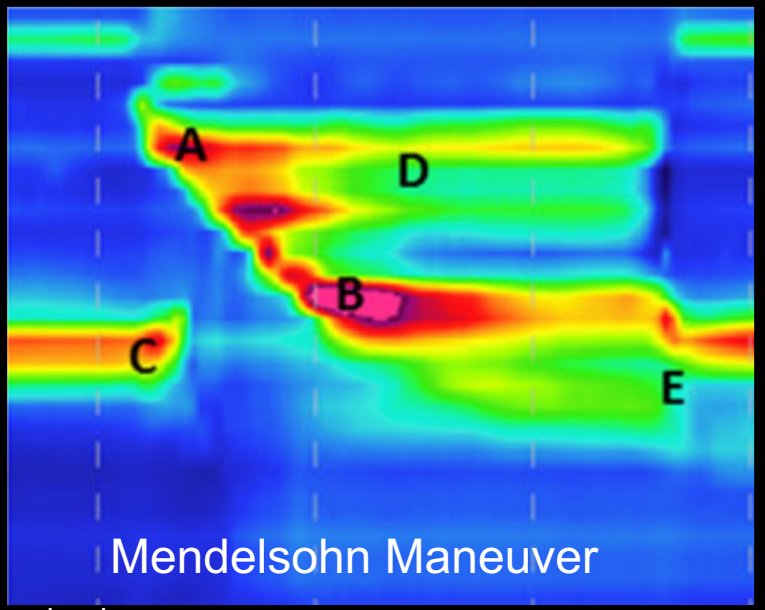
Hoffmann et al., 2012; O’Rourke et al., 2014; Nekl et al., 2012, Bülow et al., 1999; Bülow et al., 2001; McCabe et al., 2009; Molfenter 2018

Maneuvers – Mendelsohn Maneuver

- "Swallow, squeeze, and hold"
- Designed to prolong swallowing events mid-swallow
- Increases extent and duration of hyoid displacement, pharyngeal constriction, and PES distension
- Increases amplitude of swallowing pressures
- *May decrease esophageal swallowing pressures**





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Hoffmann et al., 2012; O'Rourke et al., 2014

Pharyngeal Comparisons

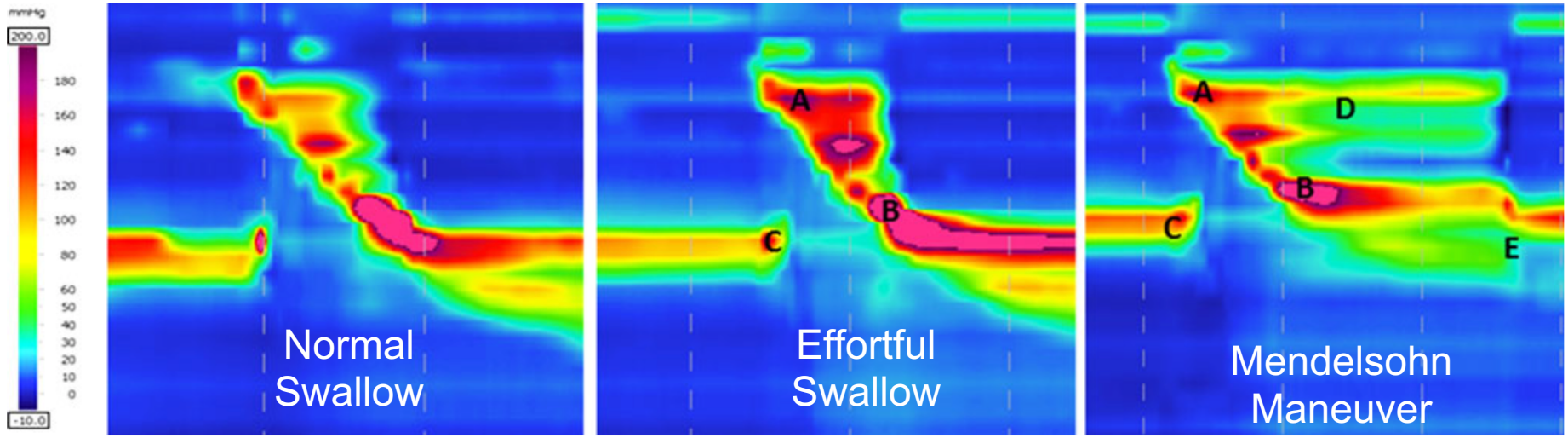

Fig. 2 Spatiotemporal plots from one subject displaying normal swallow (*left*), effortful swallow (*middle*), and the Mendelsohn maneuver (*right*). Velopharyngeal pressure (*a*) and postclosure upper esophageal sphincter pressure (*b*) are elevated in both maneuvers, while preopening upper esophageal sphincter pressure is decreased (*c*). Duration of velopharyngeal pressure is prolonged in the Mendelsohn maneuver (*d*). Descent of the upper esophageal sphincter can be easily observed (*e*) at the conclusion of the Mendelsohn maneuver

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Hoffmann et al., 2012

Esophageal Comparisons

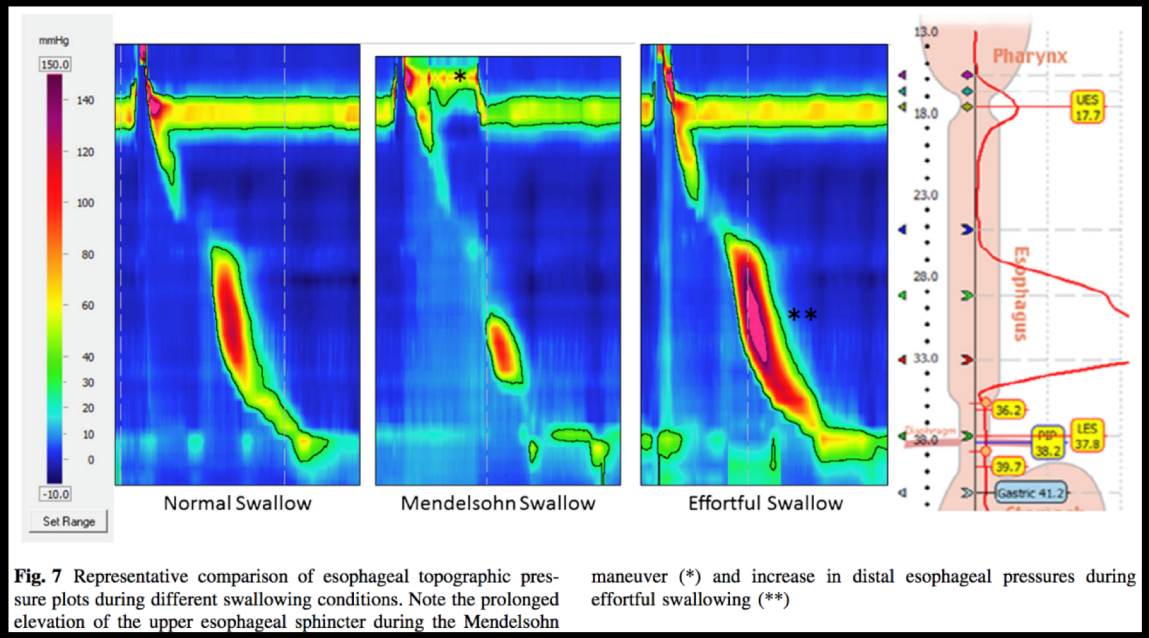

Fig. 7 Representative comparison of esophageal topographic pressure plots during different swallowing conditions. Note the prolonged elevation of the upper esophageal sphincter during the Mendelsohn maneuver (*) and increase in distal esophageal pressures during effortful swallowing (**)

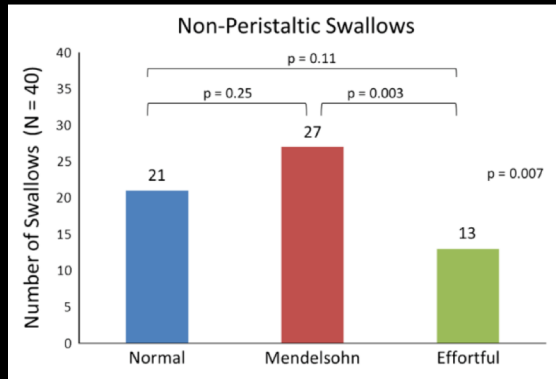

Fig. 3 Overall number of nonperistaltic swallows (combined dry and wet conditions) by swallowing maneuver. There were significantly more nonperistaltic swallows during the Mendelsohn maneuver compared to that with effortful swallowing

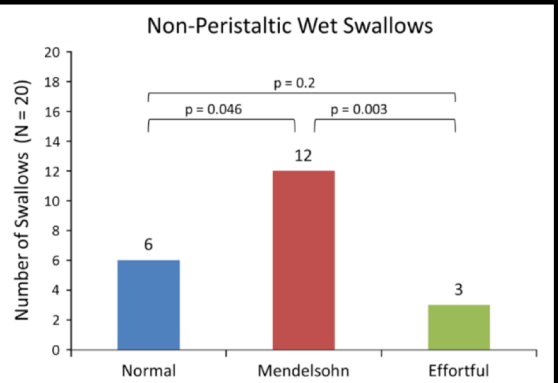

Fig. 4 Number of nonperistaltic wet swallows by swallowing maneuver. Significantly more nonperistaltic swallows were seen during performance of the Mendelsohn maneuver than when the participants completed normal or effortful swallows

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O'Rourke et al., 2014

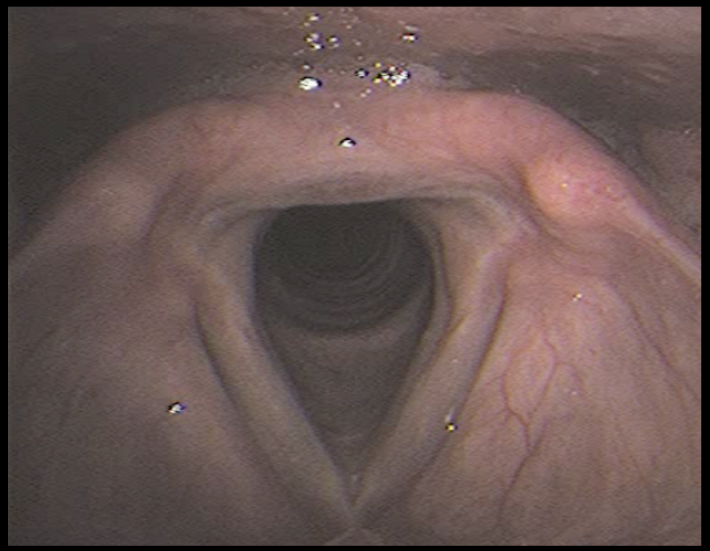
Post-Swallow Coughs

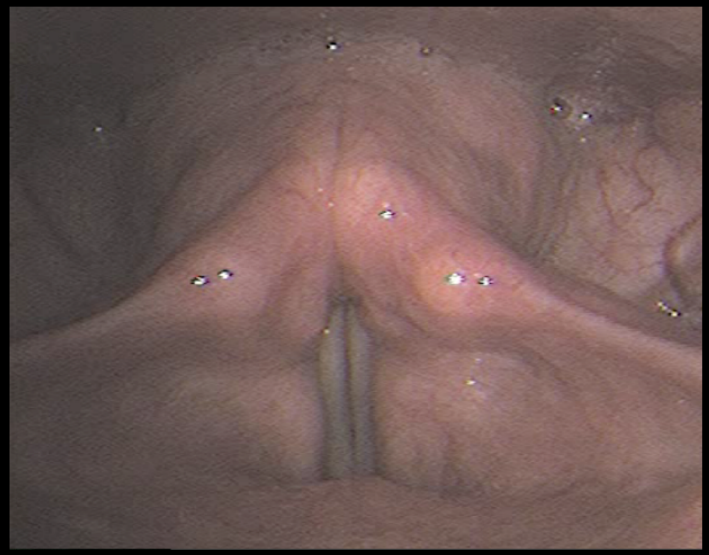
- Instruction: “Cough after you swallow”

- Designed to reduce/eliminate pulmonary aspirate by using an immediate throat clear or cough to eject aspirate material from the laryngeal vestibule and lower airway

Breath Hold

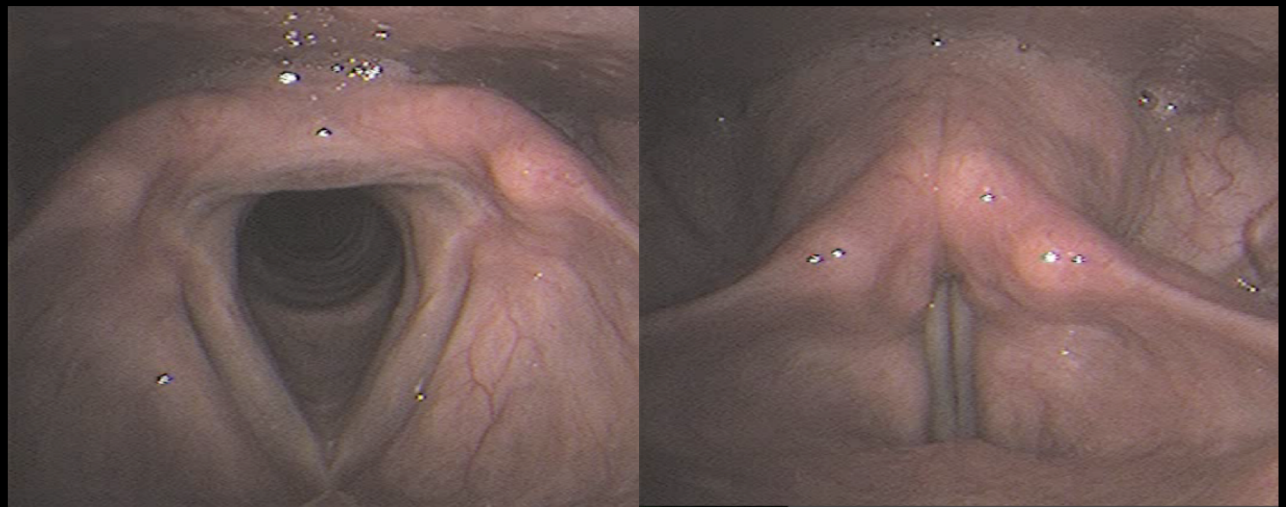
- Instruction: “Take a sip, hold your breath, then swallow”
- Goals:
  - Facilitate vocal fold adduction (tracheal protection) ± aryteno-epiglottic approximation (laryngeal vestibule protection) before the swallow
  - Increase timeliness, extent, and duration of airway closure





Supraglottic Swallow

- "Hold your breath lightly. Swallow while keeping your breath hold, then cough immediately after before you breath again"
- Goals:
  - Light breath hold before and during the swallow, with a cough immediately after the swallow (before breathing)
  - Improve timeliness, duration, and extent (glottic) of vocal fold closure prior to and during the swallow
  - Reduce pulmonary aspiration with use of immediate cough



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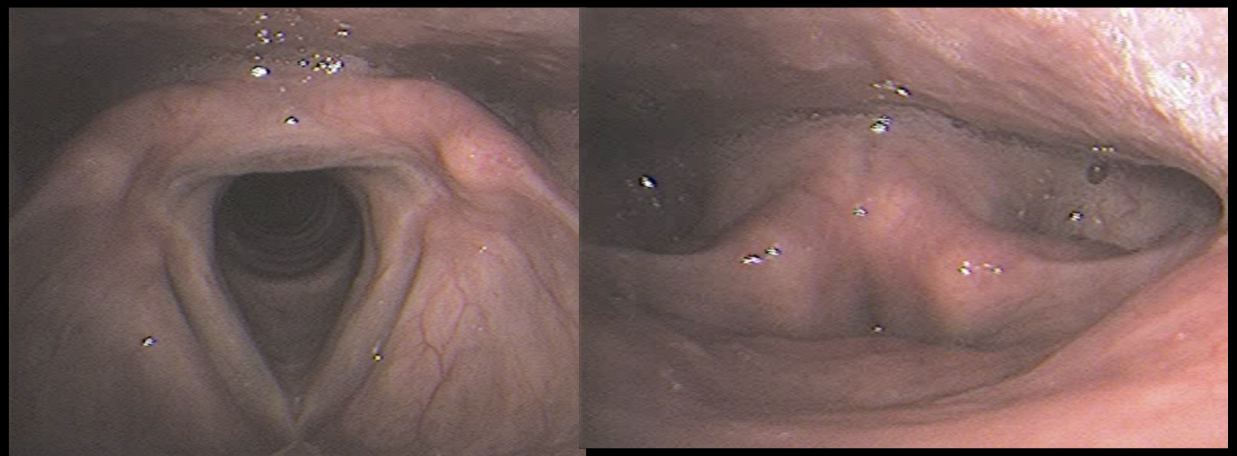
Super-Supraglottic Swallow

- "Hold your breath hard. Keep you breath held and swallow hard. Then cough hard immediately after before you breath again"
- Goals:
  - Valsalva before and during the swallow, with a cough immediately after a hard swallow (before breathing)
  - Improve timeliness, duration, and extent (glottic, supraglottic) of vocal fold closure prior to and during the swallow
  - Reduce pulmonary aspiration with use of immediate cough



Maneuvers - Contraindications

- Severe cognitive impairment

Diet

Bolus Size

- Smaller bites and sips
  - Normal cup sips ≈15-20 mL (female) 20-25 mL (male)

- Goals
  - Can result in less spillage
  - Can result in less residue
  - Can result in maladaptive physiology (kinematics and pressure generation)*

Shaker et al., 1994; Lawless et al., 2003; Wolfenberger et al., 2012; Humbert et al., 2013

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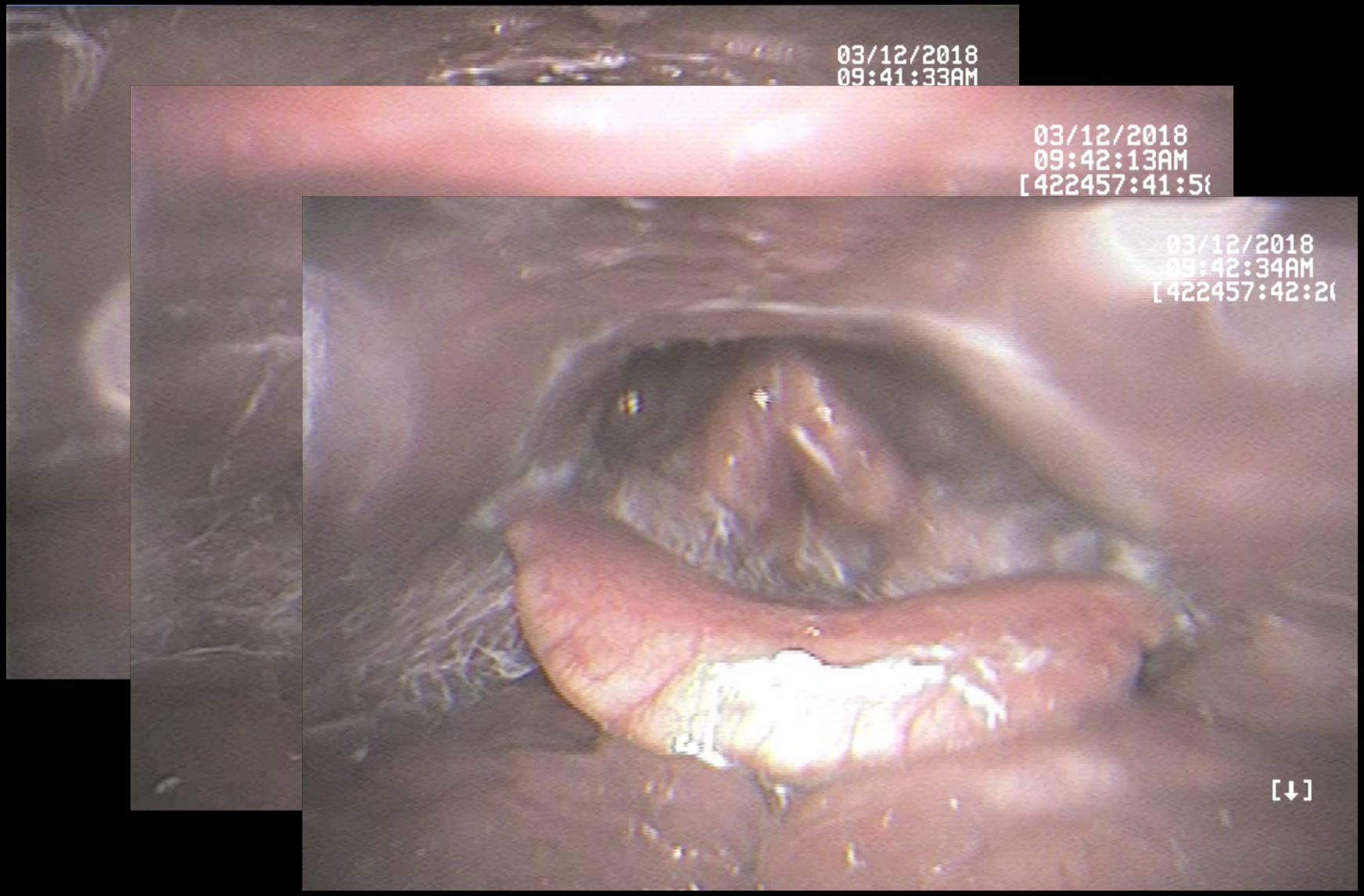
Small sip (PAS 8), small sip (PAS 8), normal sip (PAS 1)



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Delivery Method – Cup vs Straw

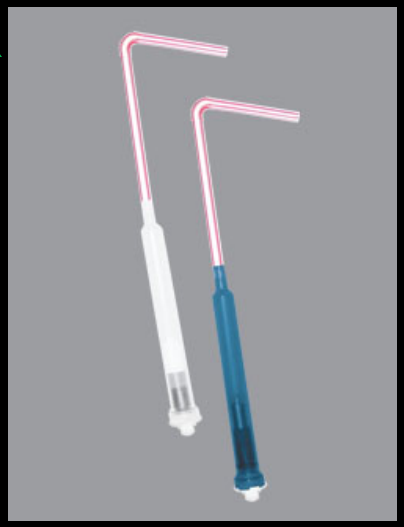
- Size of cup, and the extent to which it is filled, can *alter natural volume of sip* by ≈15%
- Straws help to *bypass the oral cavity* (for good or for bad)
- Size of *cup sips tend to be larger than size straw sips* for those <65, though *unchanged for those ≥65*

Lawless et al., 2003

Delivery Method - Utensils

Controls *volume* of bolus output

Provale Cups



Safe Straw

Delivery Method - Utensils

Controls *rate* of bolus output

Wedge Cups

Delivery Method - Utensils

Facilitates chin neutral/down drinking →

Nosey Cups

Delivery Method - Utensils

Controls for hand tremor

Liftware - Steady

https://www.youtube.com/watch?v=cFHwoOkSj7w

Delivery Method - Utensils

Controls for restricted range of motion

Liftware - Level

https://www.youtube.com/watch?v=YNwfXeLlqsU

Delivery Method - Utensils

Facilitates separation of solids from liquids for mixed consistencies

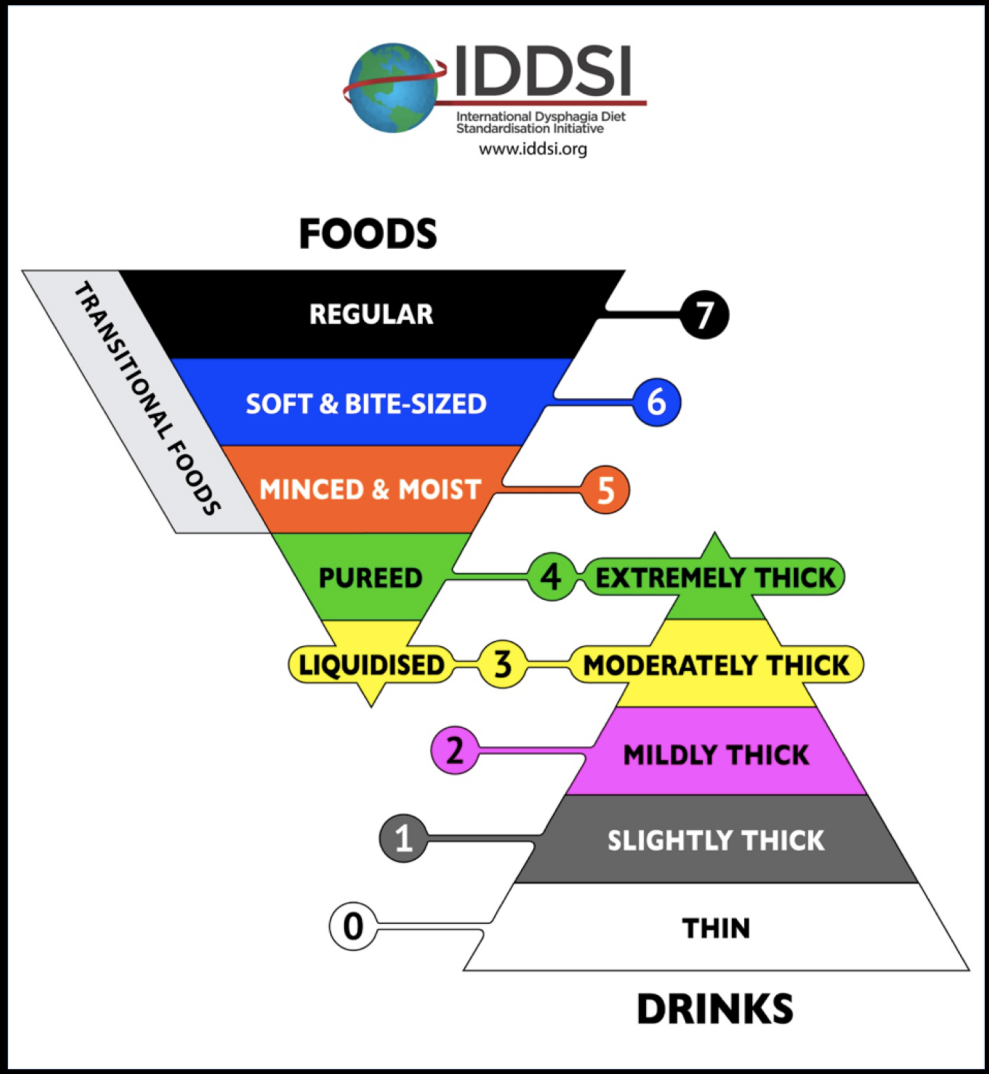
MIT-E Spoon

http://calmslp.com/mit-e-spoon-red-3-pack/

Modified Diets

- Goal: to improve ease of bolus preparation, increase efficiency of bolus clearance, and maintain airway protection

- Historically, terminology regarding diet "consistencies" was unstandardized. IDDSI is now working towards universal understanding and standardized testing methods



Texture Modified Foods

- Texture modified foods are used to alter or restrict foods to foods of certain size, softness, and cohesiveness
- Types:
  - "Mechanically Altered" (minced, chopped, diced)
  - "Soft Solid"
  - "Puree/Semisolid"
- Is associated with improved ease and efficiency of bolus transport. However, evidence beginning to show prolonged use of modified foods may be associated with malnutrition in long-term care patients.

Thickened Liquids

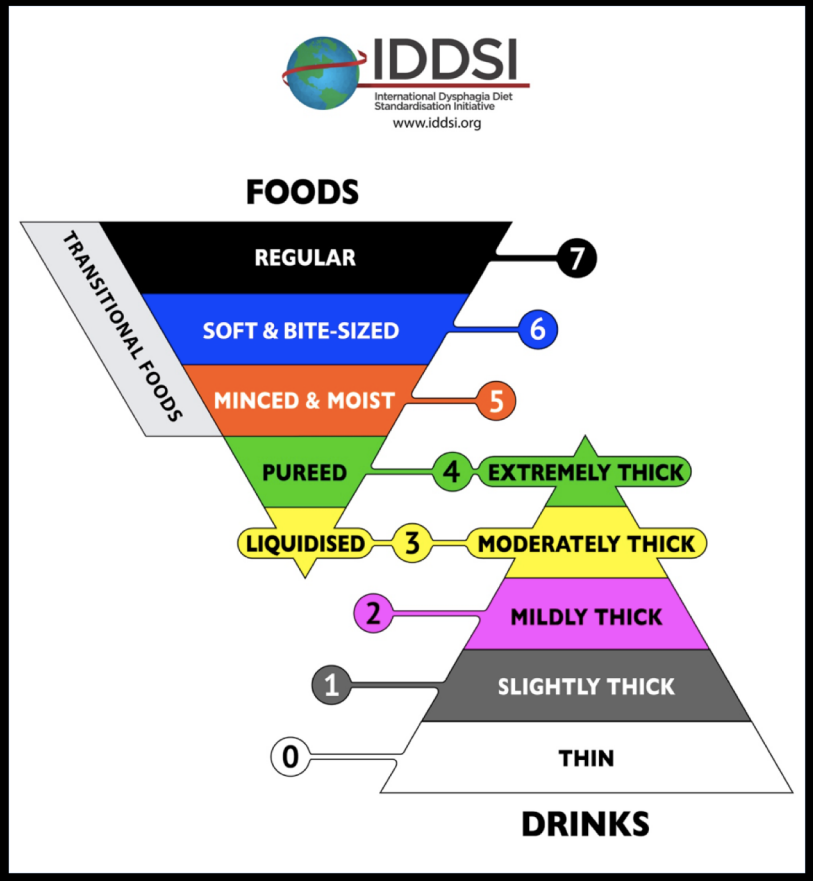
- Thickeners applied to liquid preparation to increase viscosity
- Increased viscosity leads to:
  - Slower velocity of bolus transit
  - Increased cohesiveness

Thickened Liquids

- Types of Thickener: Starch-Based & Xantham-Based

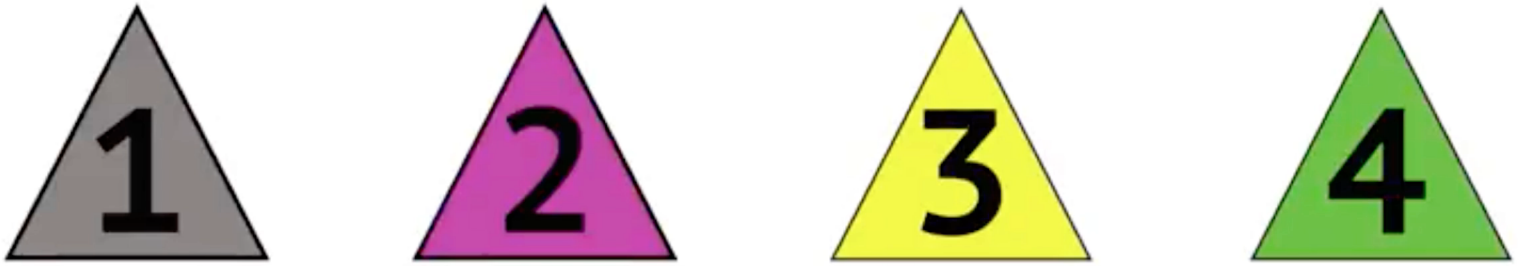
Thickened Liquids

- Levels of thickened liquid include
  - Thin (IDDSI Level 0)
  - Mildly thick (IDDSI Level 2)
  - Honey thick (DDSI Level 3)



IDDSI - Flow Test

Comparison of level 1-4



Thickened Liquids

- Pros
  - May reduce or prevent incidence of penetration/aspiration (slowed transit and cohesiveness)
  - Can be especially useful in the acute care setting if expecting rapid changes over the course of a few days/week (SHOULD EVALUATE IF MAKING THIS RECOMMENDATION, AND RE-EVALUATE BEFORE DISCHARGE!)

Thickened Liquids

- Pros
- Pros/Cons
  - Associated with increased lingual pressure

Thickened Liquids

- Pros
- Pros/Cons
- Cons
  - Expensive
  - Difficult to achieve consistent consistency
  - Low patient and staff/caregiver adherence
  - Associated with increased pharyngeal residue
  - Prolonged use appears to increase risk of dehydration, urinary tract infections, electrolyte imbalances, and growth of oral bacteria
  - Prolonged use does not appear to reduce risk of pneumonia
  - May be more harmful than non-thickened liquids if aspirated
  - May result in more events of silent aspiration when compared to thin

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Thickened Liquids

- While thickening liquids is a tempting first step, consider the pros AND the cons (especially if a long-term recommendation) - don’t forget about postures & maneuvers!

- As with all interventions (compensatory and management), no one intervention is beneficial or harmful for all patients – and this determination cannot be made at bedside (why?). Therefore any/all intervention recommendations should be made only after performed under instrumental imaging

Feeding Tubes

- PO vs NPO
  - PO (by mouth) and NPO (not by mouth)

- Types
  - Nasogastric Tube (NG-tube)
  - Gastronomy Tube (G-tube)
  - Others

- Goal is to provide an alternative means for nutrition and hydration. May also improve patient comfort if dysphagia is severe. Prolonged use may not not reduce risk of aspiration pneumonia or survival and may contribute to other health complications.

Free Water Protocols

(Frazer) Free water protocol was created in response to patient and family non-compliance with thin liquid and NPO restrictions

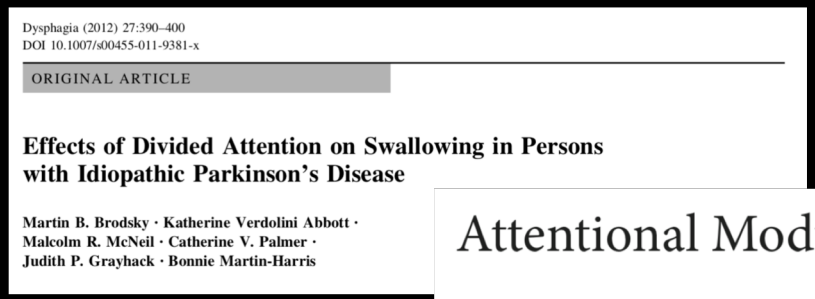
- Any patient who is NPO or on a modified diet may have water between meals, provided they have aggressive oral care
- Based on the premise that water is pH neutral and is innocuous to the lungs if aspirated in small amounts
- Patients who are impulsive or have excessive coughing are restricted to taking water with supervision
- Conflicting research on the safety of this protocol

OTHER STRATEGIES

Attentional Resource Allocation (Distractions)

- Allocating attentional resources away from swallowing and coughing has been found to negatively (in some cases, positively) impact swallow function, swallowing safety, and cough reflex thresholds

- Consider trialing the effects of distractions on cough and swallow function


Dysphagia (2012) 27:390–400
DOI 10.1007/s00455-011-9381-x

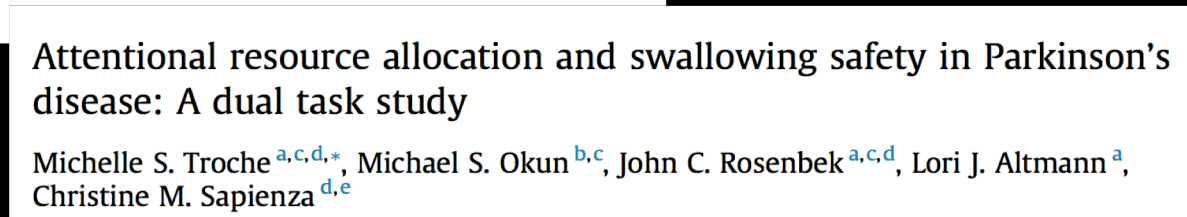
ORIGINAL ARTICLE

Effects of Divided Attention on Swallowing in Persons with Idiopathic Parkinson's Disease

Martin B. Brodsky · Katherine Verdolini Abbott · Malcolm R. McNeil · Catherine V. Palmer · Judith P. Grayhack · Bonnie Martin-Harris


Attentional Modulation of Reflex Cough

Thomas Janssens, PhD; Mitchell Silva, PhD; Paul W. Davenport, PhD; Ilse Van Diest, PhD; Lieven J. Dupont, MD, PhD; and Omer Van den Bergh, PhD


Attentional resource allocation and swallowing safety in Parkinson's disease: A dual task study

Michelle S. Troche [a,c,d,*], Michael S. Okun [b,c], John C. Rosenbek [a,c,d], Lori J. Altmann [a], Christine M. Sapienza [d,e]

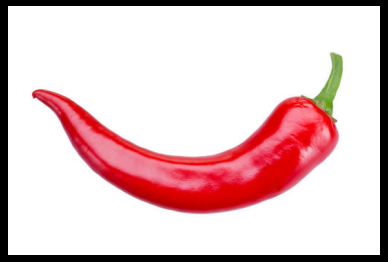
Sensory Stimulation

- Goals
  - Increase oral-sensory awareness
  - Improve speed in triggering pharyngeal phase
  - Stimulus applied prior to swallow attempt

- EXAMPLES:
  - Diet modifications
  - Mechanical stimulation

Sensory Stimulation - Diet

- Bolus Modifications:
  - Taste: Sour, Umami, Bitter, Salty, Sweet
  - Temperature: Cold & hold
  - Chemesthesis: “chemically stimulated sensation of irritation… neither taste nor smell” – spiciness, coolness (menthol), carbonation
- Reported changes (conflicting research conclusions):
  - Shorter delays before swallowing onset
  - Longer/shorter swallow durations
  - Changes in lingual and pharyngeal swallowing pressures
  - Different tastes may alter each of the above differently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Palmer 2005; Humbert 2012; Ding 2003; Hamdy 2003; Chee 2005; Leow 2007; Logemann 1995; Kagel 2003; Pelletier 2006

Thermo-Tactile Stimulation

- Method requires the clinician to stroke or rub the anterior faucial pillars with a cold probe prior to having the patient swallow. (alternatives: taste swabs)

- May be useful for patients with impaired sensation and delayed or absent pharyngeal swallow

- **Rationale:** Stimulation increases ‘‘oral awareness’’ and provides ‘‘an alerting sensory stimulus to the cortex and brainstem” such that, when the patient initiates the oral stage of swallow, the pharyngeal swallow will trigger more rapidly

https://www.youtube.com/watch?v=wRAPHIqL3z0

Oral Care

- Lack of oral care provide opportunity for oral pathogens to colonize.
  - Complicated by dependency for oral care, NPO and modified diets, dental diseases (plague, caries, gingivitis, periodontal disease) and medications altering salivary output causing xerostomia

- Reduced oral care and aspiration of oral pathogens is a leading risk factors associated with pneumonia and related mortalities (Langmore et al., 1998; Medina-Walpole et al., 1999; Mojon, 2002).

- Proper oral care practices are necessary for hospitalized elderly, ICU, mechanically ventilated patients and nursing home residents to reduce morbidity, mortality, length of hospital stay, febrile days and health care costs (Ashford & Skelley, 208)

Cases/Demonstration