EVALUATION AND TREATMENT OF SWALLOWING
The Dilemma

Oropharyngeal Dysphagia In Long-term Care: Misperceptions Of Treatment Efficacy
Campbell-Taylor 2008

“The assessment and management of patients in long term care who have oropharyngeal dysphagia has developed into an apparently complex and distinct field of practice. It is unfortunate that it lacks an evidence base, the efficacy of treatment is not established, and many clinicians are unfamiliar with appropriate and effective interventions because of a lack of training. Some commonly used interventions are not only ineffective but potentially hazardous. Physicians must become more familiar with the assessment process and appropriate management.”

Oropharyngeal Dysphagia In Long-term Care: Misperceptions Of Treatment Efficacy
Campbell-Taylor 2008

“It appears that a set of procedures and expectations has developed in advance of the evidence required to support it.”

Oropharyngeal Dysphagia In Long-term Care: Misperceptions Of Treatment Efficacy
Campbell-Taylor 2008

“The most common misperception about swallowing treatment is that the primary purpose of intervention is to identify aspiration and that aspiration can and must be prevented. The overwhelming emphasis on the supposed negative effects of aspiration seems to have developed from the early literature on swallowing disorders in which it was repeatedly stated that all aspiration was probably lethal. These early publications relied on the seminal work of Bartlett, Cameron, and others who were writing of the hazards of aspiration of stomach contents including vomitus...”

Oropharyngeal Dysphagia In Long-term Care: Misperceptions Of Treatment Efficacy
Campbell-Taylor 2008

“Some of the frequently used test items have no bearing on the ability to swallow. One example is examining tongue movements outside the mouth. These are voluntary movements and as such are cortically controlled and distinct from the brain stem-modulated function involved in swallowing. Tongue movements inside the mouth are important and revealed through speech abnormalities.”
The scope of dysphagia rehabilitation methods has been changing. Research has moved away from the use of behavioral compensations and maneuvers toward a greater emphasis on exercised-based therapy that emphasizes consistent, active muscle movement. Examples include:

- Lingual resistance exercises (IOPI)
- Expiratory Muscle Strength Training (EMST)
- McNell Dysphagia Therapy Program (MDTP)

Data from new therapies suggests a stronger emphasis on exercise yields positive results that are superior to older "management" techniques of compensations and maneuvers. Although there is evidence supporting these active exercise approaches, it is unclear how many practicing SLPs are utilizing these techniques.

Given this recent change in treatment emphasis, it is important to determine if practicing SLPs are incorporating "best practice" into their treatment approaches.

This study used a web-based survey method to target SLPs who treat adults with dysphagia in a variety of clinical settings throughout the US. The ASHA's Special Interest Group 13 was used as the sampling frame because it provided a representative study population of experienced dysphagia clinicians.

254 surveys were analyzed.

Assessment information:
- 55% SLPs reported using either self-developed assessment/outcome measures
- 44% used facility-developed measures
- 37% reported using published peer reviewed tools
- 29% reported that they used only published tools with statistically confirmed validity

Therapy techniques used were derived from:
- 95% postgraduate CEU courses
- 70% learned from colleagues
- 44% self-developed
- 20% from professional journal articles

47 different techniques were recommended.
- 3.9% were based on physiologic abnormality identified from data provided
- 96 different combinations were recommended with no single combination exactly repeated
- 58% did not match the patient's specific dysphagic symptoms
- 13% of interventions were exercise based
What Is “Usual Care” In Dysphagia Rehabilitation: A Survey Of USA Dysphagia Practice Patterns
Carnaby 2013

- 72% of SLPs believed the patient improved more than 50% of the time (improving diet)
- 19% of SLPs reported return to full oral diet without restrictions as a typical outcome of therapy
- Common causes for not regaining pre-injury diet:
  - Progression of premorbid disease
  - Cognition

Subjective Assessment Of Videofluoroscopic Swallow Studies
LEE 2017

- Seventy-six VFSS videos of patients with dysphagia were presented to blinded, experienced speech-language pathologists and laryngologists
- Evaluators rated each video as normal or abnormal for
  - Hyoid elevation
  - Pharyngeal area
  - Pharyngeal area constriction (PCR)
  - Pharyngoesophageal segment opening
- A blinded investigator assessed evaluators’ inter- and intrarater agreement and compared their responses to objectively measured results for these parameters to examine accuracy.

Subjective Assessment Of Videofluoroscopic Swallow Studies
LEE 2017

- Evaluators correctly classified only 61.5% of VFSS videos as “normal” or “abnormal”
- Agreement was highly variable
- Accuracy:
  - PCR at 71.6%
  - Hyo-laryngeal elevation was 61.3%
  - PES opening was 59.2%
  - Pharyngeal area was 45.3%
- Evaluators unanimously agreed on a “correct” interpretation of a VFSS only 28% of the time

Subjective Assessment Of Videofluoroscopic Swallow Studies
LEE 2017

- “Subjective assessment of VFSS parameters is inconsistently accurate when compared with objective measurements, with accuracy ratings ranging from 45.3% to 71.6% for specific parameters”

Interjudge Agreement in Videofluoroscopic Studies of Swallowing
Wilson 2005

- 10 therapists were given 3 recorded studies along with patient history and the results of the clinical swallow evaluation
- Clinicians spent 30 to 60 minutes reviewing the tape
  - More time than usual
  - Typically did not view tapes out of the radiology suite
  - Clinicians reported they typically were only concerned with the presence or absence of aspiration
- Poor agreement across all areas

Elucidating Inconsistencies In Dysphagia Diagnostics: Redefining Normal
Plowman 2018

<table>
<thead>
<tr>
<th>Clip</th>
<th>Rated normal swallow within normal limits</th>
<th>Rated normal swallow as disordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>84.0</td>
<td>8.0</td>
</tr>
<tr>
<td>2</td>
<td>86.0</td>
<td>44.0</td>
</tr>
<tr>
<td>3</td>
<td>69.4</td>
<td>30.6</td>
</tr>
<tr>
<td>4</td>
<td>58.3</td>
<td>41.7</td>
</tr>
<tr>
<td>5</td>
<td>62.2</td>
<td>37.6</td>
</tr>
<tr>
<td>Average</td>
<td>65.0</td>
<td>34.0</td>
</tr>
</tbody>
</table>
Survey Of Clinician Decision Making When Identifying Swallowing And Determining Treatment Vose 2018

- 3 Swallows
  - Easy: swallow delay
  - Moderate: swallow delay, duration of UVC, duration and amount of UES opening
  - Complex: UVC reaction time, duration of UVC, amount and duration of UES opening

“Easy Swallow”

- 88% identified the issue
- 77% identified 5-9 issues
- 27% identified 10+ issues

“Moderate” Swallow

- Identified all four issues
- 59% amount of UES opening
- 49% duration of UES opening
- 46% delayed swallow initiation
- 39% duration of UVC

“Complex” Swallow

- 0% identified all 4 impairments
- 68% amount of UES opening
- 65% UVC reaction time
- 54% duration of UES opening
- 53% duration of UVC

Observer Agreement of Measurements in FEES Pilz 2015

- Two evaluators scored 60 FEES
- Prior to data collection raters completed an "intensive" training program on the rating scales of four visuoperceptual ordinal variables
  - Piecemeal deglutition
  - Post-swallow vallecular pooling
  - Post-swallow peristomal sinus pooling
  - Laryngeal penetration/aspiration

Observers’ Agreement on Measurements in FEES Pilz 2016

- Intra- and inter-rater agreement on FEES measurements ranged from 0.76 to 0.93 (rater 1) and from 0.63 to 0.88 (rater 2)
- Bolus consistency resulted in decreased inter-rater agreement for all measured FEES variables during thin liquid swallows
- When rating on consensus, the raters deviated considerably from the scores they had previously given on the independent rating task
Assessing Hyolaryngeal Excursion: Comparing Quantitative Methods to Palpation at the Bedside and Visualization During Videofluoroscopy

With palpation:
- Peak anterior hyoid position was significantly lower in patients judged to have reduced hyoid elevation.
- There was no significant difference in measures of peak superior or hypotenuse hyoid positions between patients judged to have reduced versus normal hyoid elevation.

With VFFS:
- No significant differences were observed between the normal VFFS and reduced VFFS groups, indicating that clinicians were not able to visually judge differences in any plane of hyolaryngeal movement (anterior, superior, or hypotenuse).

CLINICAL SIGNS ARE A USED TO ASSESS SWALLOWING

If My Patient Coughs While Eating There is a Problem
- Daniels (1997) found cough was associated with aspiration in 61% of 59 subjects.
- 25% or more of chronic cough cases are associated with gastroesophageal reflux (Madanick 2013).
- Ace inhibitors have been reported to cause a cough in up to 35% of users (Dicpinigaitis 2006).

If My Patient Coughs While Eating There is a Problem
- Beta blockers induce bronchoconstriction which can lead patients display a chronic cough, especially in those with underlying respiratory compromise (Tafreshi 1999).
- Cold slows the passage of food through the esophagus and may cause a cough response in those with decreased esophageal emptying (Eley 2013).
If My Patient Coughs While Eating There is a Problem

- Bernard (2009) found 54.5% of patients who aspirated did without coughing
- Leder (1998) found 40% of participants who aspirated on FEES did not respond
- Butler (2018) examined 6404 swallows in 203 healthy individuals across the lifespan. 18% of the participants aspirated and 75% of the time it was “silent”

Miles (2018) With 5 ml volumes, 20 patients coughed when they aspirated thin fluids but silently aspirated thick fluids (35% of the cohort)

Wet Vocal Quality Equals Aspiration

- “Seventy-eight subjects underwent videofluoroscopic swallow study, and simultaneous recording of time-linked videofluoroscopic and acoustic data was conducted during post swallow phonation. Experienced dysphagia clinicians then rated randomized audio samples for presence or absence of wet vocal quality.”
- “Wet vocal quality is not reliably perceived by clinicians when material is present in the larynx in the region of the glottis during phonation, and there is a high degree of interrater variability for perceptual judgments of wetness.”
- Material in the larynx during phonation may result in multiple voice quality percepts. Even experienced clinicians are not adept at identifying the perceptual consequences.

Groves-Wright 2010

Runny Nose Indicates Aspiration

- Allergic rhinitis affects 10 - 30% of the adult population in the US. Many people suffer from seasonal or persistent allergies that result in a runny nose and watery eyes. Interestingly enough, rhinitis is more common in males during adolescence and young adulthood but shifts to being more common in females in the aged population.
- An estimated 19 million people in the US suffer from nonallergic rhinitis. The occurrence increases with age and is more common in females. Greater than 60% of rhinitis patients over the age of 50 suffer from this type.

The increase of nonallergic rhinitis in the aging population is multifactorial.
- Immunosenescence, the change of immune function with age, occurs due to deterioration of the thymus, skewing T-cell production.
- Anatomical and physiological changes occur in the nose. The loss of nose tip support develops because of weakening of fibrous connective tissue. Weakening and fragmentation of the septal cartilage and retraction of the nasal columella causes changes to the nasal cavity. These changes may lead to decreased airflow leading to complaints of nasal obstruction, cough, a loss of smell, and a runny nose.

Geriatric rhinitis is a broad term used to signify rhinitis due to age related changes. These changes lead to persistent mucus, postnasal drip, chronic cough, nasal obstruction and dryness. Patients may also complain of the need to clear the throat frequently.

Many medications commonly prescribed in the geriatric population are known to induce rhinitis. These medications include beta blockers, alpha blockers, antipsychotics, ACE inhibitors, typical antidepressants, gabapentin (Neurontin), clonazepam (Klonopin), and niacin (vitamin B3). This information validates the importance of reviewing medications prior to patient assessment.
What IF The Patient Has ALL Of These Clinical Signs?

CSE Results

- The patient coughed
  - What does it mean?
- There was a wet sound
  - What does it mean?
- There was a delay
  - Where? What were the conditions?
- There was residue
  - What caused residue?
- Prolonged mastication
  - What is the "normal variance?"
- Other findings?

Research that supports the use of CSE as a stand alone tool

Why Do Clinicians Choose The Therapies And Techniques They Do? MCCURTIN 2017

<table>
<thead>
<tr>
<th>Rank/Technique</th>
<th>% always/ freq. use</th>
<th>% never/ rarely use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>texture modifications</td>
<td>82.8</td>
</tr>
<tr>
<td>2</td>
<td>thickening liquid</td>
<td>71.6</td>
</tr>
<tr>
<td>3</td>
<td>positioning changes</td>
<td>73.4</td>
</tr>
<tr>
<td>4</td>
<td>double swallow</td>
<td>56.3</td>
</tr>
<tr>
<td>5</td>
<td>adapted utensils</td>
<td>44.8</td>
</tr>
<tr>
<td>6</td>
<td>volume regulation</td>
<td>43.1</td>
</tr>
<tr>
<td>7</td>
<td>physical support</td>
<td>33.3</td>
</tr>
<tr>
<td>8</td>
<td>effortful swallow</td>
<td>27.4</td>
</tr>
<tr>
<td>10</td>
<td>easier maneuver</td>
<td>90.3</td>
</tr>
</tbody>
</table>

WHY DO CLINICIANS CHOOSE THE THERAPIES AND TECHNIQUES THEY DO? MCCURTIN 2017

<table>
<thead>
<tr>
<th>Reason for using</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>It's available to my clients</td>
<td>12.8</td>
</tr>
<tr>
<td>Based on my clinical experience</td>
<td>28.2</td>
</tr>
<tr>
<td>It's more concrete than abstract</td>
<td>11.0</td>
</tr>
<tr>
<td>It's theoretically sound</td>
<td>2.3</td>
</tr>
<tr>
<td>I wasn't recorded</td>
<td>13.4</td>
</tr>
<tr>
<td>I learned it in school</td>
<td>4.9</td>
</tr>
<tr>
<td>It's suitable for my clients</td>
<td>71.0</td>
</tr>
</tbody>
</table>

What Information Do Clinicians Use In Recommending Oral Verses Nonoral Feeding In Oropharyngeal Dysphagic Patients Logemann 2008

- "There is little evidence regarding types(s) of information clinicians use to make the recommendation for oral or non-oral feeding in patients with oropharyngeal dysphagia."
- Part 1: Several small groups of clinicians were surveyed to obtain the variables used to make oral versus non oral recommendation
- 46 variables were identified
- The list of 46 variables was given to clinicians to rank the top 10 variables that were important
- 13 variables were identified
What Information Do Clinicians Use In Recommending Oral Versus Nonoral Feeding In Oropharyngeal Dysphagic Patients Logemann 2008

- Part 2: 20 MBSS videos were sent to 23 clinicians
- Decisions:
  - Oral
  - Partially oral with nonoral feeding
  - Nonoral
- Include which of the 13 variables influenced their decision

<table>
<thead>
<tr>
<th>Frequency Rank</th>
<th>Criterion</th>
<th>Frequency %</th>
<th>Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amount of aspiration</td>
<td>79.6%</td>
<td>0.008</td>
</tr>
<tr>
<td>2</td>
<td>Frequency of aspiration</td>
<td>70.4%</td>
<td>0.055</td>
</tr>
<tr>
<td>3</td>
<td>Diagnosis</td>
<td>46.6%</td>
<td>0.011</td>
</tr>
<tr>
<td>4</td>
<td>History of pneumonia</td>
<td>40.4%</td>
<td>0.243</td>
</tr>
<tr>
<td>5</td>
<td>Ability to complete postural tasks</td>
<td>35.4%</td>
<td>0.228</td>
</tr>
<tr>
<td>6</td>
<td>Diet ability</td>
<td>38%</td>
<td>0.137</td>
</tr>
<tr>
<td>7</td>
<td>Severity of medical condition</td>
<td>33%</td>
<td>0.250</td>
</tr>
<tr>
<td>8</td>
<td>Recovery prognosis</td>
<td>26.7%</td>
<td>0.054</td>
</tr>
<tr>
<td>9</td>
<td>Respiratory status</td>
<td>22.2%</td>
<td>0.015</td>
</tr>
<tr>
<td>10</td>
<td>Silent aspiration</td>
<td>20.4%</td>
<td>0.229</td>
</tr>
<tr>
<td>11</td>
<td>Patient wishes</td>
<td>21.5%</td>
<td>0.056</td>
</tr>
<tr>
<td>12</td>
<td>Alertness</td>
<td>21.3%</td>
<td>0.038</td>
</tr>
<tr>
<td>13</td>
<td>Secretion management</td>
<td>11.7%</td>
<td>0.084</td>
</tr>
</tbody>
</table>

EBP AND THE DUAL PROCESSING THEORY

What is Evidenced Based Practice?

So What About My Clinical Judgement?

- Recently I was engaged in a conversation related to the ability of a speech pathologist to clinically determine swallowing pathophysiology.
- A therapist responded she had paid a great deal of money for her degree and if she could not rely on her “clinical judgement” to accurately diagnose patients with dysphagia she had wasted her money.

So, What About My Clinical Judgement?

“The perspective through which we look at something determines what we see. What we see, determines what we think. What we think, determines how we act.

In this way, perspective is powerful.

Therefore, it’s important to evaluate the perspective through which we see the world around us. When our perspective is narrowed, our ability to see the whole picture is limited. This can skew the way we think about what we see and ultimately affect the way we act.”

Ernst 2018
So What About My Clinical Judgement?

- When a child is referred for articulation disorders we administer the Goldman-Fristoe, Khan-Lewis, or some other such assessment to quantify the impairment even though the deficits are quite clear from simply listening to the child speak?
- When a child is referred for intellectual disabilities do we simply spend a bit of time with the child and try to quantify the level of disability or is an IQ test is required?

Dual Processing Theory

- A widely accepted explanation of cognitive processes that characterizes human decision-making.
- This theory postulates that reasoning and decision-making can be described as a function of both an intuitive, experiential, affective system (System I) and/or an analytical, deliberative System II processing system (Stanovich 2011, Croskerry 2009, Evans 2007, Stanovich 2000).

- If a child has been identified with a hearing loss we do just give a label and move on? No, a referral is made for audiological testing.
- The same holds true for childhood language disorders, aphasia, cognition, fluency, etc.
- Why is this concept lost lost when it comes to dysphagia.

- When providing a diagnosis using System I processing alone, medical professionals are influenced by factors that may be irrelevant such as gender (Borkhoff 2008), race (Green 2007), obesity (Heit 2001), history of psychiatric illness (Daumit 2006), and age (Podplsky 1993).
- Typically when making clinical decisions no account is taken of ambient conditions, such as other cases being managed concurrently, team dynamics, fatigue, sleep deprivation, location, and other variables critical to performance (Croskerry 2009).

- System II processing is a robust decision making paradigm that is more analytical than intuitive. It is a systematic approach that leads to making effective decisions. It is typically analytical, slow and resource intensive. However, it is more likely to end with a correct diagnosis/decision (Croskerry 2009).

- Imagine, for instance, a clinician taking a break in the middle of a work day to have lunch with a friend. During the course of lunch the friend takes a drink and begins to cough. Both people laugh and make a joke about aspiration, and the meal continues without concern. Upon returning to work, a nurse comes to the clinician reporting that patient X coughed during lunch. An order is requested for a speech evaluation, and in the interim, for safety, the patient is placed on nectar thick liquids.
Why were two situations handled differently?

There are many possible answers

Much of it has to do with biases of location, prescribed roles, etc.

Vose (2018) provided SLPs with video clips of one swallow. Clinicians were asked to identify the swallow impairments. In one clip the obvious abnormal physiology was a delay in the pharyngeal trigger (27 seconds). Although the swallow delay was quite compelling, 33% of the respondents did not identify the delay as the primary impairment. 67% of therapists identified the delay as the primary issue, but only 58% said this would be the focus of treatment. In addition, 77% of respondents indicated there were 5-9 impairments and 27% indicated there were 10 or more issues.

In this case the use of System I processing would have caused the patient to be both misdiagnosed and given inappropriate treatment. If a System II approach had been used, the clinician would use quantifiable measures to analyze the videos, employing a systematic approach such as measuring the delay using a frame by frame analysis. Once the pathophysiology was determined, the clinician would reference literature (or rely on having referenced literature previously) to determine possible treatments.

When performing a swallow study, the clinician observes the patient has laryngeal penetration at a PAS of 2 and 3. When documenting the events the therapist transcribes, “The patient displayed silent penetration.”

The term “silent penetration” would suggest that not responding to laryngeal penetration is pathological. In fact a review of the afferent innervation of the airway teaches that the hypopharynx is innervated by the internal branch of the superior laryngeal nerve. When stimulated the nerve facilitates a swallow, not a cough (Mazzone 2016). This causes the material to be ejected from the laryngeal vestibule disallowing aspiration. In a System I approach the patient might be placed on altered liquids due to the concern of aspiration “risk” even though their body acted in a healthy manner. Investigation of the literature concerning basic neuroanatomy would yield a different result (System II approach).

When Plowman (2018) provided clinicians with five swallows that had been recorded on videofluoroscopy, clinicians were asked to determine if the swallow was “normal” or “abnormal.” As an average, 34% of clinicians labeled each of the 5 swallows as “impaired” (range 54% to 6%). In fact, all of the swallows were performed by healthy graduate students.
Dual Processing Theory

- In a System I approach the clinicians most likely hypothesized that some of the swallows were impaired and randomly assigned impairments.
- This is the same rationale the SLP may employ when a patient is referred for a swallow study.
- Instead of simply reviewing anatomy and physiology, the therapist is looking for something wrong.
- A critical analysis of a swallow requires employing quantifiable measures of both temporal and kinematic events and recognizing the internal bias to "find" issues that do not actually exist. This approach would lead to a more reliable diagnosis.

Dual Processing Theory

- One of the most compelling concerns related to reliance on System I processing comes from Croskerry 2009:
  - “Autopsy findings have consistently shown a 20% to 40% discrepancy with the antemortem diagnosis, and a third of these autopsies would not have taken place if the true diagnosis had been known. Despite improved technology and an improved evidence base in medicine, the misdiagnosis rate detected through autopsy studies has not changed significantly during the last century”

Dual Processing Theory

- Possible reasons why we rely more heavily on System One Processing (Plowman 2018):
- Education has a focus on the disordered system leaving clinicians with a poor understanding of a “normal” swallow.
- Clinicians are trying to conserve cognitive energy (System I processing is easier and faster).

Dual Processing Theory

- Swallowing is complex and the consequences of swallowing impairment are more complicated than we understand.
- The inability to visualize the swallowing processes, clinically and the limited exposure to “normal” when performing imaging.
- Productivity requirements

Plowman 2018

So What Do We Do Now?

?