Dysphagia Treatments: Current Controversies, Evidence & Hype

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• Goal: the long-term outcome that the treatment should produce
  – It is a health outcome
• Objectives: increments toward the Goal
  – They are the stepping stones

Dysphagia Treatment

• What is our Goal?
  – Eliminate aspiration?
  – Cause patient to swallow “better”?
  – Least restrictive diet without aspiration?
  – Improve biomechanics?
  – Reduce premature mortality?
Sometimes the goal is not easy to see.

\[ \text{Dysphagia} \rightarrow ? \rightarrow \text{Pneumonia} \]

**Selecting goals/objectives**

- Treatment decisions require accurate diagnosis
  - The observation always has a cause
  - ...and if we miss it, we treat a symptom and not its cause
Sometimes the wrong objective is chosen

- Airway closure timing
- Airway closure completeness
- Hypopharyngeal “Pooling”

Stroke → Aspiration

Pharyngeal residue

Re-opens before bolus clears

Bolus tail separation

Sub-cause 1

Observation

Cause 1

Sometimes the wrong objective is chosen

- Poor intrabolus pressure
  - Generation? [Tongue]
  - Maintenance? [Vllum]

Bolus tail separation

Short duration

HLE

UES noncompliance

Inhibition? [vagal]

Structural? [osteophyte, bar, web]

Sub-cause A: Gives us one treatment objective

Sub-cause B: gives us a different objective

Dysphagia

- Misdirection of swallowed material
  - Airway
  - Can’t direct it to digestive system

- Inability to get enough
  - Nutrition, hydration, etc.
Consequences of Dysphagia

- Aspiration
- Bolus mismanagement
- Pneumonia
- Malnutrition
- Premature mortality

Objectives

Goals

Evidence based decision making

Patient Values and Expectations

Best Clinical Evidence

Best Clinical Judgment

Dysphagia Interventions

- What do we know about them?
Terms we use

- Efficacy
  - The treatment works under controlled conditions

- Effectiveness
  - The treatment works in every day conditions

- Treatment: efficacy → effectiveness

Proof that treatment works

- Treatment produces objectively, measurably, improved function.
- Outcome can be reproduced
- Withholding treatment will NOT result in improved function

Proof that treatment works

- Is there justification in the literature?
- Have we controlled for judgment errors?
- Do we have defensible impressions?
  - strength in numbers
  - valid and reliable
  - groups of similar patients
Proof that treatment works

- Long-term goals
  - Are there fewer hospital readmissions?
  - Has the patient stopped losing weight?
  - Has the patient gained weight?
  - Are there fewer respiratory tract infections?
  - Is patient using progressively less enteral formula?

Proof that treatment works

- Short-term objectives
  - performs without cue
  - initiates use of method
  - monitors own performance
  - modifies plan appropriately
Justifying Treatment

• Target level of function:
  – current and prior patient function
  – behavioral function (clinical)
  – physiologic function (instrumental)
• Medical history
  – dysphagia related illness in history?
    • Nutritional, pulmonary, other

Justifying Treatment

• Is there a reason to believe that:
  – Dysphagia will cause/has caused health problems?
  – Current function is worse than prior function?
  – Selected intervention will likely improve health/function?
    • Can you show from literature or your own data?

Justifying Treatment

• Objective measure of change(+) or (-)?
  – Incremental reassessment
  – data collection
• Termination criteria?
• Would you pay for this out of pocket?
• Is patient a good candidate for selected behavioral interventions?
Dysphagia Treatment Targets

- **Strategy**
  - The plan that produces the overall outcome
    - Healthier patient with lower risk of premature mortality
- **Tactics**
  - The parts of the plan that produce the strategy
    - Specific treatments, their intensity, schedule, etc.

Strategies & Tactics

- **Tactics**: the actual procedures
  - These can be implemented similarly between cases
- **Strategies**: stringing tactics together
  - How tactics are combined into a strategy varies from patient to patient

Strategies & Tactics

1. Eliminate aspiration
2. Train airway protection
3. Increase compliance
4. Speed recovery
5. Retest, modify independence
Tactics: what will fix the problem?

- Compensatory
  - Change how patient swallows to compensate
  - Does not restore function
  - Often needed only until restoration occurs
- Restorative/Rehabilitative
  - Improve the physiologic function of impaired structures
  - Often replaces effects of compensation

Tactics: implementation

- Behavioral
- Passive, active
- Facilitative
- Environmental
- Medical
- Surgical, prosthetic
- Combinations of interventions

- Behavioral – patient does something
  - Restorative/Rehabilitative: exercises, etc.
  - Compensatory: swallow maneuvers, etc.
  - Changes own textures
  - Brushes teeth more often
  - Etc.
Tactics: implementation

- Passive – the patient is acted upon
  - Caregiver positions pt. for maneuver
  - Caregiver increases pt’s oral hygiene
  - Caregiver manipulates dietary textures
  - Etc.

Tactics: implementation

- Facilitative – something is done while pt. acts
  - Something is done to the patient while he is doing something else
    - Electrical, sensory stimulation
    - Etc.

Tactics: implementation

- Environmental – the environment is modified
  - Texture modification
  - Positioning devices
  - Elimination of distractions
  - Etc.
Tactics: implementation

- Medical
  - A medical procedure, medication, etc. is performed to alter swallow physiology
  - An appliance is fabricated to artificially alter the shape of the aerodigestive tract

- Surgical
  - Anatomic disruption of structures to facilitate improved physiology
  - Combinations of the above
    - The most common of all (hopefully!)

Behavioral Treatment-Compensatory

- Effects
  - Some of them were designed for one thing...but were later found to do other things...
    - ...we learn more as we go...
Behavioral Treatment - Compensatory

1. Head rotation posture* - divert bolus
   - Contralateral pharyngeal flow diversion - increased bolus flow through opposite pyriform sinus
   - BUT IT ALSO:
     - Increases UESO diameter (rotation to either side in normals)
     - Reduces UES pressure (either side, normals)
     - Increased intrabolus pressure
     - Unilateral pharyngeal paresis, poor UES opening


Compensatory

2. Chin-down posture* - reduce aspiration
   - Patients with aspiration due to "pharyngeal delay"
     - 50% did not aspirate with CDP (OR = 0.5)
     - Continued aspirators: pyriform sinus residue aspirated
       - Valleculae widened
     - Anterior bolus position (phar. delay, oral containment)
     - BUT IT ALSO:
       - Reduces intrabolus hypopharyngeal pressure**
     - Contraindicated in patient with weak constrictors


Oral containment vs. delay?

- Pharyngeal delay
  - Abnormally long pause between volitional oral transit of an organized bolus and onset of hyolaryngeal excursion

- Oral containment impairment
  - Loss of posterior bolus containment (tongue & soft palate); unorganized material enters pharynx before hyolaryngeal excursion
Impaired oral containment  Pharyngeal Delay

Compensatory

3. Head/neck lateral flexion posture
   - oral flow diversion toward side of flexion
   - unilateral lingual, oral/facial motor, sensory deficits

Compensatory

4. Increase duration of UES opening*
   - Mendelsohn Maneuver
     - maintains prolonged HLE
   - BUT IT ALSO:
     - Is difficult to teach, difficult to perform
   - SEMG biofeedback training improves treatment effect* **

*Logemann et al (1990); ** Coyle (2008)
Compensatory

• 5. Self-protection of airway
  – Supraglottic swallow (SGS)
    • Closes airway before swallow
  – "super SGS"
    • "effortful" vocal fold closure + tilts arytenoids
  – Earlier/longer UES relaxation and HLE* **

*Bulow et al (2002); **Ohmae et al., 1996;

Compensatory-SGS/SSGS

BUT IT ALSO:

• HLE reduced due to preparatory position*
• Increased intrabolus pressure*
• Increase DUESO and laryngeal closure*
• Reduced oral residue*
• Danger!!
  – Produces arrhythmia in certain patients**

*Bulow et al (2002); **Chaudhuri et al. (2001)
Swallow respiratory coordination

- Healthy swallows followed by exhalation
- Disordered swallows followed by inhalation
- Training patients to coordinate breathing and swallowing?

Gross et al., 2009; Leslie et al., 2002a,b; Leslie et al., 2003

Compensatory

- 6. Tongue holding (Masako maneuver)
  - Bulge in PPW during swallow
  - Inhibits tongue motion
  - Increases oral residue in normals
- BUT IT ALSO:
  - Is Not Intended For Use By Patients When Swallowing!

Fujii and Logemann (1996)

Compensatory

- Bolus modification
  - Larger bolus
    - Earlier HLE, tongue movement, UES opening*
  - Taste, temperature, consistency
    - Earlier activation in some patients**

*Cook et al., 1989; Dantas et al., 1990; **Ding et al., 2003
• These maneuvers can be combined

**Restorative Methods**

- Improves the function of the damaged structures
  - 1. Exercise
  - 2. Electrical Stimulation
  - 3. Sensory Facilitation

**Restorative methods**

- Exercise
- Emerging efficacy in the literature
- Exercise-Preventive, Restorative, beyond?
  - physiologic logic, predicted baseline, target
  - muscle strengthening requires repetition to modify contractile properties (hundreds, thousands...)
  - Do range of motion exercises do anything?
**Reference List**

Lingual Strengthening Exercise


**Significant Differences**

Lingual Strengthening Exercise

- Reduced oropharyngeal residue
  - Pharyngeal (p = .03), overall (p = .01 - .02)

- Improved PA scores (3mL, 10mL liquid)
  - 4 weeks: p = .02; 8 weeks: p = .005

- Increased isometric pressure
  - Anterior 4-8 wk: (p = .001); posterior (p = .01, .001)

- Increased swallowing pressure
  - All consistencies/volumes at 4, 8 weeks.
Restorative Methods

- Exercise
  - Resistive expiratory exercise
    - Increase force of expiratory effort

Sapienza et al.

Restorative methods

- “Shaker” exercise*
  - Head-Neck flexion while supine
  - Increase AP dimension of UES during swallow
  - “Eliminated tube feeding in stroke patients”**

*Shaker et al (1997), **Shaker et al (2002);

Sham (7) vs Real (11)
- No significant difference in any biomechanical measures
- 11 real exercise pts. Pre- Post Real Exercise
  - AP UESO, anterior laryngeal excursion (ALE), all significantly increased from own baseline
Facilitative Methods

- Electrical stimulation
- Many studies, mostly poor design

Facilitative Methods

- Thermal Tactile Stimulation
  - Thought to stimulate afferent pathways *
  - No evidence supports sustained effects
    - High dosage over long term produced momentarily quicker onset of HLE (reduced DST)**
- Taste-sour bolus (50% lemon juice/barium)
  - Reduced aspiration in neuro patients***
  - Reduced DST in stroke patients***


Environmental Management

- Who is the target of the intervention?
  - Patient dependence upon caregiver
  - Compensatory, rehabilitative
- Expectations-what is realistic?
  - Clinician directs treatment
    - rehabilitation does not occur in a weekly office visit
  - Printed, objective guidelines
Medical Treatment

- Medications
  - enhance salivary flow
  - improve motility
    - reduce esophageal stasis/pooling, reflux
    - “tighten/loosen (botox) up” sphincters
  - Nifedipine sped transit times*
  - Method: 2 weeks post stroke
  - Timing of medication in PD**

*Perez et al (1998); Bushmann et al., 1989

Medical Treatment

- Endoscopic dilatation
  - Increase UES compliance (scar tissue)
- Short-term enteral tube (nasogastric)

Medical Treatment

- Diet Modification
  - Texture alterations
    - indications for...?
  - order of presentation
  - Caregiver training
Diet modification

- Should be the last compensatory evaluated in testing
- Issues:
  - What does texture modification do for patient?
  - Is patient amenable to modification?
    - Is patient will not eat the prescribed diet
      - Malnutrition, dehydration

Diet modification

- Assuming that behavioral/compensation fails
- Increasing friction and reducing flow rate (thick)
  - When pharyngeal stage is delayed and dangerous
  - Oral containment cannot be otherwise managed
  - Some times when laryngeal closure is incomplete
- Decreasing friction and increasing flow rate (thin)
  - Inability to propel bolus
  - UES does not distend adequately
  - Need good airway protection

Thick liquids

- Thin liquids aspirated most frequently
  - Compared to other viscosities
- Spawned experimentation with thick liquids
- Theory for dysphagia use:
  - Slowing the flow
    - Compensates for mistimed airway closure
Water

- Intake of water: \(~2300\) mL per day
  - \(2100\) mL through intake
  - \(200\) mL synthesized by body (CHO metabolism)

- Variations in water intake
  - Climate, habits, physical activity

Thickened liquids

- Reduces aspiration of thin liquids
  - Kuhlemeier et al., 2001; Logemann et al., 2008

- Swallow apnea later/longer with thick liquids
  - Hiss et al., 2004; Butler et al., 2004

- More effort needed to clear thick
  - Nicosia et al., 2001

Thickened liquids

- Patients do not like thick liquids
  - Garcia, 2005: prepackaged vs. mixed
    - Prepackaged better: Whelan, 2001

- Great variability in thick liquids
  - Prepackaged & mixed: UW/VA Swallowing Research Lab, 1999
  - Prepackaged: Garcia, et al., 2005; Steele, 2005

BUT IT ALSO:
Thickened liquids

- Hydration and thick liquids
  - Sharpe et al., 2007
    - >95% water absorbed from thick mixtures
    - No difference between water, thick water
  - Hydration and thick liquids
    - Reduced fluid intake when thick prescribed
    - Whelan, 2001: 24 stroke patients
      - Mean fluid intake = 455 mL/day


Thick liquids

- Protocol 201 (Logemann et al., 2007; Robbins et al., 2008)
- Problem: Thin liquid aspiration
- Chin Down Posture vs. Thick liquids
  - Nectar, honey
- Parkinson’s disease, dementia, both

Thick liquids

- Do thick liquids reduce aspiration?
- Do thick liquids reduce pneumonia risk?
Thick liquids

- Results – Protocol 201 Part 2
  - 52/515 patients developed pneumonia (11%)
    - Half of expected
Results

Aspirate on NO interventions  Aspirate on ALL interventions

Randomization 515 patients 3 months

Thin/ Chin Nectar Honey

166 not aspirating 42 345 still aspirating

PART 2 Pneumonia prevention

166 not aspirating

Pneumonia (32)

Phase I: Preventing aspiration

Aspirate on NO interventions  Aspirate on ALL interventions

515 patients 3 months

Thin/ Chin Nectar Honey

166 not aspirating 42 345 still aspirating

Phase II: Pneumonia prevention

Pneumonia

<table>
<thead>
<tr>
<th>Pneumonia</th>
<th>Chin-thin</th>
<th>All thick liquid</th>
<th>Nectar</th>
<th>Honey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>24 (10%)</td>
<td>28 (11%)</td>
<td>10 (8%)</td>
<td>18 (15%)</td>
</tr>
<tr>
<td>Aspiration eliminated Part 1 (10)</td>
<td>6 (7%)</td>
<td>4 (5%)</td>
<td>0 (0%)</td>
<td>4 (10%)</td>
</tr>
<tr>
<td>Aspirated all in Part 1 (42)</td>
<td>18 (9.8%)</td>
<td>24 (14%)</td>
<td>10 (11.5%)</td>
<td>14 (19%)</td>
</tr>
</tbody>
</table>

Overall, patients randomized to thin or thick liquids had similar pneumonia incidence.
- People who aspirated thick liquid on the VFS, had higher pneumonia incidence in the 3-month follow-up.
- Chronic aspirators randomized to honey thick liquids had twice as many pneumonias as those continuing to aspirate thin liquids.

Thick liquids

- Other results
  - Dehydration: Thin: 2%, Thick: 6%
  - UTI: Thin: 3%, Thick: 6%
- Median hospital stay with pneumonia
  - Honey (18 d.), nectar (4 d.), CDP (6 d.)
Thick liquids

- Do thick liquids reduce aspiration?  
  – Yes

- Do thick liquids reduce pneumonia risk?  
  – No

- Are aspirators more likely to get pneumonia?  
  – Yes

So, what are we doing when we prescribe thick liquids???

- We think we are reducing risk...

- Are we just shifting risk to a different place?  
  – Hydration? QOL?

Evidence Summary for using Free Water Protocols

“FREE WATER” PROTOCOLS
• Frazier Rehab Institute Water Protocol
• "... Concern over patient and family non-compliance with thin liquid restrictions both within the facility and after discharge led us to alter our protocol in 1984. ...oral intake of water became a major feature in both treatment and day to day hydration. Features of Frazier’s program ..."

Retrieved 01/20/09 from http://www.speech-languagepathologist.org/archives/chat/03LP/03LP110300a3BM

“Free Water” Protocol Principles

• Developers discuss
  – Safety of Water
  – Hydration
  – Compliance

How do the lungs respond to aspiration?
Lung response to aspiration: water

- Inside alveolus
- Capillary membrane
- Alveolar membrane
- Respiratory Membrane
- H2O
- RBC's
- WBC's
- Toward (L) heart
- From (R) heart

Effros, et al., 2000

Lung response to aspiration: pathogens and particulate matter

- Inside alveolus
- Alveolar membrane
- Capillary membrane
- Respiratory Membrane
- H2O
- WBC's
- Toward (L) heart
- From (R) heart
- Plasma containing water inside capillary
- Chemical pneumonitis

Free Water Protocols Evidence

- Bronchoalveolar lavage
- Whelan et al. (2001) reduced fluid intake in patients prescribed thick liquids
- Numerous citations on dehydration in dysphagia
- Animal studies of water aspiration
Free Water Protocols Evidence

- Garon et al., 1997
  - 20 aspiration-documented CVA patients
    - Aspirated liquid only on VFSS
    - Randomized to free water or no free water
  - Duration: treatment + 30 day follow up
- Small and underpowered study
  - Yet the main evidence for protocol

Results

- No patient in either group developed pneumonia
- No dehydration, complications
- Intake of fluids comparable between groups
  - 1210 mL (C) - all thick
  - 1318 mL (E): 855mL thick, 463mL thin
- "Much less water than expected" by investigators ("we were surprised...")

Free Water Protocols

- A recent study
  - Presented at ASHA 2008
    - Becker et al., 2008. An oral water protocol in rehabilitation patients with dysphagia for liquids.
Free Water Protocols

- Randomization to water protocol or prescribed dietary fluid (26 patients)
- 17 patients requiring feeding assistance
  - 8 assigned to control, 9 to treatment
- 9 independent feeding patients
  - 3 assigned to control, 6 to treatment
- All received oral care four times per day

Becker, et al., 2008

Free Water Protocols

- Results
  - Pneumonia: 1 patient in each group
  - UTI: 2 patients in each group
  - Death: 2 treatment deaths, no control deaths
  - FIM: no significant difference
  - FCM: no significant difference
  - Length of stay: 29.1 days (control) vs. 15.8 (tx)
    - Diet influence length of stay?

Becker, et al., 2008

Other findings:

- Independent patients consumed significantly less fluid than dependent patients (p<.01), regardless of group
- The presence of two deaths in the treatment group cannot be ignored
  - Both patients that died had chronic pulmonary conditions
• Karagiannis et al. (2011)
  – Significant increase in lung complications (6/42) vs. controls (0/34)
• Carlaw et al. (2011)
  – No complications in either group
  – More fluid intake in “protocol” patients

“Free water protocols”

  In the time since the implementation, we have seen a very low incidence of aspiration pneumonia at Frazier. In the early 1990s, over an 18-month period, we conducted a retrospective chart review of 234 inpatients with dysphagia who received thickened liquids during their admissions. Two of the 234 patients developed aspiration pneumonia, and both of these individuals were suspected of aspirating solid foods.

Panther, 2005

Incidence of HCAP in elderly = 6%-52% (Marston et al., 1997)

“Free water protocols”

• Summary
  – Physiologic justification exists
  • But not for all patients
    – Severe pulmonary disease
    – One size does not fit all
  – Developers obligation to publish data
**Surgical Management**

- Not typically a first resort
- Improve airway protection
- Enhance bolus flow
  - oral
  - pharyngeal
  - esophageal

**Surgical-airway protection**

- Tracheostomy
  - Airway obstruction, long term, permanent
  - chronic aspiration
  - assist respiratory demands

- Reduced glottic closure
  - Vocal Fold Augmentation/Injection
  - Thyroplasty, medialization
  - Arytenoid adduction
  - Airway separation
Cricopharyngeal Myotomy

- Reduced UES compliance
- Low GE reflux risk
- BUT IT ALSO:
  - Preoperative manometric confirmation

Non-Oral Nutrition

- Enteral nutrition
  - Delivered to the gut
  - Utilizes digestive system
- Parenteral \(\rightarrow\) blood
- Tube name \(\rightarrow\) entry, delivery
  - Naso-gastric (NG); gastrojejunostomy (GJ)
- Depth: sphincters, absorption

Gastrostomy
Enteral Tube Indications

- Intractable aspiration
- Failed interventions
- Recurrent illness attributed to prandial aspiration
- Permanent → temporary
- Replacement/substitute for oral intake
- Supplement to oral intake
- Replacement for types of materials aspirated

Contraindications

- Ileus/Gastroparesis, SBO
  - Paralysis, obstruction
- Absorption Deficits
  - Default to parenteral nutrition
- Prior abdominal resections/anatomy diff.
  - Surgically inserted abdominal enteral tubes
- GER, severe.

Feeding Tubes

- Aspiration
  - Is not mitigated (25-40% in PEG)
    • Saliva production
  - may increase → new site (Metheny et al., 2006)
Enteral Tube Feeding

- Mortality in tube fed patients is high
  - Because they have multiple conditions
    - Dementia: 25-50% mortality
    - ¼ dementia patients die in hospital following PEG placement (McClave & Chang, 2003)
  - Callahan et al., 2000 (150 PEG cases)
    - 7-14 days 16%
    - 30 day 22%, 1 year 50%

Complications

The SLP and the Feeding Tube

- 1. Patient education most important
  - Empower patient to ask questions
  - Neutral pro's and con's
- 2. Clinician personal opinion irrelevant
- 3. Clinician understanding of all the “ins and outs”
  - Our patients are sick
  - Balance of risks = medical care
Prosthetic Intervention—
examples
• Etiologically guided
• Palatal lift, obturator
• Maxillary denture “build-down”

Combined Treatment
• Methods from more than one
  category
• Often (if not usually) indicated at
  some point

Patient Compliance

<table>
<thead>
<tr>
<th></th>
<th>Always complied</th>
<th>Never complied</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>68 (79%)</td>
<td>18 (21%)</td>
<td>na</td>
</tr>
<tr>
<td>Live at home &gt; Institution &gt;</td>
<td>28</td>
<td>12</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Hospitalizations for chest infection, “AP”</td>
<td>1</td>
<td>4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Chest infections per patient</td>
<td>1.13</td>
<td>0.94</td>
<td>NS</td>
</tr>
</tbody>
</table>

Low et al. (2001)
Patient Compliance and Outcomes

- 21% noncompliance
  - Younger, living at home (p<0.05)
  - More hospitalizations for chest infections: 22% vs. 1.5% (p<0.001)
  - 6/7 deliberate “noncompliance” died of AP

Low et al. (2001)

We agree that:

- Aspiration is the most clinically significant short-term result of dysphagia
- Aspiration can cause bad outcomes
- Sometimes it cannot be mitigated (?)
- Sometimes its management is impossible

Nosocomial Pneumonia

CDC MMWR (1997) Vol. 46, RR-4
Who is at risk for DAP?

- Neurogenic – most prevalent
  - Stroke
  - Neurodegenerative
  - Skull base
- Head/Neck – relatively self-evident
- Iatrogenic
  - Medication, surgical interventions

DAP Risk Factors

- Iatrogenic – surgical
  - Predispose to dysphagia
    - Anterior cervical fusion*
    - Thyroidectomy, carotid endarterectomy
    - Aortic repairs
    - Chest wall (transplant)**
    - Phrenic, vagus n.
    - CABG?

(*Kriskovich, et al., 2000; **Atkins, et al., 2007b)
Issues/Risk Factors

• Pulmonary disease and dysphagia
  – rate exceeding 30/min**
  – Reduced airway pressure at swallow onset
    • Open tracheostomy
    – Interrupted swallow-respiratory coordination →
      • Also seen in stroke*
    – Impaired pulmonary clearance

*Leslie et al., 2002; **AHRQ: Pneumonia severity index

Other pneumonia risk factors

• PPI usage
  – Up to 3 fold increase in pneumonia risk*
  – Higher in new recipients & early in usage
      – 2-6 fold increase in pneumonia risk
      – Ambulatory community dwellers → inpatients

*Sarkar et al., 2008

GOSP

• Geriatric Oral Science Project
**Significant predictors**

<table>
<thead>
<tr>
<th></th>
<th>Pneumonia</th>
<th>No pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysphagia</td>
<td>81%</td>
<td>47%</td>
</tr>
<tr>
<td>Tube feeding at</td>
<td>27%</td>
<td>9%</td>
</tr>
<tr>
<td>pneumonia dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low or no activity</td>
<td>59%</td>
<td>28%</td>
</tr>
<tr>
<td>Dependent oral care</td>
<td>34%</td>
<td>10%</td>
</tr>
<tr>
<td>Dependent feeding</td>
<td>41%</td>
<td>6%</td>
</tr>
<tr>
<td>Brush teeth</td>
<td>40%</td>
<td>12%</td>
</tr>
<tr>
<td>occasionally or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>never</td>
<td></td>
<td></td>
</tr>
<tr>
<td># decayed teeth</td>
<td>5.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Dry or excess oral</td>
<td>38%</td>
<td>17%</td>
</tr>
<tr>
<td>secretions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

But, EACH WAS SIGNIFICANT IN PRESENCE OF OTHER RISK FACTORS

**Independent predictors (OR)**

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
<th>Patients eating orally</th>
<th>Dentate patients</th>
<th>Dentate patients eating orally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent for feeding</td>
<td>ns</td>
<td>ns</td>
<td>-</td>
<td>11.8</td>
</tr>
<tr>
<td>Multiple Diagnoses</td>
<td>ns</td>
<td>ns</td>
<td>4.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Now smoking</td>
<td>ns</td>
<td>ns</td>
<td>4.1</td>
<td>ns</td>
</tr>
<tr>
<td>Tube fed before</td>
<td>ns</td>
<td>ns</td>
<td>3.0</td>
<td>ns</td>
</tr>
<tr>
<td>pneumonia</td>
<td></td>
<td>-</td>
<td>ns</td>
<td>-</td>
</tr>
<tr>
<td>Dependent for oral</td>
<td>ns</td>
<td>ns</td>
<td>2.8</td>
<td>ns</td>
</tr>
<tr>
<td>care</td>
<td></td>
<td>-</td>
<td>ns</td>
<td>ns</td>
</tr>
<tr>
<td># decayed teeth</td>
<td>ns</td>
<td>ns</td>
<td>1.2</td>
<td>ns</td>
</tr>
<tr>
<td>Number of meds</td>
<td>ns</td>
<td>ns</td>
<td>1.16</td>
<td>ns</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

Increase in likelihood of pneumonia, when patient has the single risk factor

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80% pneumonia patients had dysphagia 32% dysphagia patients had pneumonia
Hype & enthusiasm

Evidence. What is Evidence?

"... significant inverse relationship between pirates and global temperature."
• Buy It! It is Good!

  - Meta-analysis – the highest level of evidence
    - If it is a good meta-analysis
“This preliminary meta-analysis revealed a small but significant summary effect size for transcutaneous NMES for swallowing. Because of the small number of studies and low methodological grading for these studies, caution should be taken in interpreting this finding. These results support the need for more rigorous research in this area.”

- Small = clinically insignificant
- Low grading = invalid results

Carnaby-Mann & Crary, 2007

Hype & Myths

- Enthusiasm is not a good motivator
  - Evidence is a good motivator
- Reading the research as a consumer
- Collecting objective data in treatment

Using the /k/ phoneme

Subjects were instructed to perform the following tasks:

1. relax until a baseline EMG signal could be determined,
2. suck water through a straw and then swallow,
3. suck through a polyethylene tube (PE-200), connected to a pressure transducer,
4. perform a traditional Valsalva maneuver,
5. perform a "modified Valsalva."
6. say the word Nik
7. say the word Hawk
8. "snick" on their index finger
9. produce /k/ at a comfortable pitch and intensity
10. produce /k/ using a falsetto voice
11. produce /k/ using vocal fry
12. laugh
13. gug

Modified Valsalva:
"make a /k/ as hard as you can and hold it for as long as you can, don’t let any air escape."

Hawk:
"say the word 'hawk', make the /k/ as hard as you can."

Perlman et al, 1989
**Carbonated thin liquid**

Study. They were asked whether they would like to try to swallow carbonated thin liquid. The liquid was administered in the same way as the other liquids. However, the patients were told to swallow immediately so that the gas should not disappear.*

- Order effects**?
- Command swallow effects***?
  - Cued swallows significantly shorter duration

*Bulow et al., 2003; ** Robbins et al, 1999; *** Daniels et al., 2007

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**TCMS**

- Much investigation
- Stimulating cortex → swallow activity
- What else is happening in the black box?
  - Insufficient understanding of brain stimulation to warrant adoption

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*Table 1. EMG activity of all tasks as a percentage of the EMG activity during swallowing.*

<table>
<thead>
<tr>
<th>Task</th>
<th>Percent of Swallow activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>2.70 %</td>
</tr>
<tr>
<td>Air</td>
<td>5.60 %</td>
</tr>
<tr>
<td>Suck tube</td>
<td>0.70 %</td>
</tr>
<tr>
<td>fry</td>
<td>7.31 %</td>
</tr>
<tr>
<td>Hacking</td>
<td>7.30 %</td>
</tr>
<tr>
<td>Navela</td>
<td>0.50 %</td>
</tr>
<tr>
<td>Swallow</td>
<td>10.00 %</td>
</tr>
<tr>
<td>Habit</td>
<td>14.53 %</td>
</tr>
<tr>
<td>Modified Hacking</td>
<td>20.00 %</td>
</tr>
</tbody>
</table>

"Hawk", modified valsalva produced 20% of muscle activity seen during swallow.
How to decide?

Evaluating the evidence

- PEDro

1. Eligibility criteria were specified
2. Subjects were recruited into groups via a randomised study design; subjects were randomly allocated to groups in which treatment was allocated
3. Allocation was concealed
4. The groups were similar at baseline regarding the most important prognostic indicators
5. There was blinding of all subjects
6. There was blinding of all reviewers who assessed the therapy
7. There was blinding of all reviewers who measured at least one key outcome
8. Measures of at least one key outcome were performed at baseline and at key time points
9. The statistical analysis plan was specified prior to analysis of the subjects initially allocated to groups
10. An intention-to-treat analysis was used
11. The study provides both point estimates and measures of variability for at least one key outcome

Figure 1. The Physiotherapy Evidence Database scale was developed to facilitate analysis of research trial design and evidence-based clinical practice guidelines.

Summary

- Treatment is guided by accurate diagnosis
- Strategies are guided by many factors
- Tactics are scaffolded to make a strategy
- Evidence is essential
  - Evidence consumers are the customers!
Tactic 1
Tactic 2
Tactic 3

Objectives

Goals

Prior Evidence!

New Evidence!

Improved Health, Reduced Risk

Strategies

Department of Communication Science and Disorders

Thank you!

jcoyle@pitt.edu
Learning Objectives: Participants will...

1. Identify evidence regarding advantages and disadvantages, risks and benefits of three common dysphagia treatment methods
2. Identify evidence regarding efficacy of three common dysphagia interventions
3. Identify weaknesses in research studies that are read to make treatment decisions, that would compromise the study's validity and believability

References


