



Welcome



PADRECC/EES - FY 2014 Movement Disorder Series

To provide VHA healthcare professionals with current practice standards and emerging trends in the treatment of Parkinson's disease and other movement disorders

Today's Presentation

a 1 hour virtual conference broadcast over Lync

Thursday, December 12, 2013

12:00 PM - 1:00 PM Eastern Time

and

3:00 PM - 4:00 PM Eastern Time

“Dysphagia in Parkinson's Disease”

Parkinson's Disease, Swallowing, and Best Practices

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**AUDIO access: connect through your computer
or call in on 1-855-767-1051 Conference ID: 2016640**



Parkinson's Disease Swallowing and Best Practice

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Old Way of Thinking



- PD is a motor only issue
 - Only neurotransmitter affected is dopamine
 - Only regions of brain affected are the basal ganglia
- Doesn't impact swallowing until the later stages



Oral Motor Disorders in Parkinson's

- Oral motor disorders are common
 - **Dysarthria** occurs in about 90% of individuals
 - **Drooling** occurs in about 78% of individuals
- Depending on how sensitively **dysphagia** is measured and treatments are introduced, swallowing problems occur in nearly 100% of PwP at some time in the disease course; swallowing changes occur from the earliest stages, even in asymptomatic cases

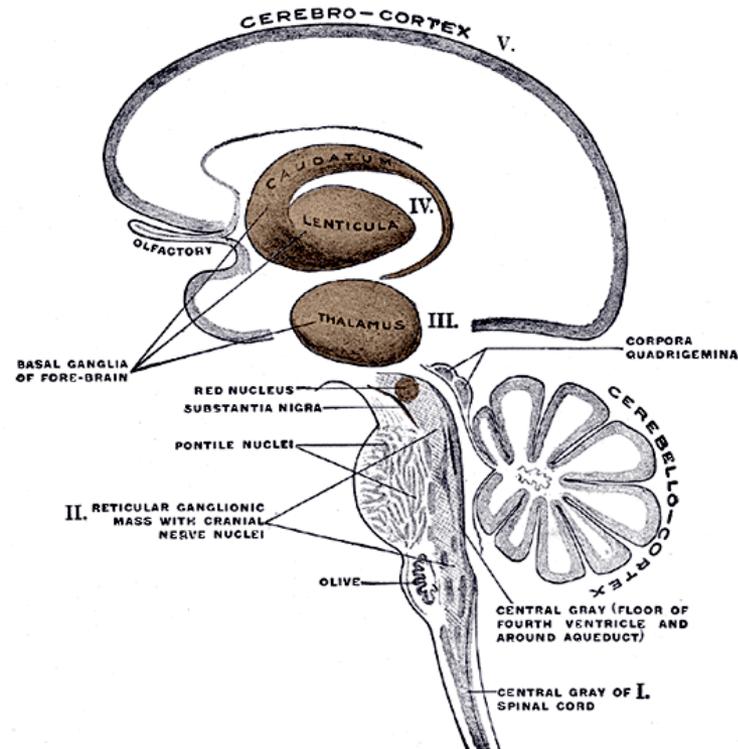
New Way of Thinking

- PD effects entire brain and other neurotransmitters
- PD is a problem of sensorimotor control impacting scaling, magnitude of movement, and sensory feedback



Parkinson's Disease

- Disease begins in the brain stem and ascends the neuroaxis to end in the cortex involving the entire brain (Braak et al., 2004)
- Thus, dysphagia in PD is a motor, sensory and *cognitive* disorder

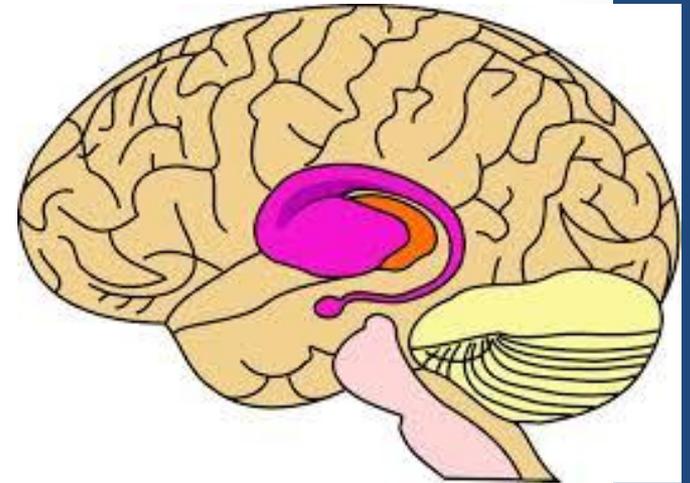


Dysphagia in Parkinson's Disease

- Aspiration pneumonia is the leading cause of death in PWP (Ebihara et al., 2003; Kakashima et al., 1997)
- Numerous morbidities: weight loss, changes in diet, dehydration, anorexia
- Significant impact on quality of life
 - Negative impact on dining with family, friends, and others
 - Reluctance to eat in public due to fear of choking, slow eating, or embarrassment about drooling (Rosenbek & Jones, 2008)
 - Self-feeding problems due to problems with reach-to-eat movements (Doan et al., 2008)

Basal Ganglia and Swallowing

- Select and initiate motor plans
- Sequence, force, and timing
- Adapt to changes in fluid and food bolus
- Adapt general motor plans



What Does the PwP Commonly Complain of?

- Difficulty with pills
- Fatigue during eating
- Longer meal times
- Nasal regurgitation
- Food sticking in the throat
- Trouble starting the swallow
- Need for change in diet
- Coughing or choking while eating/drinking
- Excessive saliva and drooling
- Recurrent PNA or pulmonary infections
- Unintended weight loss
- Nasal regurgitation

Dysphagia Symptoms

- All three phases of swallowing are affected due to changes in both striated musculature under dopaminergic control and smooth musculature under autonomic control (Morrell, 1992)
- Oral stage often more severely involved until later in the disease process
- Pill dysphagia is one of the earliest symptoms reported
- Tongue pumping or backward and forward rocking motion of the tongue is often considered to be a defining feature (Blonsky et al., 1975)
- Aspiration is often a later feature



Oral Stage Deficits



- Sialorrhea or drooling is a common, debilitating, and socially isolating symptom (Troche & Fernandez, 2010)
- The mechanism of drooling is not fully understood (some studies have shown low saliva production in PwP) but, thought to result from a reduction in frequency of spontaneous swallows, impairments in oromotor control, and stooped posture (Proulx and colleagues, 2005)

Sialorrhea and PD

- Drooling predicts dysphagia, with 86% of PwP who present with drooling also exhibit oropharyngeal dysphagia
- PwP and diurnal or daytime sialorrhea are likely to develop silent aspiration and are at increased risk of respiratory infection and death compared to other individuals with PD

Nóbrega A C, Rodrigues B & Melo A (2008). Is silent aspiration a risk factor for respiratory infection in Parkinson's disease patients? *Parkinsonism Relat Disord*, 14, 646–648.

Nóbrega A C, Rodrigues B & Melo A (2008). Silent aspiration in Parkinson's disease patients with diurnal sialorrhea. *Clin Neurol Neurosurg*, 110, 117–119.

Pharyngeal Stage Deficits

- Laryngeal closure may be incomplete and cough is frequently impaired (Ebihara and colleagues, 2003)
- Decreased laryngeal elevation combined with poor tongue base and pharyngeal wall motion can result in cricopharyngeal dysfunction (Logemann, 1998) and hence penetration/aspiration



Penetration and Aspiration



Other Contributors to Dysphagia

- **Medical/pharmacological**

- Levodopa and dopamine agonists aimed at replenishing or enhancing dopamine (levodopa aka Sinemet and dopamine agonists include Requip, Mirapex)
- Other medications used in conjunction with Sinemet and dopamine agonists either alter or enhance effect (Amantadine, Cogentin, Artane, etc.)
- New drugs in pipeline or under investigation



- **Surgical**

- Thalatomy
- Pallidotomy
- Deep Brain Stimulation (DBS)



Influence of PD Treatments on Swallowing

- Medications appears to have a neutral effect on swallowing or may diminish function
- Swallowing efficiency may be reduced with levadopa (Lim et al., 2008)
- As side effects from prolonged levadopa use occur (dyskinesia), swallowing may decline (Rosenbek & Jones, 2009)
- Swallowing is seldom improved by surgery and may be negatively affected

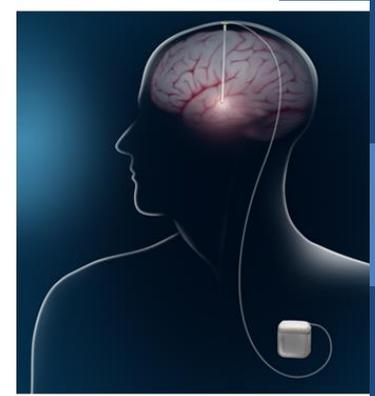


DBS and Swallowing (Ciucci et al., 2008)

- 14 subjects (12 men, 2 women) with electrodes placed in the subthalamic nucleus (STN) region
- VFSS performed with DBS on and off

Results:

- no improvement in the oral stage
- improved pharyngeal transit times, reduced pharyngeal residue and aspiration with DBS on
- no improvement in hyoid bone excursion (with less excursion) with DBS on



Other Contributors to Oropharyngeal Dysphagia

- Cognitive impairment, upper extremity impairment, and impulsive feeding behaviors in advanced PD (15-20% of PwP develop dementia compared to 7-10% of the elderly population)
- Fatigue
- Disease progression

Swallowing Evaluation in PD

- Does the PwP have dysphagia? *Probably YES*
- Are swallowing problems often under recognized or under reported by PwP (Bird et al., 1994)? *Yes, reduced self awareness or cognitive deficits and slowly progressive decline*
- Likewise, practitioners may not identify symptoms
- Swallowing deficits do not always correlate with general disease severity
- This underscores the need for a careful, targeted, structured interview with both the PwP and their significant other

Components of Thorough History

(Rosenbek & Jones, 2009)



-Relationship of symptoms to medication schedule

-Relationship between protein consumption and medication effects that may influence dietary recommendations

-Other patterns in swallowing difficulty such as time of day, type of food and drink, posture, etc.

-Appetite

-Influence of upper extremity control on eating

-Fatigue/energy

-Apathy/interest

-Rate of eating or other idiosyncratic behaviors such as gorging

-Sensory change (taste, smell)

Patient-Rated Assessment of Speech, Swallowing, and Saliva

(Kalf et al., 2011)

- Radbound Oral Motor Inventory for Parkinson's Disease (**RAMP**)
- Validated questionnaire to assess dysarthria, dysphagia, and drooling symptoms at the levels of functioning and activities as well as in accordance with the ICFDH

Example:

- *“Does your swallowing difficulty limit your dining with others?”*
 - 1. Eating with others is no problem for me at all.
 - 2. I dine and drink with others, but I have to take my swallowing difficulty into account.
 - 3. I prefer eating in the presence of familiar people in familiar places.
 - 4. I eat only at home and in the presence of familiar people.
 - 5. I can eat only at home and with the assistance of a skilled caregiver.

Clinical Swallow Examination should always include:

Observation of eating

(self-feeding or feeding by assistant/caregiver)

Cognitive Screening

- St. Louis University Mental Status (SLUMS) Examination
(SH Tariq, N Tumosa, JT Chibnall, HM Perry III, and JE Morley)
- The Montreal Cognitive Assessment (MoCA)
(Z. Nasreddine, 2003 to 2013)
- The Mini-Mental Status Examination
(Folstein, Folstein, & McHugh, 1975)

Is An Instrumental Swallowing Assessment Necessary?

- **YES!!!!** Even if the PwP is asymptomatic or swallow appears safe and functional based on clinical swallow assessment
- Will provide a baseline
- There are fluctuations in function that may not be seen at time of clinical assessment
- The study may identify subclinical or mild signs which may facilitate earlier intervention



Dysphagia Severity Rating Scale

Dysphagia Severity Rating Scale for Parkinson's Disease
(Waxman and colleagues, 1990)

- Seven-point staging scale ranging from “normal swallowing mechanism” to “severe dysphagia”
- Gradations in severity rating are based on patient's report, observations of family members or caregivers, and results of VFSS

Example: 2: Moderate-severe dysphagia: Patient aspirates 5-10% on one or more consistencies, with potential for all consistencies. Potential for aspiration minimized by use of specific swallowing instructions. Cough reflex absent or non-protective. Alternative mode of feeding required to maintain patient's nutritional needs. If pulmonary status is compromised, NPO may be indicated

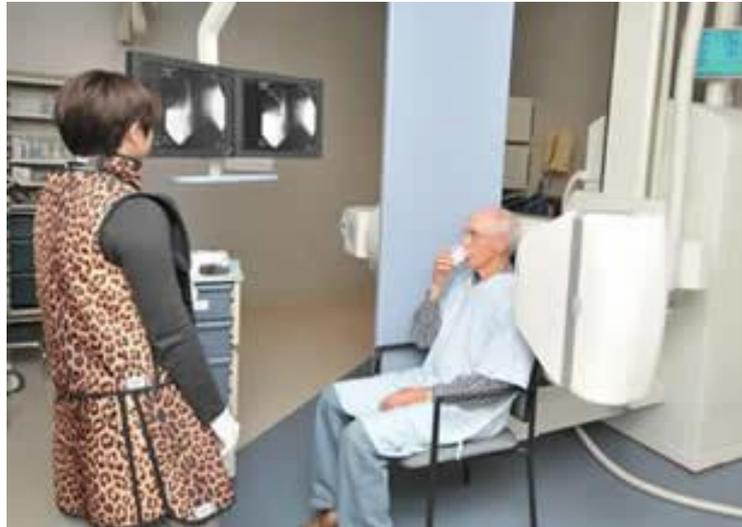
Modified Barium Swallow (MBS) or Video-Fluoroscopic Swallow Study (VFSS)

- Developed in 1971 to evaluate the oropharyngeal swallow in PD patients
- Assess levadopa treatment
- Small amounts of food:
 - 1 ml thin liquid
 - 1 ml of pudding
 - ¼ of Lorne Doone cookie coated w/ barium pudding



Adaptations to the Modified Barium Swallow (MBS) or Video-Fluoroscopic Swallowing Study (VFSS)

- Changes to food and fluid volumes and viscosity including cup drinking
- Introduction of treatment strategies
- The procedure has “...evolved over as our knowledge of normal and abnormal swallow has grown.” (Logemann, 2005)



Video-Fluoroscopic Swallowing Study (VFSS)

- Try and approximate patients natural eating posture; if possible, let the patient control liquid bolus size and rate
- Evaluate impact of fatigue by evaluating swallow before and after challenge
- cursory imaging of the esophagus
- Bolus CHALLENGES to include:
 - 13mm barium PILL
 - Lateral AND AP projections
 - Small AND large boluses to assess sensation
- Evaluate patient in ON and OFF states (meds, DBS)
- Re-evaluate when patient/family reports change



Penetration/Aspiration Scale

(Rosenbek, Robbins et al, 1996)

No Penetration: **1** Contrast does not enter the airway

Penetration: **2** Contrast enters the airway, remains above the vocal folds

3 Contrast remains above the vocal folds with visible residue

4 Contrast contacts vocal folds, no residue

5 Contrast contacts vocal folds, visible residue

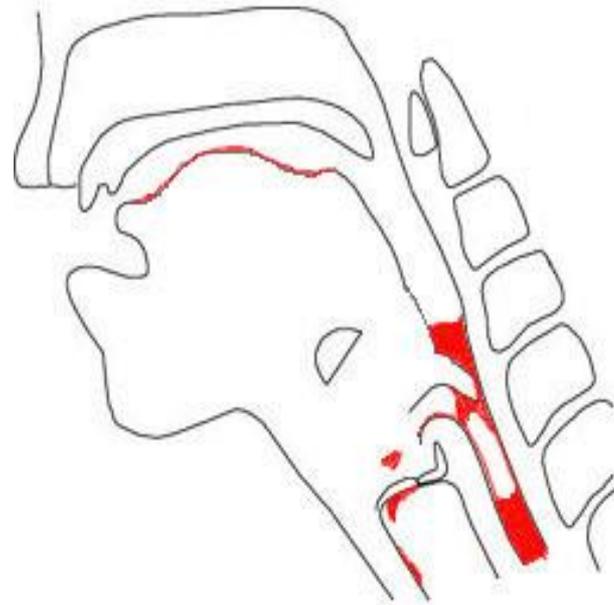
Aspiration: **6** Contrast passes glottis, no subglottic residue

7 Contrast passes glottis, visible subglottic residue despite response (cough/expiratory reflex)

8 Contrast passes glottis, visible subglottic residue, absent of response

Penetration Aspiration Scale

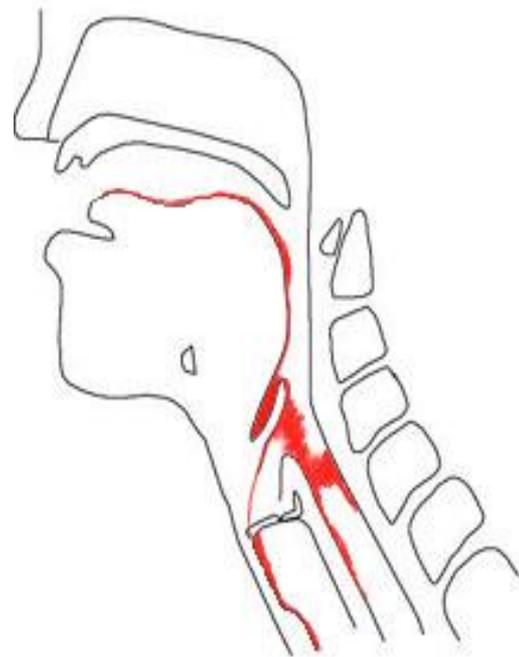
Score 7



Contrast passes glottis; visible sub-glottic residue despite patient's response

Penetration Aspiration Scale

Score 8



Contrast passes glottis; visible subglottic residue; absent patient response

Flexible Endoscopic Examination of Swallow (FEES)

- MBS or VFSS is typically exam of choice given significant oral stage dysphagia and disturbance to all three stages
- Patient tremor may be a barrier to FEES
- FEES, however:
 - Allows for direct visualization of pharyngeal/laryngeal secretions
 - Helpful in determining the effects of fatigue as meal progresses
 - Provides information relative to laryngeal integrity, particularly when impaired laryngeal closure or vocal fold bowing are suspected



WHAT can
we do?

Counseling, Education, and Evaluation

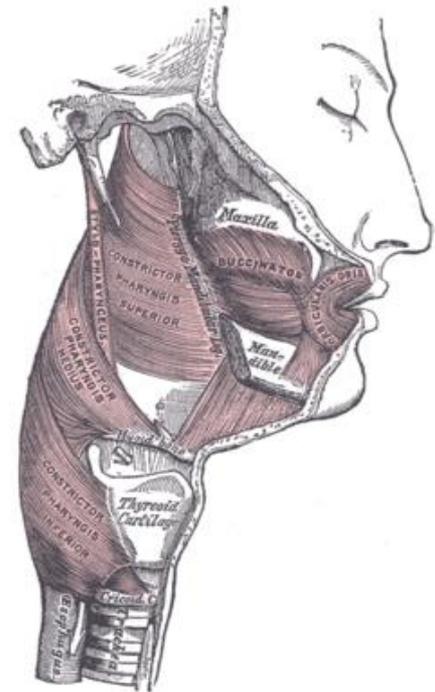
- Educate PwP and significant others about dysphagia symptoms associated with the disease, course, importance of weight monitoring, nutrition and hydration, etc.
- Regular evaluation important is critical
- Provide support and ongoing education

Educate about Food Interactions and Timing of Medication

- Consider timing meals to the medication cycle and when most rested
- Dopaminergic medications should be taken 30-60 minutes before meals as amino acids in meats and dairy can impact absorption



Compensatory vs. Rehabilitative Approaches



Compensatory vs. Rehabilitative

- Postural
- Increasing bolus sensory input
- Feeding/eating modifications modifications (adaptive utensils, bolus size, eating rate, order of liquid and solid boluses, eating environment)
- Airway protection maneuvers (effortful swallow, double swallow, supraglottic maneuver)
- Verbal prompting to swallow/reswallow
- Supervised/assisted feeding
- Dietary modifications (safest, least invasive diet consistencies)
- **Oral health**
- **Saliva/drooling management**
- **Altering foods/fluids**
- ROM exercises
- **Shaker exercise**
- **Lee Silverman Voice Treatment (LSVT)**
- **Expiratory Muscle Strength Training (EMST)**

Oral Health

- PwP had more complaints about their oral health and more problems in oral health behavior than the general population (Nakayama and colleagues, 2004) and are at increased risk of periodontal disease
- Tremor, hypokinesia, and rigidity can interfere with oral care and hygiene
- Xerostomia is a common side effects of PD medication
- Institute an oral health program



Saliva: Behavioral Management

- Visual and tactile cueing
- Wiping the mouth and chin with cloth
- Maintaining upright posture
- Consciously thinking about swallowing more frequently
- Reminders or cues to swallow
- Behavioral treatments have only been studied in a limited fashion and have not been found to be efficacious

Gum Chewing in PD



South and colleagues (2010) studied the impact of gum chewing on respiratory related and laryngeal swallow related signals before, during and following gum chewing in 20 PwP

- **Findings:**

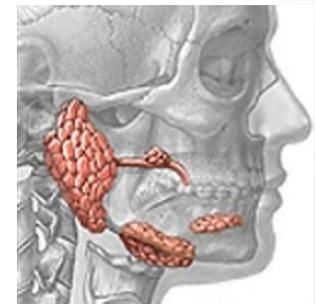
- Swallowing frequency increased and swallowing latency decreased during gum chewing compared with before
- Values for these parameters during chewing reverted toward baseline after chewing was discontinued
- However, a marked difference could still be found between the swallowing frequencies and latencies before and after gum chewing

- **Conclusions:** Gum chewing may be a cost effective and self-managed approach w/o side effects or reducing salivary flow

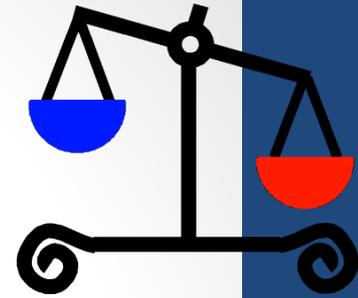
South A R, Somers SM & Jog M S (2010). Gum chewing improves swallow frequency and latency in Parkinson patients: A preliminary study. *Neurology* 74, 1198–1202.

Saliva/Drooling : Medical Treatment

- Medical
 - Anticholinergic drugs are problematic as they stimulate CNS related adverse effects such as confusion, mental dullness, and drowsiness; cause xerostomia
 - Arbouw and colleagues (2010) studied the impact of glycopyrrolate on sialorrhea
 - Mancini and colleagues (2003) found that **Botox injection** into parotids and submandibular glands is an effective and safe treatment
- Radiation/Surgical excision of salivary glands



Altering Fluids/Foods



- Provide recommendations regarding optimum diet, food and fluid bolus size, eating rate, posture, and environment
- Carefully consider diet modifications only after determining **patient risk** for development of adverse health outcomes
- Thicker consistencies generally result in less penetration and aspiration in PwP (Troche et al., 2008)
- Consider Protocol 201 findings (Robbins et al., 2008)

Protocol 201 (Robbins et al., 2008)

- Protocol 201: Largest multi-institutional randomized clinical trial funded by NIH
- N = 742 patients at 126 institutions
- **Methods:**
 - PD w/ & w/out Dementia; Dementia alone
 - Screening VFSS w/thin liquid; qualifiers must aspirate on 1 swallow
- **Part 1: immediate effects of intervention**
 - Randomized to presentation of chin down vs. nectar vs. honey thickened 3 ml swallows vs. cup drinking
- **Part 2: long-term effects of intervention (n=515)**
 - If either all 3 strategies eliminate aspiration or none eliminate, qualify
 - Randomize to 1 strategy for 3 months
 - Follow rate of aspiration pneumonia

Aspiration Rates by Diagnoses

	None of the Interventions	All of the interventions
Parkinson's disease	32%	39%
Parkinson's disease with dementia	26%	50%

Part 2 Findings: Thickened Liquids

- 52/525 (11%) patients developed pneumonia
- More dehydration in patients on thick liquids (6% vs. 2%)
- More UTIs in patients on thick liquids (6% vs. 3%)
- Longer hospital stay for patients with pneumonia (**honey = 18 days**; nectar = 4 days; chin tuck = 6 days)

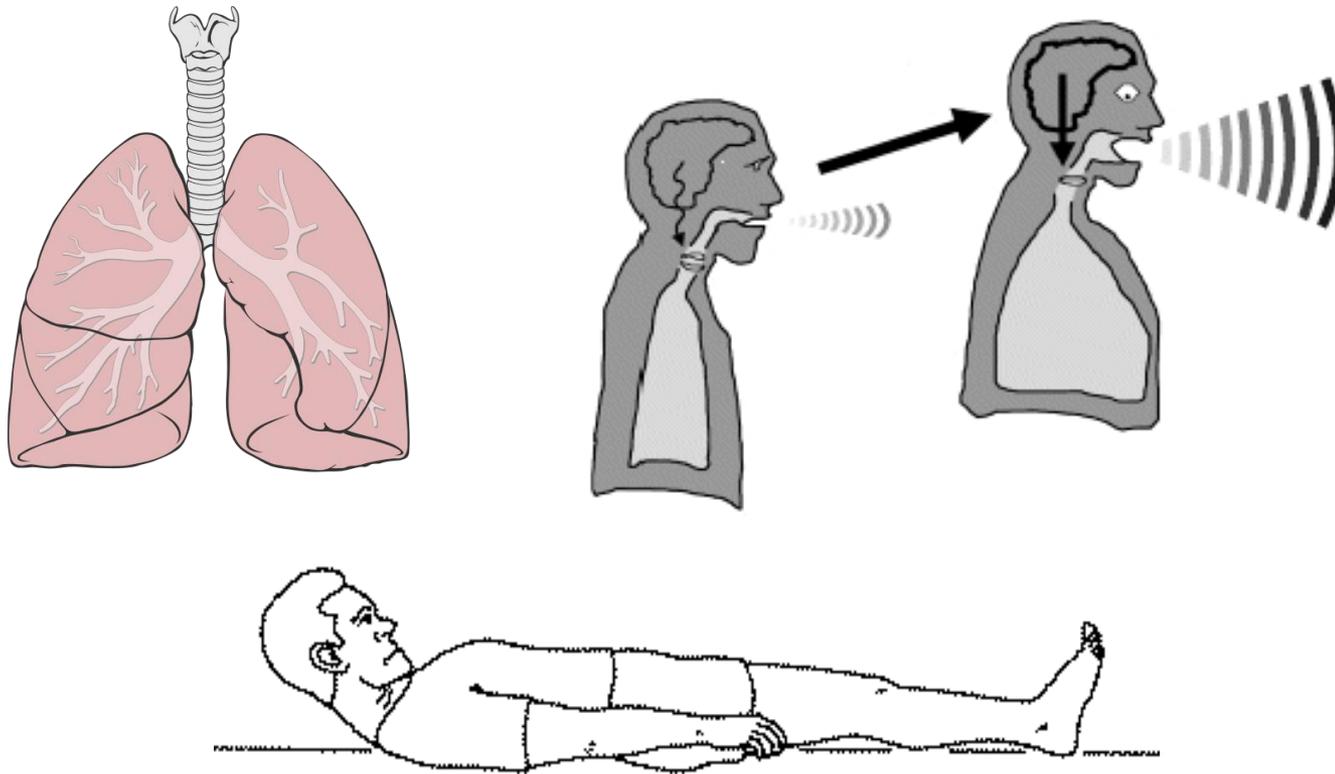


Protocol 201: Clinical Considerations

- Must balance risk and benefits of interventions given the lower than expected pneumonia incidence
- Thicker is not always better - patients who aspirate thick liquids have worse health outcomes



Rehabilitative Approaches



Shaker or Head Lift Exercise

(Shaker et al., 1997; Easterling et al., 2000)

- Used to improve hyolaryngeal elevation and upper esophageal sphincter relaxation/opening by targeting anterior hyoid movement
- Two-part exercise **completed 3x/day for 6 weeks:**
 1. Sustained head raising in supine
(3 repetitions, 1 minute hold, 1 minute break)
 2. Repetitive head raising in supine
(30 repetitions, 1 second hold)



Shaker Exercise

- Easterling (2002) conducted study of 27 tube fed pts. Examined prior to exercise and after 6 week treatment. Etiologies for dysphagia were varied.
- Regardless of etiology or chronicity of dysphagia, subjects showed **resolution of post-swallow aspiration, increase in anterior laryngeal motion, increase in upper esophageal sphincter opening diameter, and significant decrease in pyriform sinus residue.**

Shaker, “Head Lift”, “Head Raising”

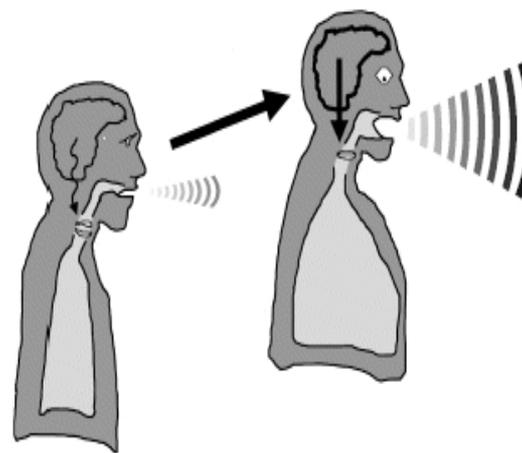
- Logemann et al. (2009) conducted small clinical trial on 19 patients with oropharyngeal dysphagia impacting upper esophageal sphincter and 3-month history of aspiration.
- Patients were randomized to either traditional therapy (SSG, Mendelsohn, tongue exercises (pull tongue back, yawn, gargle) or Shaker exercise for 6 weeks.
- **Results: Significantly less aspiration in Shaker group.** Residue did not differ between groups. With traditional therapy, there were several significant increases (superior laryngeal movement and superior hyoid movement). **After both types of therapy there was a significant increase in UES opening width on 3ml paste swallows.**



Lee Silverman Voice Treatment-LSVT[®]

Cross-systems Effects

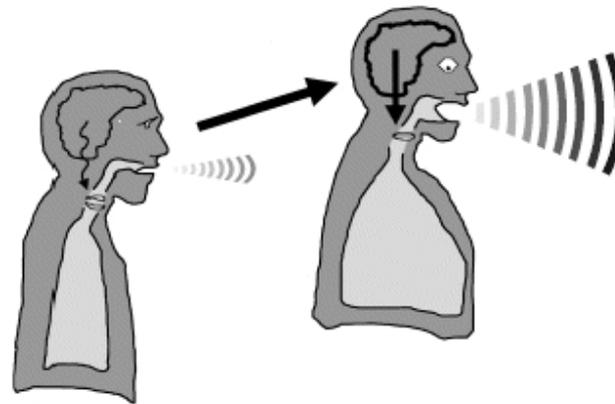
- Intense voice therapy using phonation as a trigger to
- effort and coordination through stimulating the “loud” global variant (respiratory support)
- 5x/day for 4 weeks
- Think Loud/Think Shout



PD Swallowing Treatment- LSVT®

Lee Silverman Voice Treatment (LSVT)

- Effects on swallowing (El Sharkawi et al. 2002)
 - Patients with PD (n = 8)
 - Completed LSVT for 1 month
 - VFSS evidence of :
 - ↓ oral residue
 - ↓ oral dysmotility
 - ↓ pharyngeal residue



Dystussia and Dysphagia

- Weakness in voluntary cough is related to penetration/aspiration (Pitts et al., 2008)
- Expiratory muscle strength training resulted in decreased penetration/aspiration in PwP (Pitts et. al, 2008)



Expiratory Muscle Strength Training (EMST)

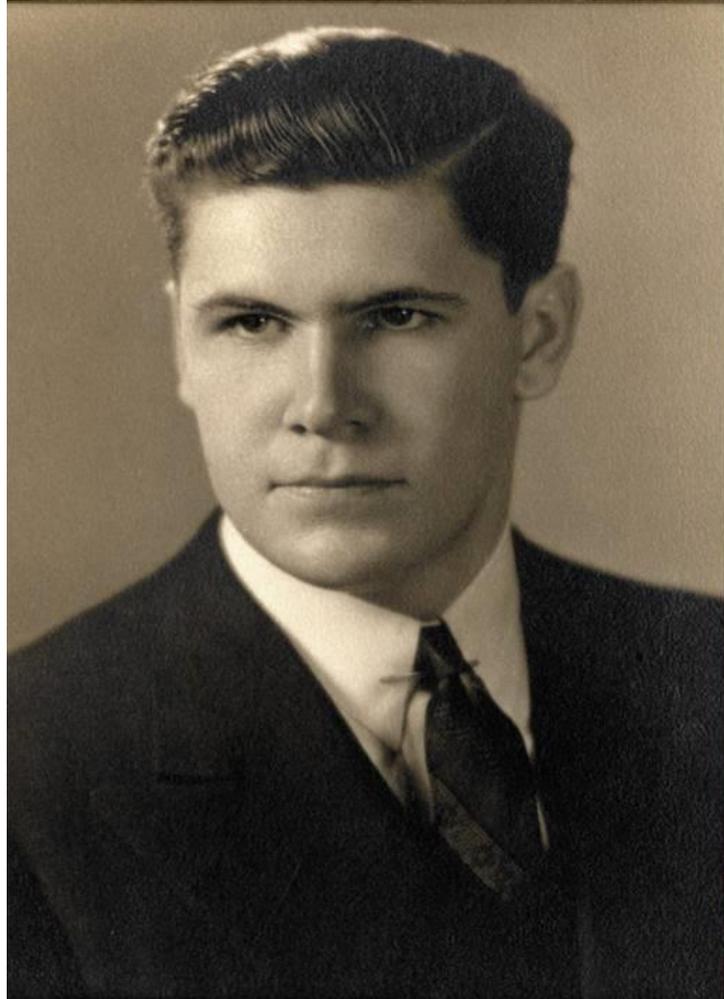
- Calibrated, one-way, spring-loaded valve to exercise the expiratory and submental muscles. The valve blocks the flow of air until enough pressure is produced to open the device
- Isometric training 5 days per week, 5 sets of 5 breaths for a total of 25 breaths per day (power of 5)

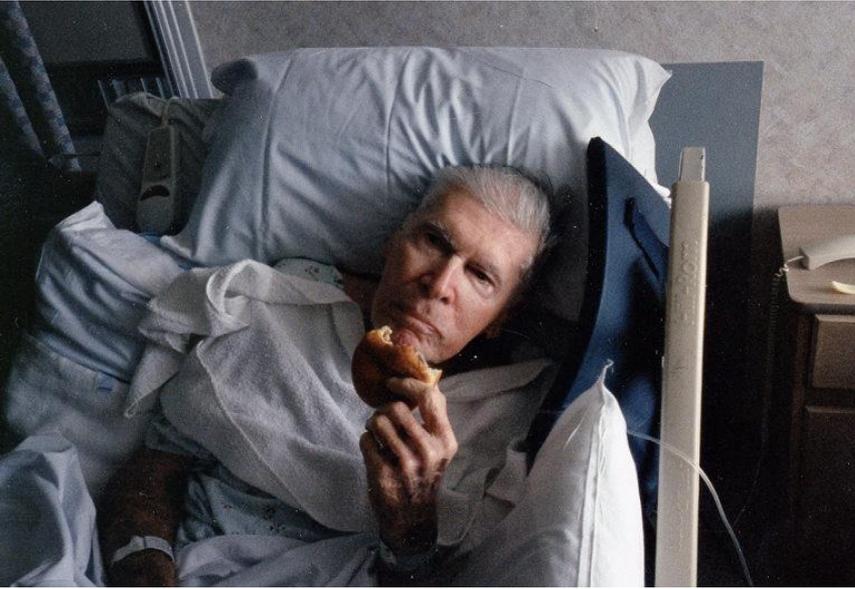


EMST and Aspiration in PWP

(Troche et al., 2010)

- Randomized, blinded, sham-controlled EMST trial
- 60 PwP completed EMST, 4 weeks, 5 days week, for 20 minutes per day, using a calibrated or sham, handheld device
- Measures of swallowing function and safety included PA scale scores, swallow timing, and hyoid movements from VFSS
- No pretreatment group differences existed
- The EMST group demonstrated improved swallow safety as evidenced by improved PA scores
- EMST group demonstrated improvements of hyolaryngeal function during swallowing not evident for sham group
- **Conclusions:** EMST may be a restorative treatment for dysphagia in those with PD.





Conclusions

- Early identification is critical to minimize impact on health status and quality of life
- Targeted evaluation with instrumental assessment is critical to identify and treat deficits
- Initiate intervention early
- Consider principles of exercise and neuroplasticity (intensity, salience, use it or lose it, timing, etc.)
- Minimize cognitive load
- Despite its degenerative nature, early and ongoing intervention is beneficial