MBSS: BEING THE DYSPHAGIA SLEUTH

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DISCLOSURE

- Financial: CEO/Owner MassTex Imaging, LLC; receive a salary
- Non-Financial: none

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LEARNER OUTCOMES

- Apply Aspiration PNA risk factors in relation to formulating diet recommendations
- Recognize esophageal dysphagia and explain its impact on dysphagia management
- Integrate QOL decision making into dysphagia POC
- Identify muscle tension dysphagia as an etiology of dysphagia symptoms

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SESSION AGENDA

- **8:00 to 8:45** Brief Review of Anatomy & Physiology of Swallowing and Esophagus; Evidenced Based Data Regarding Risk Factors for Aspiration Pneumonia; QOL; Role of Instrumentation
- **8:45 to 9:30** Discuss assessing the whole patient and incorporating instrumental assessment into critical decision making while balancing ethics and quality of life issues. Being the Sleuth, case discussion
- **9:30 to 9:50** Break
- **9:50 to 10:30** Differential Diagnosis: Esophagus, Muscle Tension Dysphagia, Other
- **10:30 to 11:15** Case Studies
- **11:15 to 11:20** Wrap Up

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CAUSES OF DYSPHAGIA

- Most common:
  - neurological
  - neuromuscular disorders: acquired and congenital
- Other causes:
  - muscle tension
  - head and neck surgery or cancer
  - gastroenterological disorders
- Medications

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THE NORMAL SWALLOW – QUICK REVIEW

- **Anatomy**
  - **34 muscles responsible for normal swallow**
  - **Both skeletal and smooth muscle**
- **Key structures**
  - **Tongue/teeth/oral cavity**
  - **Soft Palate**
  - **Pharyngeal walls/pharyngeal space**
  - **Epiglottis**
  - **Larynx**
  - **UES**

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NEURAL CONTROL OF SWALLOWING

- Central pattern generator in medulla
- Cranial Nerves involved
  - CN V
  - CN VII
  - CN IX
  - CN X
  - CN XII

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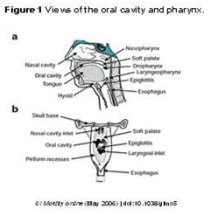
BASIC ANATOMY



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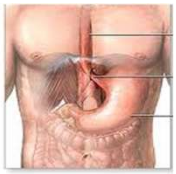
ESOPHAGEAL STAGE

- Purpose: move food through the esophagus into the stomach
- Esophagus is a tube enclosed by 2 sphincters, the UES and LES
- Stripping action or wave



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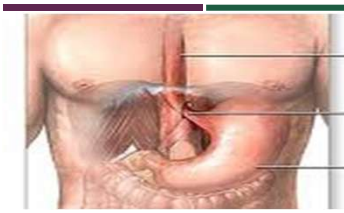

NORMAL ESOPHAGUS

Veers to the left at the LES

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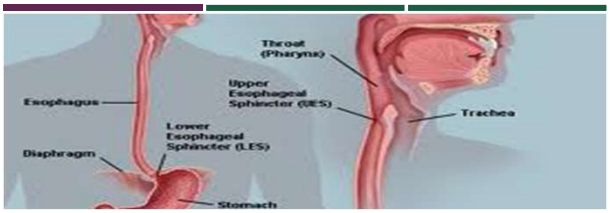

NORMAL ESOPHAGUS

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ESOPHAGEAL STAGE

Three distinct areas:

- Cervical or Proximal Esophagus
  - From the UES to the top of the sternum
- Thoracic or Mid Esophagus
  - Forms the bulk of the esophagus and is located in the chest cavity or thorax
- Abdominal Esophagus or Distal Esophagus
  - Left of the abdominal cavity and ends at the LES which forms the entrance to the stomach

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NORMAL ESOPHAGEAL FUNCTION

- 20cm (approx. 8 inches) long from UES to LES
- Average time to complete clearance is 13 to 15 seconds
- Less than 20 seconds is considered 'normal'
- "Marble through a balloon"
- LES – Anti-reflux barrier

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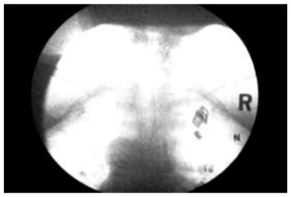
NORMAL ESOPHAGUS



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RISK OF ASPIRATION

1. Progressive weakness with each swallow exacerbating bolus control past the base of the tongue increases risk
2. COPD with large amounts of secretions and ineffective clearance is one of the leading risk factors for aspiration
3. Retrograde flow of stomach, esophageal or diverticular contents causes a very elevated risk of aspiration because the protection of the airway is less effective and aspiration is often silent
4. The flow of the bolus past the UES is delayed or retrograde in the upper 1/3 of the esophagus and the patient is unaware or on sedating medications
5. The patient has residuals, near the airway, that they cannot feel and cannot clear in the valleculae or piriform recesses

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RISK OF ASPIRATION PNEUMONIA

- Did the patient aspirate on evaluation by VFSS?
- Did they aspirate on all consistencies?
- Did the patient demonstrate barium beyond the carina after the aspiration?
- Positive response to these questions places the patient at high risk but…….

- Not the whole story……

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PREDICTORS OF ASPIRATION PNA IN NURSING HOME RESIDENTS (LANGMORE 2002)

Requires suctioning	Dysphagia (#9)
COPD	UTI
CHF	Mechanically Alt. Diet
Feeding Tube	Dependence for eating
Bedfast	Bed Mobility
High care mix index	Locomotion
Delirium	Number of meds
Weight loss	Age (#16)

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ORAL HYGIENE

Oral hygiene: poor oral hygiene contributes to aspiration PNA risk!!!!

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CORE PRINCIPLES IN DECISION MAKING

- AUTONOMY
- NON-MALFEASANCE
- BENEFICENCE
- SOCIAL JUSTICE

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THE FOUR PRINCIPLES – 1 AUTONOMY

THE CONCEPT THAT THE INDIVIDUAL HAS THE RIGHT AND RESPONSIBILITY TO MAKE THEIR OWN DECISIONS.

- SUPERCEDES THE NEEDS OF THE CULTURE AND SUPPORT SYSTEM
- REQUIRES PROTECTION BY THE COMMUNITY TO BE IMPLEMENTED
- IMPLIED COGNITIVE COMPETENCY
- **HEALTHCARE TEAMS - Are obligated to "Create the Conditions Necessary for Autonomous Choice in Others"**

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THE FOUR PRINCIPLES - 2 BENEFICENCE

- **THE ACTION THAT IS DONE FOR THE BENEFIT OF OTHERS - Supersedes self-interest**
  - Includes the prevention or removal of harm or improving the situation of another
- **Health Care Teams– Move focus to only implement that which benefits the patient**
  - NO UNPROVEN INTERVENTIONS TO PATIENTS

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THE FOUR PRINCIPLES – 3 NON-MALFEASANCE

- **THE CONCEPT OF "FIRST DO NO HARM" –** IN INTERACTIONS BETWEEN INDIVIDUALS AND ORGANIZATIONS
- Assumes "The Benefit will Outweigh the Risk"
- Focus is on preventing a malicious or predictably harmful event
- **Health Care Teams- Must consider the risks of an intervention for a patient and/or patients' families**

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THE FOUR PRINCIPLES – 4 SOCIAL JUSTICE

- **THE CONCEPT THAT EVERYONE DESERVES EQUAL ECONOMIC, POLITICAL AND SOCIAL RIGHTS AND OPPORTUNITIES**
  - Assumes that other 3 principles have been met in Western Cultures
  - Promotes an understanding of gross inequities, power imbalances and underlying causes of poor health
- **Health Care Teams – Must ensure fair access to care and resources, regardless of age or diangosis**

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FRAMEWORK FOR UNDERSTANDING HEALTH CARE DECISION MAKING

- Patient - **First**
- Spouse - **Second**
- Family Member of closest relationship - **Third**
  - Parent
  - Child
- PCP – Primary Health Care Providers - **Last**

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SO WHO MAKES THE DECISIONS?

- TEAM EFFORT BETWEEN FAMILY, ONSITE CARE TEAM AND PCP
- THERE IS NO RIGHT ANSWER FOR ALL SITUATIONS
- EACH SITUATION MUST BE ANALYZED BY THE FAMILY AND TEAM TO DETERMINE WHAT IS IN KEEPING WITH THE 4 PRINCIPLES

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MOST COMMON DIAGNOSES THAT RAISE THESE DILEMMAS IN MEDICAL DECISIONS

1. **Alzheimer's** - Progressive neurologic disease that affects memory and cognitive function/awareness
2. **Parkinson's** - Progressive neurologic disease that affects muscular activity making patients rigid w/ tremors
3. **CVA -** cerebrovascular accidents (Stroke) that affect cognition and expression

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WITHIN THE CONTEXT OF PRACTICING THE BIOETHICAL PRINCIPLES - - PRACTICE

- **Ask** - Which principles apply and take precedence?
- **Act** - How will this inform your recommendations?
- **Inform** - How do you work with the patient and team to assist in the assurance that these principles are upheld?

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IN AN IDEAL WORLD

ALL MEDICAL DECISION MAKING WOULD IMPLEMENT THESE PRINCIPLES

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THE LIFE OF MR. CP AND SWALLOWING

MR. CP is a 55 year college professor who sustains a Left Sided stroke that leaves him weak on his right side with difficulty swallowing, communicating and self-care and fails a bedside swallow test.

- Will he benefit from a MBSS?
- Why?
- What is the potential risk of doing or not doing it?

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THE LIFE OF MR. CP (CONT)

He recovers from his CVA after PT, and goes on to continue teaching until he retires at age 67and has no problems swallowing until he is 68. He reports food sticking when he swallows.

- Will he benefit from a MBSS?
- Why?
- What is the potential risk of doing or not doing it?

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THE LIFE OF MR. CP (CONT)

Following his treatment of Thyroid CA he enters rehab and is able to make modifications in his diet and strategies to achieve an adequate diet. He does well until 10 years later when he complains of bad breath and regurgitation of whole food pieces.

- Will he benefit from a MBSS?
- Why?
- What is the potential risk of doing or not doing it?

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BACK TO OUR 88 Y/O HOME PATIENT

- **Family and Patient Wishes:**
  - Stay at Home and Keep comfortable
  - Eat with Family
- **Provider Team Concerns:**
  - Is he Safe to eat at home?
  - Prevent Hospitalization?
- **Ethically Based Decision:**
  - Need to determine best route to maintain hydration and nutrition.

- Will he benefit from a MBSS?
- Why?
- What is the potential risk of doing or not doing it?

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THE LIFE OF MR CP (CONT)

He is now 91, in a SNF with Alzheimer's dementia and cannot recognize his grandson, daughter or wife of 50 years. Swallow study is performed, and demonstrates criteria for NPO recommendation

- Did he benefit from a MBSS?
- Why or Why Not?
- Was there a potential risk of doing or not doing it?

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MBSS GOLD STANDARD

Most Comprehensive & Dynamic Assessment of

ORAL, PHARYNGEAL & CERVICAL ESOPHAGEAL STRUCTURE & FUNCTIONS

- Bolus movement before, during & after the swallow
- Laryngeal closure at the airway entrance
- Presence amount & timing of penetration/aspiration
- Etiology of airway compromise
- Patients response to penetration/aspiration
- Effectiveness of cough response
- tongue base to posterior pharyngeal wall
- movements
- Presence of oral, cervical & pharyngeal residuals
- soft palate movement
- Effectiveness of compensatory strategies & diet modifications
- Motility concerns
- Vocal fold movement

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END OF LIFE: RESOURCES & RECOMMENDATION STATEMENTS

Resources/Readings ASHA Website

- How We Die by Sherwin B. Nuland
- Death and Dignity by Timothy Quill
- Dying Well by Ira Byock
- Handbook for Mortals by Joanne Lynn
- Meetings at the Edge: Dialogues With the Grieving and the Dying, the Healing and the Healed by Stephen Levine

(This list is not intended to be exhaustive and includes recommendations from ASHA members and others with expertise in end-of-life issues.)

Wording for Recommendations:

- Patient presents with eating dysfunction consistent with the patient's diagnosis of advanced dementia. Recommend family meeting to reach consensus on a plan of feeding management consistent with patient's prognosis and goals of care. It should be recognized that tube feeding and NPO status do not prevent aspiration pneumonia in patients with dementia and does not prolong life.
- In light of the patient's guarded prognosis and poor likelihood of swallowing recovery, they appear to profile as one that would benefit from a non-invasive, compassionate approach with a focus on comfort feeds. If the decision is made to continue with PO feedings, ensure that the patient is given scrupulous oral care, maintain strict aspiration precautions when feeding the patient, respecting the patient's desire or lack of desire to eat.
- Despite the known risk of aspiration, if the care team and/or family wish to purse PO, we recommend the following Comfort Feeding Plan (provide diet levels and feeding strategies)

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SUMMARY

- **RESPECT PATIENT AUTONOMY**
- **PRACTICE BENEFICENCE**
- **PROTECT THE PATIENT FROM HARM**
- **THINK ABOUT ensuring fair access to care and resources**

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WHAT IS THE PURPOSE OF THE MBSS ?

- Purpose: Visualize and evaluate the oropharyngeal structures and upper GI tract
- Assess and evaluate swallow physiology with a wide range of consistencies to replicate normal food/fluids
- Identify the risk and presence of aspiration and the patient's response
- Assess the impact of therapeutic mechanisms over time
- Patient, carer, and health care professional education

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PURPOSE OF MBSS: BIOMECHANICAL ANALYSIS PLUS

Biomechanical analysis is essential to detection and listing of impairments

BUT

toward the endpoint of accurately focused interventions and medical management

Contribution to a diagnostic profile

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WHAT IS THE BENEFIT OF INSTRUMENTATION?

Direct Visualization of the biomechanics of upper airway and digestive tract through direct visualization

- Muscles and Structure Coordination
- Symmetry and Effectiveness of Timing of
  - Velopharyngeal port/Nasal Regurgitation
  - Lingual Movements/Mastication/Bolus Control
  - Pharyngeal Swallow Timing
  - Closure of Airway
  - Movement of the larynx
  - Esophageal Transit

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WHAT DO WE LEARN FROM INSTRUMENTATION?

- Biomechanics of Dysphagia
- If Oropharyngeal and/or Esophageal Dysphagia is Contributing to Nutritional or Pulmonary Compromise
- Candidacy for Oral Nutrition
- Most Effective Strategies to Improve Swallow Physiology
- Plan Appropriate Treatment
- Provide critical information for QOL decisions

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WHAT WE CAN LEARN ABOUT THE ESOPHAGUS

- **Primary Peristalsis**
- **Secondary Peristalsis**
- **Tertiary Contractions**
- **Pathologic Structural and Functional Disorders**

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OUR STORY: BEYOND AN IMAGING STUDY ALONE

Fluoroscopy and video is a "starting point" to patient care

- **Our philosophy is to assess the WHOLE patient**
- **Multidisciplinary approach to care in the community**
- **Consultant to the patient's medical team for coordination of care**
- **Comprehensive Evaluation of Dysphagia by Physician and SLP *Coordination of care: instrumental assessment is not done in a vacuum***

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HOW TO GET THERE?

Assessment offers conclusions on the objectively observed "grocery list" of findings.

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BEDSIDE ASSESSMENT

Bedside Assessment: Understand the patient's dysphagia in their everyday setting through the eyes & actions of the caregivers.

Gilmore-Bykovskyl & Rogus-Pulia, 2018, found task-centered caregiver actions and behavioral symptoms are temporally associated with observable indicators of aspiration in nursing home residents with dementia.

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CAREGIVER INTERVIEWS: INSIGHT INTO THE SYMPTOMS

- Time of Day
- Frequency
- Settings/Conditions

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INSTRUMENTATION

SWALLOW EFFICIENCY
NURTRITIONAL STATUS

Goals of Care; Quality of Life

SWALLOW SAFETY
RESPIRATORY STATUS

Wang et al (2008) found that thickened liquids had no statistical decreases in pneumonia and this was true for both nectar-thickened and honey-thickened groups. However, the thickened liquid groups were more likely to be dehydrated.

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HOW TO GET THERE…

Use your experience to adapt to an individual situation to answer the question

DRs Brownyn Jones and Martin Donner: Each patient with dysphagia is different. Although there is a routine or basic examination, as with any radiologic technique, studies of patients with swallowing problems lend themselves to tailoring.

How I Do It: Examination of the Patient with Dysphagia I. Bronwyn Jones. MB, BS and Martin W. Donner, M.D. Dysphagia 4: 162-172 (1989). Johns Hopkins Swallowing Center and The Russel H. Morgan Department of Radiology and Radiologic Science. The Johns Hopkins School of Medicine, Baltimore, Maryland, USA. Catriona M. Steele, Ph.D., S-LP(C). CCCSLP, BCS-S, Reg. CASLPO, ASHA Fellow Designing a VFSS: Creating a VFSS Protocol and Technical Aspects

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GRADED RECOMMENDATIONS

- STRATEGIES/TECHNIQUES THROUGHOUT AS NEEDED
- TEST VOLUME/SELF FEEDING/SUCCESSIVE SWALLOWS
- END WITH LIQUID RECOMMENDING TO TEST FOR FATIGUE
- BARIUM PILL IF APPROPRIATE
- STRESS THE MECHANISM!!!!
- QUESTION IF THE MEDICAL DIAGNOSIS DOES NOT FIT THE SWALLOW PROFILE

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DECISION MAKING/POC

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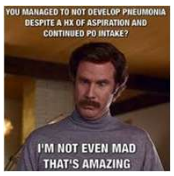
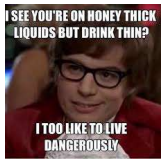
SOME OF MY FAVORITE MEMES





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SUMMARY: INSTRUMENTATION IS NOT DONE IN A VACUUM

- Dysphagia instrumentation requires a multifaceted approach
- The Patient & QOL decisions are in the center of the POC
- Maximize intake and optimize safety & efficiency
- Provide evidenced based treatment and strategies for dysphagia
- Provide input into differential diagnosis for dysphagia
- Caregiver & staff education, training, and support is critical
- Provide evidenced based information for patient/loved ones decision making

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BREAK 10 MINUTES

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DYSPHAGIA SLEUTH

Dysphagia can frequently be the initial pressing feature across numerous medical & neuromuscular conditions

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DIFFERENTIAL DIAGNOSIS

If MBSS findings do not support patient's clinical complaints then…

Think about esophageal causes

The subjective location of dysphagia does not always correspond to the anatomical location of the pathology. Patient's clinical complaints and reporting regarding the site of dysphagia may be unreliable and does not correlate with actual problem. Distal stricture often referred proximally. Jones et al., 1989

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AMERICAN COLLEGE OF RADIOLOGY APPROPRIATENESS CRITERIA

Abnormalities of the mid or distal esophagus or gastric cardia can cause referred dysphagia to the upper chest or pharynx

Therefore, a combined radiographic evaluation of the pharynx, esophagus and gastric cardia is recommended in patients with unexplained pharyngeal dysphagia

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MASSTEX IMAGING EXPERIENCE

DATA PRESENTED AT DYSPHAGIA RESEARCH SOCIETY 2016

PREVEALANCE OF ESOPHAGEAL DYSPHAGIA

- Retrospective study EHR 9,921 patients primarily over age 60
- Esophageal Dysphagia assessed by physician: 47%
- Structural Abnormalities: 10%
  - CP Bar, Diverticula, Hernia, Obstruction
- Functional Abnormities: 36%
  - Dysmotility: bolus retention; transit delay

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EXTRINSIC EFFECTS -THE NEIGHBORS: IMPACT OF STRUCTURES

Cervical Esophagus

- **Thyroid gland - butterfly shaped** – usually anterior or lateral – rarely interferes posteriorly – if demonstrated think **Cancer** of the thyroid
- **C-spine** –pathology - posterior and lateral – often impacts bolus flow speed and bolus size in the cervical esophagus

Thoracic Esophagus

- Posterior to trachea
- **Aortic Arch** – may cause delay in bolus flow
- **Tracheobronchial Tree –** may impinge on flow due to masses or traction effects from scarring or fistulas
- **Lungs –** masses or post-operative traction effects
- **Thoracic Spine – rarely interferes with bolus flow**

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THE NEIGHBORS CONTINUED

The lower 1/3 of the Esophagus

- **Diaphragm –** may cause distortion of esophagus with entry into the stomach especially post operatively
  - **Esophageal bands**
  - **Nissen fundoplication**

Stomach

- **Masses**
- **Hernia deformations**

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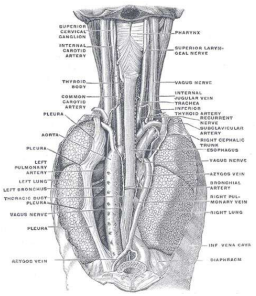

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ESOPHAGEAL DYSPHAGIA SYMPTOMS

- Specific complains of difficulty swallowing solid food
- Sensation of discomfort from mid-chest to neck region
- Complaint of food "sticking" during swallowing
- Reports of coughing up food/pills after the swallow
- Requiring liquids to complete a meal
- Complaints of dysphagia without overt signs of swallowing problems
- Reports of pain upon swallowing

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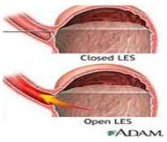
ESOPHAGEAL DISORDERS

- Structural
  - "Something is sticking"
- Functional
  - "Something isn't working"
- Both
  - GERD leading to stricture
  - Multiple pathologies



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STRUCTURAL DISORDERS

- Cricopharyngeal Bar
- Diverticula (Zenker's)
- Stricture
- Malignancy / Tumor
- Extrinsic

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CRICOPHARYNGEAL BARS

- **Controversial in both pathophysiology and pathology**
- **Usually do not interfere with bolus flow integrity or velocity if they do not protrude more than 1 cm into the hypopharyngeal space**
- **Are probably most likely due to a motor hypertrophy in striated muscle cause by increased pressures in the hypopharynx**

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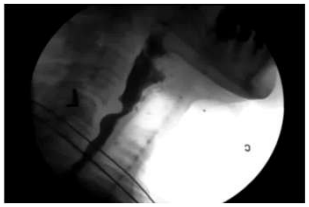
CP BAR



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CERVICAL OSTEOPHYTES

- Very common in patients with dysphagia
- Can interfere with swallowing and cause globus sensation
- Often are not candidates for surgery
- Most common at C4-C6
- Usually need to be at least 10 mm to interfere with bolus flow velocity and clearing
- Can be unilateral or bilateral
- Are amenable to head turning to relieve obstruction in some cases

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DIVERTICULA

- Outpouching from the lumen from high pressures near an area of structural weakness or traction from fibrosis
- Can occur anywhere along the esophagus
- Most common we see is Zenker's Diverticulum

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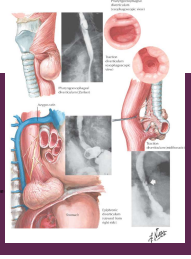
Figure 1 Illustration and radiological appearance of Zenker's mid esophageal and epiphrenic esophageal diverticula.
(*Source:* Netter image, with permission from Elsevier.)



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ZENKERS

- Occur proximally
- Pocketing or pooling of contrast observed
- Often located above the CP muscle in posterior wall at Killian's Triangle
- Seen in 2-3% of MBSS patients
- Occurs mostly in patients over 70

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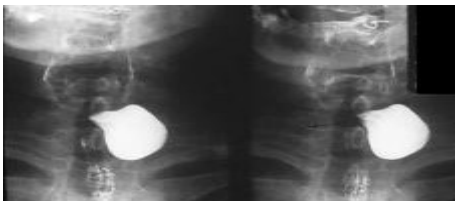

ZENKER'S DIVERTICULUM

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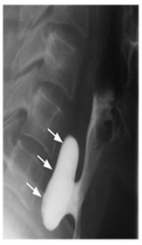
Figure 2 Barium swallow of a patient with Zenker's diverticulum.



GI Motility online (May 2006) | doi:10.1038/gimo41

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MID THORACIC DIVERTICULUM

Figure 3 Barium swallow of a patient with midthoracic or traction diverticulum.

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ESOPHAGEAL STRICTURE

- Fixed narrowing that can occur anywhere from the pharynx to the UES
- Represents the end stage of ongoing reflux, mucosal damage and healing
- Combination of fibrosis, spasm and edema
- Slow, progressive dysphagia for solids
- As stricture grows, heartburn decreases
- GI consult indicated to confirm benign nature of stricture

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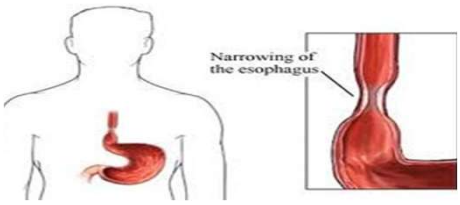

ESOPHAGEAL STRICTURE

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ESOPHAGEAL STRICTURE

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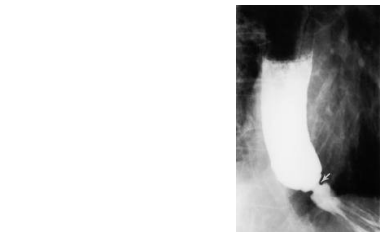

ESOPHAGEAL STRICTURE

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FUNCTIONAL DISORDERS

- Abnormal muscle contractions
  - Diffuse Esophageal Spasm
  - Ineffective Esophageal Clearance (Esophageal Dysmotility)
- Achalasia
- LES dysfunction
  - GERD

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DIFFUSE ESOPHAGEAL SPASM

- Abnormal Contractions of the Body –tertiary contractions
- Incomplete deglutitive inhibitory function in the body
- Esophagus contracts without intramural distention
- LES is normal
- Can be caused by emotional disorders including anxiety and panic disorders
- DX made when -20% or more of contractions are nonperistaltic

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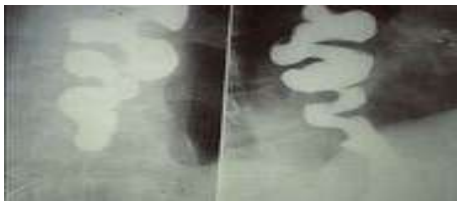


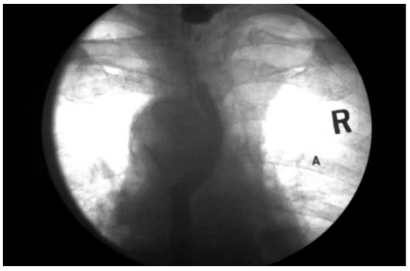
DIFFUSE ESOPHAGEAL SPASM

79

INEFFECTIVE ESOPHAGEAL CLEARANCE

- Can be diagnosed with MBSS or barium swallow if it is suspected
- Contractions are not physiologic
  - Do not result in peristalsis
  - Are not strong enough to move bolus
  - Unexplained delay in clearance
- Hallmark of low amplitude <30 mm of pressure on manometry

80



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ACHALASIA

- Failure of the inhibitory neurons in the distal esophagus
- Results in disease of the muscles of the lower esophageal body and LES
- Failure of the smooth muscle fibers to relax, causing the LES to remain closed and fail to open when needed
- Increased LES tone, failure of LES to open and lack of peristalsis of the esophagus

82

ACHALASIA

- No known cause (?Infectious)
- Classic "bird's beak" appearance with dilation of the more proximal esophagus

83

REFLUX / GERD

In certain circumstances, the LES may relax without associated peristaltic contraction (TLESR)

- Breakdown of Anti-reflux barriers in LES
- Mechanical move of LES – Hiatal Hernia
- Impaired esophageal clearance of refluxed gastric contents due to hypotensive or nonperistaltic contractions which then increases acid exposure
- Heartburn – due to reflux esophagitis from gastric acid

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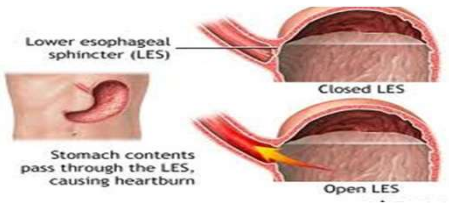

GERD

85

TREATMENT FOR GERD: SURGERY

- Fundoplication:
  - A band of upper stomach muscle is wrapped totally (Nissan) or partially (Thal) around the lower esophagus.
  - Patient can lose protective ability to vomit, burp or retch but is often critical in reducing severe esophageal damage.
  - It separates lower esophagus

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TREATMENT FOR GERD: TYPES OF MEDICATION

- Antacids: Work to quickly neutralize acid that is already present in the stomach (Mylanta, Maalox, Simethacone)
- Acid Suppressors/ Histamine (H-2) blockers: Reduce stomach acid production (Tagamet, Zantac, Pepcid).
- Acid Blockers/Proton Pump Inhibitors: Can completely eliminate stomach acid production (Prevacid, Prilosec, Protonics, Nexium, Zegerid).
- Prokinetics or Motility Medications: Move food through the GI tract more effectively and a bit faster. Can tighten the lower esophageal sphincter muscles (Reglan, Bethanechol, Erythromycin, Motilium)
- Physical Barriers/ Cytoprotective Agents: Coat stomach and protect from acid damage or float on top of stomach contents and provide a physical barrier to keep acid from backwashing into the esophagus (Carafate, Gaviscon)

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IN SUMMARY: ASHA 2004 SLP KNOWLEDGE

- "Clinicians should be aware that oropharyngeal swallowing function is often altered in patients with esophageal motility disorders and dysphagia."
- Speech Language Pathologists "possesses the ability to recognize characteristic patient complaints and obtain a clinical history, which assist in identifying primary or related esophageal problems…"
- Patient's should therefore be confident that "…the SLP has a basic understanding of oropharyngeal and esophageal relationships that will allow the clinician to provide optimal services, thus reducing the risk that underlying causes of a patient's dysphagia will go undetected during an examination."

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STRATEGIES

- Patients benefit from sitting in an upright position during eating and drinking, as well as remaining upright for some time after ingestion…gravity at work.
- Sleep with head of bed elevated.
- Avoid eating before bedtime, reduce caffeine, chocolate, peppermint and alcohol consumption and stop smoking…helps lessen transient relaxations of the LES (Lohsiriwat, Puengna & Leelakusolvong, 2006)
- Performing additional dry swallows and consuming warm fluids with meals may aid in esophageal clearance and limit esophageal spasms (Triadafilopoulos, Tsand & Segall, 1998)
- Chew food thoroughly and consider more frequent and smaller meals.
- Some patients do better with hot liquids vs. cold beverages.

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DIFFERENTIAL DIAGNOSIS: MEDICATIONS IMPACT

- MANY KINDS OF MEDICATIONS IMPACT SWALLOWING
- SIDE EFFECTS MAY OCCUR AT ANY STATE: ORAL, PHARYNGEAL, OR ESOPHAGEAL
- ESOPHAGEAL FUNCTION CAN BE INFLUENCED WITHOUT SYMPTOMS

90

ORAL PHASE: MEDICATION EFFECTS

- Dry mouth (xerostomia): anticholinergics, antihistamines, antidepressants → reduced bolus formation.
- Altered taste (dysgeusia): chemotherapy, antibiotics → poor appetite, reduced oral prep.
- Oral mucosal irritation: bisphosphonates, NSAIDs → pain with mastication.
- Sedatives/antipsychotics: decreased oral motor control → pocketing, drooling.

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PHARYNGEAL PHASE: MEDICATION EFFECTS

- Sedatives & muscle relaxants: reduced reflex initiation, delayed swallow trigger.
- Antipsychotics & antiepileptics: extrapyramidal side effects → discoordinated contractions.
- Opioids: suppression of cough reflex → increased risk of silent aspiration.
- Neuromuscular blockers (chemotherapy agents): weaken contraction force → residue.

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ESOPHAGEAL PHASE: MEDICATION EFFECTS

- Calcium channel blockers & nitrates: reduce LES tone → reflux, regurgitation.
- Anticholinergics: slow motility → stasis, bolus retention.
- Bisphosphonates, tetracyclines: esophagitis, ulceration, strictures.
- Opioids: can cause esophageal dysmotility and spasm.

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POLYPHARMACY & CUMULATIVE EFFECTS

- Multiple medications increase risk of compounded side effects.
- Older adults particularly vulnerable due to polypharmacy.
- Important to review medication lists during dysphagia evaluation.

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TOP OFFENDERS INTERFERING WTH SWALLOWING LIPS TO LES

- ANTICHOLINERGIC DRUGS
- ANTIDEPRESSENT DRUGS
- ANTIHISTAMINES
- CNS MEDICATIONS
- OTHER CLASSES

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COMMON ANTICHOLINERGIC MEDICATIONS

ANTIANXIETY DRUGS

- ALPRAZOLAM (XANAX)
- AMITRIPTYLENE
- CLORAZEPATE (TRANXENE)
- TEMAZEPAM (RESTORIL)

ANTISPASMODIC DRUGS

- BACLOFEN
- CARISOPRODOL (SOMA)
- CYCLOBENZAPRINE (FLEXERIL)
- DICYCLOMINE (BENTYL)
- HYCOSAMINE (LEVSIN)
- ORPHENADRINE (NORFLEX)

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COMMON ANTICHOLINERGIC DRUGS

GI DRUGS

- CIMETADINE (TAGAMET)
- DIPHENOXYLATE (IMMODIUM)
- METOCHLORPRAMINE (REGLAN)
- RANITIDINE (ZANTAC)
- PROMETHAZINE (PHENERGAN)
- PROCHLORPERAZINE (COMPAZINE)

CV MEDICATIONS

- DIGOXIN
- FUROSEMIDE (LASIX)
- DISOPYRAMIDE (NORPACE)
- NIFEDIPINE (PROCARDIA)
- OTHER CALCIUM CHANNEL BLOCKERS

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ANTIDEPRESSANTS - SLIENT OFFENDER

- AMOXAPINE (ASENDIN)
- CLOMIPRAMINE (ANAFRANIL)
- DOXEPIN (SINEMET)
- NORTRIPTYLINE (PAMELOR)
- PAROXETINE (PAXIL)
- DESIPRMINE (NORPRAMIN)
- IMIPRAMINE (TOFRANIL)
- PROTRIPTYLINE (VIVACTIL)
- SERTRALINE (ZOLOFT)

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ANTIHISTAMINES

- CHLORPHENIRAMINE (CHLOR TABS)
- CYPROHEPTADINE (PERIACTIN)
- DIPHENHYDRAMINE (BENADRYL)
- HYDROXYZINE (ATARAX OR VISTARIL)

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CNS MEDICATIONS

PARKINSONS / DEMENTIA

- AMANTADINE (SYMMETREL)
- BENZTROPINE (COGENTIN)
- BIPERIDEN (AKINETON)
- TRIHEXYPHENIDYL (ARTANE)
- MECLIZINE (BONINE)
- NAMENDA (MEMANTINE)
- SCOPOLAMINE

ANTIPSYCHOTICS

- CHLORPROMAZINE (THORAZINE)
- CLOZAPINE (CLOZARIL)
- HALPERIDOL (HALDOL)
- OLANZAPINE (ZYPREXA)
- THIORIDAZINE (MELLARIL)

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HORMONES

- BIRTH CONTROL
  - PREGNANCY CAUSES REFLUX DUE TO LES RELAXATION
- PREDNISONE
- PROGESTINS (INCLUDING REPLACEMENTS)
- SYNTHROID (MAY INCREASE MOTILITY)
- BISPHSOPHONATES (FOSAMAX)

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INCONTINENCE MEDS

- OXYBUTININ (DITROPAN)
- TOLTERODINE (DETROL)

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PAIN MEDICATIONS

- TYPICAL OPIOIDS SLOW MOTILITY
  - CODEINE
  - HYDROCODONE
  - LORTAB
  - OXYCODONE
  - PERCOCET/PERCODAN
- ATYPICAL
  - LYRICA
  - ULTRAM

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CLINICAL IMPLICATIONS FOR SLPS

- Incorporate medication review into case history.
- Collaborate with physicians/pharmacists on alternatives.
- Distinguish between structural vs medication-induced dysphagia.
- Educate patients/caregivers about side effects.

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SUMMARY: MEDICATIONS AFFECT ALL STAGES OF SWALLOWING

- THE NUMBER OF MEDICATIONS THAT CAUSE OROPHARYNGEAL AND/OR ESOPHAGEAL PROBLEMS IS INCREASING
- THE MOST COMMON IMPACTS ARE
  - FAILURE OF THE BOLUS TO MOISTEN TO ALLOW EASY OF FLOW
  - DELAYED OR INEFFICIENT PERISTALSIS DUE TO MUSCLE EFFECTS
  - ABNORMAL RELAXATION OF THE LES CAUSING REFLUX
- Team-based approach (SLP, MD, pharmacist) is essential.

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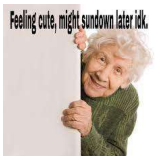
DIFFERENTIAL DIAGNOSIS: DYSPHAGIA AS A SENSORY FUNCTION

- In a 2008 article in Physical Medicine and Rehabilitation Clinics of North America, Ianessa Humbert and JoAnne Robbins say that sensory function is understudied in the swallowing literature, despite its influence on the pharyngeal swallow response.
  - It changes with age and is influenced by declining perception of spatial tactile recognition on the lip and tongue, diminished perception of viscosity in the oral cavity, poor oral stereognosis [tactile object recognition], and reductions in taste perception.
  - They recommend that all forms of increased sensory stimulation or attention to a task be incorporated into swallowing treatment, especially given known diminishment in oral-pharyngeal sensation, attention and memory in older adults.



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IMPACT OF SENSES ON SWALLOWING

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TEST YOUR SENSES

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SENSORY IMPACT ON SWALLOWING

- Food elicits perceptions of
  - Taste
  - Sound during chewing and biting
  - Tactile responses to temperature
  - Tactile responses to texture
  - Comfort/discomfort of the swallowing mechanisms
  - Kinesthetic and Proprioceptive awareness of oral movements while biting, chewing and swallowing

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SENSORY IMPACT ON SWALLOWING

- Auditory Senses
  - Sounds of chewing and biting
  - Sounds in the environment
  - Over or under stimulating environment
- Olfaction/Smell & Taste
  - Appetite
  - Most significant impact on quality of oral intake
  - Changes in smell and taste sensation will tend to reject food or "forget to eat"

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SENSORY IMPACT ON SWALLOWING

- Tactile/Touch
  - Oral phase: feel of the food in the oral cavity
  - Organizes oral manipulation
  - Senses hot/cold
  - Detects oral or pharyngeal residuals
  - Coughs on penetration/aspiration

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SWALLOWING SPECIFIC SYMPTOMS OF SENSORY DISORDER

- Difficulty achieving/maintaining optimal feeding positioning
- Poor attention to the feeding/swallowing process
- Oral defensiveness/hypersensitivity/food aversions
- Reduced Oral sensation/awareness/long chew/oral hold
- Spillage/messiness in eating
- Difficulty calming during meals
- Resist doing oral motor exercises or safe swallowing strategies

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SWALLOWING SPECIFIC SYMPTOMS OF SENSORY PROCESSING DISORDER

- Will not eat foods or will only eat foods with certain visual characteristics
- Is the patient bothered by the sounds the food makes as he/she bites/chews or by sounds in the environment
- Reduced appetite.

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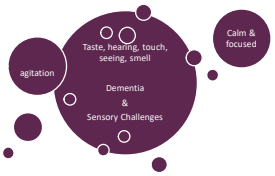
SENSORY ISSUES IN DEMENTIA

- Orally defensive
- Food/texture aversions
- Temperature aversions
- "Grainy" pieces -> food expulsions
- Inability to remain focused during eating.
- Oral defensiveness/hypersensitivity/food aversions.
- Reduced oral sensation/awareness
- Difficulty remaining calm and task-focused during meals.
- Food refusal and Perception of food as unappealing, diminishing appetite.



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POPULATIONS WITH A LIKELIHOOD OF SENSORY PROCESSING DISORDER

- Premature Infants
- Autism Spectrum/PDD
- Tourette's Syndrome
- TBI
- MS
- Intellectual Disabilities
- Learning Disorders/Dyslexia
- Apraxia
- Stress Related Disorders
- Stroke
- Dementias

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TREATMENT IMPLEMENTATION

- Organize sensory information to use in an adaptive manner
- Interact with the environment effectively
- Provide vestibular and proprioceptive stimulation
- Modulate sensory information
- Move towards self regulation
- Help the individual process more organized response to sensory stimuli

COORDINATED EFFORT BETWEEN PT/OT/SLP

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SENSORY DIET

- Different from a nutritional diet
- Incorporate techniques for sensory processing and sensory stimulation
- OT has the key to developing Sensory Diets
- SLP should have an active role
- Designed to provide sensory input
  - Assist in modulating sensory information
  - Organize the CNS
  - Process a more organized response to sensory information

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ORGANIZING THE DINING EXPERIENCE/ENVIRONMENT

It's important to consider sensory issues when assessing a person's ability to swallow.

Swallowing—whether for a dysphagia assessment or for eating—requires a calm, alert state.

People with cognitive disorders may struggle to achieve this state when noises, sights, smells, tastes and other sensations interfere as they seek to orient themselves and to maintain their postural stability.

They may become agitated or lethargic—or lose focus or become hyperattentive.

120

THINK OUTSIDE THE BOX

- Entire Sensory Experience.
- Much more is involved than just the motor process

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DIAGNOSIS

- Comprehensive clinical assessment
- Laryngoscopy (to rule out structural causes)
- Videofluoroscopic Swallow Study (VFSS)
- FEES: Fiberoptic Endoscopic Evaluation of Swallowing
- Multidisciplinary team: ENT, speech-language pathologist, sometimes psychologist

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DIFFERENTIAL DIAGNOSIS: MUSCLE TENSION DYSPHAGIA

What is Muscle Tension Dysphagia?

- A functional swallowing disorder
- Caused by excessive muscle tension in the neck, throat, or larynx
- Occurs **without structural or neurological abnormalities**
- Often co-occurs with **voice disorders or stress-related issues**

Key Characteristics:

- Normal anatomy and imaging
- Difficulty swallowing (dysphagia) despite no visible cause
- Muscle overuse or misuse during swallowing
- Can be intermittent or persistent

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TREATMENT APPROACHES & PROGNOSIS

- Behavioral therapy is the main treatment
- Voice therapy and swallowing therapy
- Techniques to reduce muscle tension
- Breathing and relaxation exercises
- Treatment of underlying issues (e.g., reflux or stress)

Prognosis:

- Good with proper therapy and management
- Often reversible if caught early
- Ongoing support may be needed in high-stress situations or vocal demands

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CAUSES AND RISK FACTORS

- Voice overuse or strain
- Stress, anxiety, or psychological factors
- History of gastroesophageal reflux disease (GERD)
- Laryngopharyngeal reflux (LPR)
- Poor swallowing coordination
- Prior negative swallowing experience

123

PUTTING IT ALL TOGETHER

CASE STUDIES: SMALL GROUPS

126

FOOD FOR THOUGHT #1

- 74 YEAR OLD WOMEN
- COMPLAINT: Solids are not going down well
- Medical History: PD, Esophageal Stricture, Falls, GERD, HH, Lung CA
- Frequency of Symptoms: Solids Greater than Liquids
- CURRENT DIET: Regular solids and thin liquids

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FOOD FOR THOUGHT #1

WHAT ARE YOUR THOUGHTS?

128

FOOD FOR THOUGHT #1 MBSS RESULTS:

- MBSS Results: Mild to moderate oral dysphagia with impaired mastication, impaired bolus transport/lingual motion and mild pharyngeal dysphagia with delayed initiation of swallow.
- Pen-Asp Scale: 2 (intermittent transient penetration of thin liquids/ No cough
- Esophageal Assessment: Puree and Liquid Boluses had timely and complete transit

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FOOD FOR THOUGHT MBSS DISCUSSION #1

- DOES THE PATHOPHYSIOLOGY RELATE TO THE PATIENT COMPLAINT?
- IF PATHOPHYSIOLOGY DOES NOT RELATE TO THE COMPLAINT WHAT NEXT DURING AND/OR AFTER THE MBSS?
- DOES THE PATIENT'S MEDICAL DIAGNOSIS EXPLAIN THE PATHOPHYSIOLOGY? IF NOT THEN WHAT?

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FOOD FOR THOUGHT #2

- 88 YEAR OLD MALE
- COMPLAINT: coughing, breathing difficulty with po intake
- MEDICAL HISTORY: COPD, CHF
- FREQUENCY OF SYMPTOMS: during po intake
- CURRENT DIET: Regular solids and thin liquids

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FOOD FOR THOUGHT #2

WHAT ARE YOUR THOUGHTS?

132

FOOD FOR THOUGHT MBSS RESULTS #2:

- MBSS Results: Severe oral dysphagia with impaired tongue control, impaired bolus transport/lingual motion, impaired oral clearance and Severe pharyngeal dysphagia with delayed swallow, incomplete laryngeal elevation/closure, impaired epiglottic inversion, reduced tongue base retraction and inadequate pharyngeal clearance.
- Pen-Asp Scale: 8 (noted for all liquids and purees)
- Esophageal Assessment: normal

133

FOOD FOR THOUGHT MBSS DISCUSSION #2

- DOES THE PATHOPHYSIOLOGY RELATE TO THE PATIENT COMPLAINT?
- IF PATHOPHYSIOLOGY DOES NOT RELATE TO THE COMPLAINT WHAT NEXT DURING AND/OR AFTER THE MBSS?
- DOES THE PATIENT'S MEDICAL DIAGNOSIS EXPLAIN THE PATHOPHYSIOLOGY? IF NOT THEN WHAT?

134

FOOD FOR THOUGHT #3

- 75 YEAR OLD MALE
- COMPLAINT: coughing
- MEDICAL HISTORY: GERD
- FREQUENCY OF SYMPTOMS: intermittently during po intake
- CURRENT DIET: Regular solids and thin liquids

135

FOOD FOR THOUGHT #3

WHAT ARE YOUR THOUGHTS?

136

FOOD FOR THOUGHT MBSS RESULTS #3:

- MBSS Results: Normal oral pharyngeal swallow
- Pen-Asp Scale: 1
- Esophageal Assessment: Normal

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FOOD FOR THOUGHT MBSS RESULTS #3

- DOES THE PATHOPHYSIOLOGY RELATE TO THE PATIENT COMPLAINT?
- IF PATHOPHYSIOLOGY DOES NOT RELATE TO THE COMPLAINT WHAT NEXT DURING AND/OR AFTER THE MBSS?
- DOES THE PATIENT'S MEDICAL DIAGNOSIS EXPLAIN THE PATHOPHYSIOLOGY? IF NOT THEN WHAT?

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CASE STUDY: BEHAVIORAL OR PHYSIOLOGICAL???

- 85 y.o. Female with severe dementia
- Hx of spitting out food and weight loss
- Several bedside assessments with multiple diet downgrades over the past few months
- Spitting behavior continues despite changes in diet modifications
- Currently on IDDSI 4 puree and IDDSI 2 mildly thick/nectar thick liquids
- Nursing staff/physician now referring to psych for medications to control behavior
- SLP decides to recommend instrumentation and states "I'm pretty sure this is behavioral, but I thought we should look before putting the patient on medications"

139

CASE STUDIES: CASE HISTORY

- Are there symptoms of esophageal dysphagia? Oropharyngeal dysphagia? Muscle tension dysphagia?
- What would you expect on the MBSS and esophageal assesssment?

140

ANSWER THE QUESTION: BEHAVIORAL OR PHYSIOLOGICAL???

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CASE STUDIES: MBSS & ESOPHAGEAL ASSESSMENT

- What do you see on the MBSS?
- Does the consult answer the question?
- Does the pathophysiology fit the disorder?
- Does the medical diagnosis fit the pathophysiology? Need to look at medications?
- Are there symptoms of esophageal dysphagia, oropharyngeal dysphagia, muscle tension dysphagia, sensory concerns?
- Does esophagus function affect diet recommended on MBSS?
- Do we need to add any strategies for esophageal dysphagia? For muscle tension dysphagia? For oropharyngeal dysphagia?
- Any recommended referrals? Therapy focus

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CASE STUDY # 1

AGE/GENDER: 85 y.o. Female

COMPLAINT: coughing, wet vocal quality, decline in swallowing

MEDICAL HISTORY: Dementia, HTN, Depressions, UTI, AAA repair, TAA repair

DIET: IDDSI 4 Puree and IDDSI 3 Moderately Thick/ Honey Liquids

143

CASE STUDY #1

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CASE STUDY #2

AGE/GENDER: 93 y.o. Female

COMPLAINT: Coughing, Pneumonia

MEDICAL HISTORY: AF, Dementia, PNA, DVT, Pulmonary Embolism

DIET: IDDSI 7 Regular Solids, IDDSI 0 Thin Liquids

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CASE STUDY # 2

146

CASE STUDY #3

AGE/GENDER: 81 y.o. Male

COMPLAINT: choking, coughing, moist cough

MEDICAL HISTORY: Recurrent PNA, COPD, CVA, Dementia, HTN

DIET: IDDSI 4 Puree, IDDSI 2 Mildly Thick/Nectar Liquids

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CASE STUDY #3

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CASE STUDY #4

Age/Gender: 63 yo male

Complaint: coughing during meals; frequent refusal of liquids

Medical Diagnosis: Severe Intellectual Disabilities, Constipation, VP Shunt, HH

Current Diet: IDDSI 5 Minced & Moist; IDDSI 0 Thin Liquids

149

CASE STUDY #4

150

CASE STUDY #5 MBSS

AGE/GENDER: **66** y.o. Male

COMPLAINT: dysphagia, GERD, food getting stuck in throat, intermittent choking

MEDICAL HISTORY: GERD, seasonal allergies, former smoker

DIET: IDDSI 7Regular Solids; IDDSI 0 Thin Liquids

151

CASE #5 MBSS

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CASE STUDY #6

AGE/GENDER: 88 y.o. Female

COMPLAINT: coughing, dehydration, globus sensation, malnutrition, moist cough, pain on swallowing, poor PO intake, wet vocal quality

MEDICAL HISTORY: Dehydration, Malnutrition, GERD, HTN, Anxiety, Depression, Hyperlipidemia, Hypothyroidism, OA, Osteoporosis, Altered Mental Status

DIET: IDDSI 5 Minced & Moist; IDDSI 0 Thin liquids

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CASE STUDY #6

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CASE STUDY #7

AGE/GENDER: 86 y.o. Female

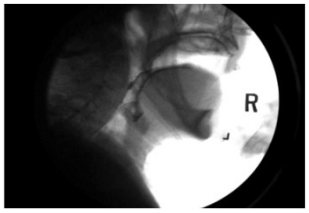
- **COMPLAINT:**
  - coughing, suspect silent aspiration, breathing difficulty with PO intake,
  - patient expressing fear when swallowing, doesn't want to choke, only taking small sips/bites, complains his food does not go down.
  - Staff and wife report that he sometimes regurgitates undigested food hours after he as eaten.
  - The patient and staff complain about a "foul breath" that has gotten worse over several months and has not responded to good oral care

MEDICAL HISTORY: Alzheimer's Disease, Asthma, Significant Lingual and Jaw Tremors

DIET: IDDSI 4Puree; IDDSI 2 Mildly Thick/Nectar Liquids

155

CASE STUDY #7



156

CASE STUDY #8

AGE/GENDER: 86 y.o. Male

COMPLAINT: dehydration, food/pills getting stuck

MEDICAL HISTORY: HTN, Anemia, BPH, CKD, Dehydration, DVT, Renal Failure, UTI, Colon CA, s/p Colectomy

DIET: IDDSI 6 Soft and Bite-Sized; IDDSI 0 Thin Liquids

157

CASE STUDY #8

158

CASE STUDY #9

AGE/GENDER: 84 y.o. Female

COMPLAINT: suspect silent aspiration, hoarse vocal quality, vomiting, abdominal pain

MEDICAL HISTORY: GERD, COPD, Anemia, GI Bleed, HH, Peptic Ulcer Disease (PUD), Gastric outlet obstruction from PUD

DIET: IDDSI 6 Minced & Moist; IDDSI 2 Mildly Thick/Nectar Liquids

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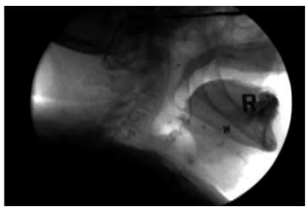
CASE STUDY # 9



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CASE STUDY # 10

AGE/GENDER: 76 y.o. Male

COMPLAINT: dysphagia, coughing, choking, mindful of bites he takes, vocal tremor

MEDICAL HISTORY: HTN, Hypercholesterolemia, Left Vocal Cord Paralysis, Parathyroidectomy, Pituitary Surgery, Arthritis, Pre-Diabetic Mellitus, Sleep Apnea

DIET: IDDSI 7Regular Solids; IDDSI 0 Thin Liquids

161

CASE # 10 MBSS

162

CASE STUDY #11

Age/Gender: 21 Year Old Male

Complaint: Weight Loss, Poor PO Intake

Medical History: s/p TBI

Current Diet: NPO with trials of IDDSI 4 Puree and IDDSI 0 Thin Liquids

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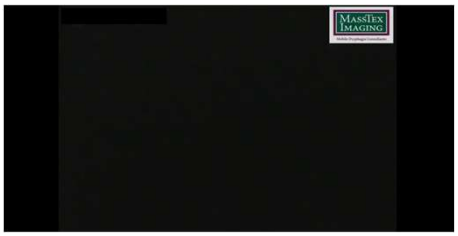
CASE STUDY #11



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CASE STUDY # 12

AGE/GENDER: 72 y.o. Female

COMPLAINT: vomiting, weight loss, patient reports after vomiting she can eat more

MEDICAL HISTORY: Anemia, CKD, COPD, Depression, GERD, Hypothyroidism, MS, UTI

DIET: IDDSI 7Regular Solids; IDDSI 0 Thin Liquids

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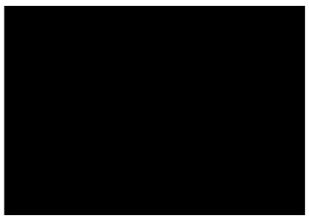
CASE STUDY # 12



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CASE STUDY # 13

AGE/GENDER: 86 y.o. Male

COMPLAINT: breathing difficulty with po intake, moist cough, poor po intake, coughing w/ thin liquids, history of PNA, wet vocal quality

MEDICAL HISTORY: AF, CHF, COPD, HTN, BPH, Falls, GERD, Hypothyroidism, Barrett's Esophagus

DIET: IDDSI 7Regular Solids; IDDSI 2 Mildly Thick/Nectar Liquids

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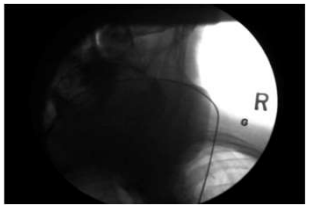
CASE STUDY # 13



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CASE STUDY # 14

AGE/GENDER: 95 y.o. Female

COMPLAINT: coughing, poor po intake

MEDICAL HISTORY: GERD, Dementia, PNA

DIET: IDDSI 7Regular Solids; IDDSI 2 Mildly Thick/Nectar Liquids

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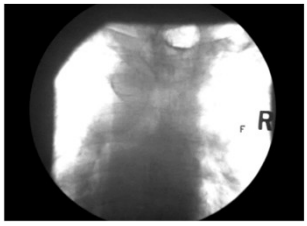
CASE STUDY # 14



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WRAP UP & QUESTIONS

ALWAYS ASK "DID I ANSWER THE QUESTION?"

You are the Dysphagia Sleuth!!!

THANK YOU!!!!

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