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Dysphagia Treatments: Current Controversies, Evidence & Hype

Michigan Speech Language Hearing Association
Kalamazoo, 03/2012


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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

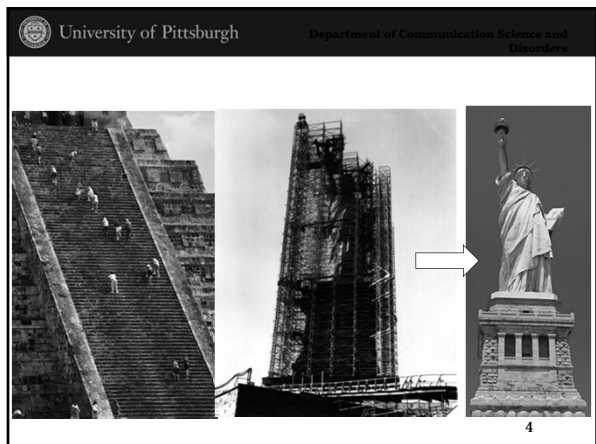
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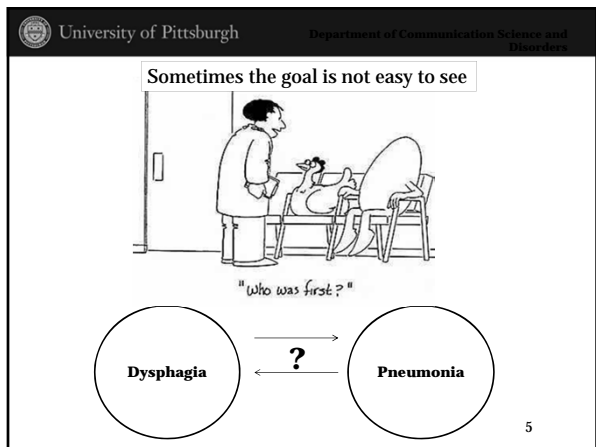
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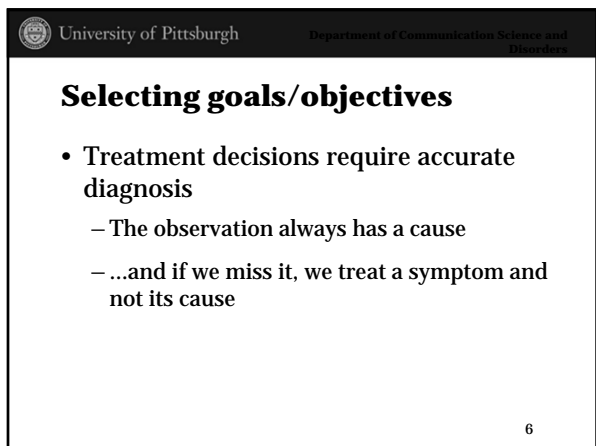
Dysphagia Treatment

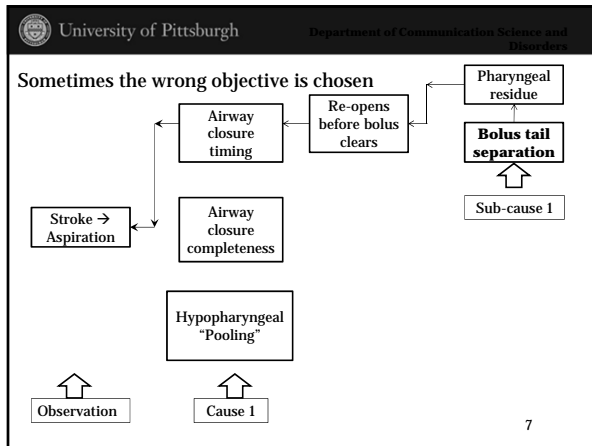
- What is our Goal?
 - Eliminate aspiration?
 - Cause patient to swallow “better”?
 - Least restrictive diet without aspiration?
 - Improve biomechanics?
 - Reduce premature mortality?

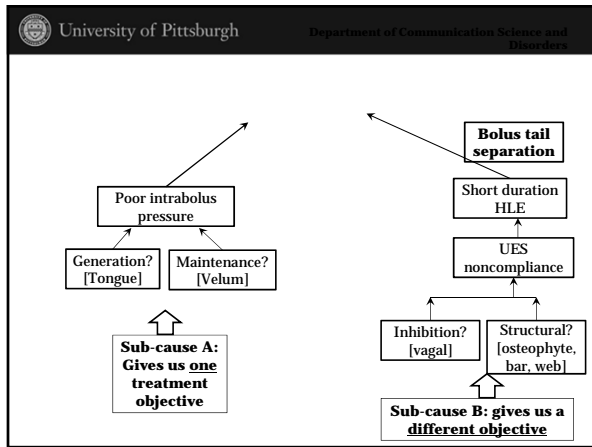
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Dysphagia

- Misdirection of swallowed material
 - Airway
 - Can't direct it to digestive system
- Inability to get enough
 - Nutrition, hydration, etc.

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Consequences of Dysphagia

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

Objectives

Goals

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Evidence based decision making

Patient Values and Expectations

Best Clinical Evidence Best Clinical Judgment

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Dysphagia Interventions

- What do we know about them?

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Terms we use

- Efficacy
 - The treatment works under controlled conditions
- Effectiveness
 - The treatment works in every day conditions
- Treatment: efficacy → effectiveness

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Proof that treatment works

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

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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

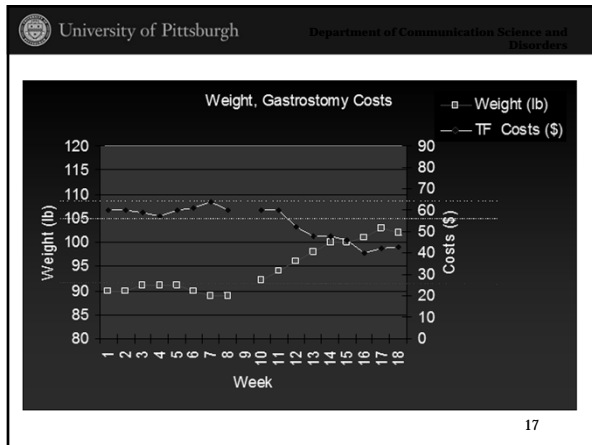
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Proof that treatment works

- 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?

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Proof that treatment works

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

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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

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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?

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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?

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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.

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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

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Strategies & Tactics

- 1. Eliminate aspiration
- 2. Train airway protection
- 3. Increase compliance
- 4. Speed recovery
- 5. Retest, modify independence
- 6. Etc.

Strategy

Tactics

Tactics

Tactics

Tactics

Tactics

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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

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Tactics : implementation

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

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Tactics: implementation

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

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Tactics: implementation

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

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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.

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Tactics: implementation

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

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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

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Tactics: implementation

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

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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...

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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

*Logemann et al (1989) 34

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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

*Shanahan et al. (1993); **Bulow et al (2002) 35

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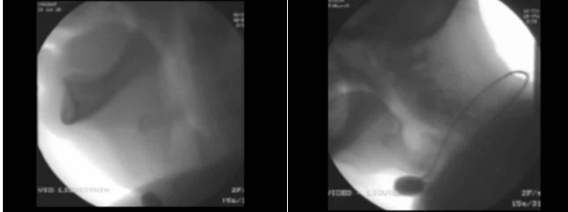
Oral containment vs. delay?

- 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

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Impaired oral containment Pharyngeal Delay




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Compensatory

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



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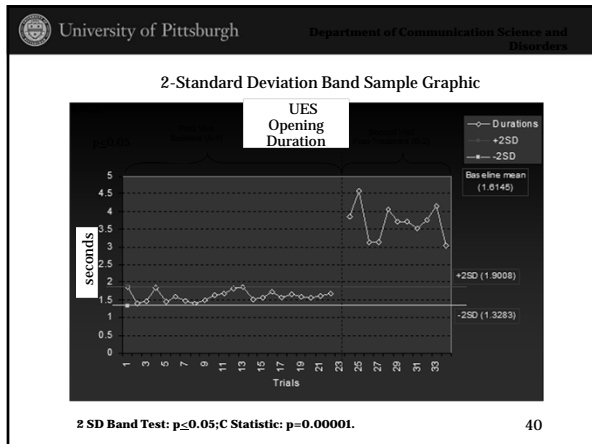
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Compensatory

- 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)

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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;

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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)

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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. 2005 43

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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!

Fujiu and Logemann (1996) 44

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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 45

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- These maneuvers can be combined

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Restorative Methods

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

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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?

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Reference List

Lingual Strengthening Exercise

- Kays, S. & Robbins, J. (2006). Effects of sensorimotor exercise on swallowing outcomes relative to age and age-related disease. *Seminars in Speech & Language, 27*, 245-259.
- Robbins, J., Gangnon, R. E., Theis, S. M., Kays, S. A., Hewitt, A. L., & Hind, J. A. (2005). The effects of lingual exercise on swallowing in older adults. *Journal of the American Geriatrics Society, 53*, 1483-1489.
- Robbins, J. A., Kays, S. A., Gangnon, R. E., Hind, J. A., Hewitt, A. L., Gentry, L. R. et al. (2007). The effects of lingual exercise in stroke patients with dysphagia. *Archives of Physical Medicine & Rehabilitation, 88*, 150-158.

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Fig 2. Positioning of 3-bulb array of pressure sensors for measuring swallowing pressures. Testing/measurement

Fig 1. Positioning of air-filled IOPi pressure sensor between tongue blade and hard palate. Exercise protocol

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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.

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Restorative Methods

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


Sapienza et al.

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Restorative methods

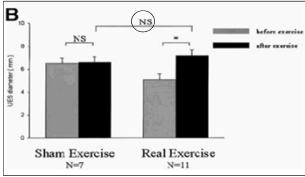
- “Shaker” exercise*
 - Head-Neck flexion while supine
 - Increase AP dimension of UES during swallow
 - “Eliminated tube feeding in stroke patients”**



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

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Group	Condition	UES length (cm)
Sham Exercise (N=7)	before exercise	~5.5
	after exercise	~5.5
Real Exercise (N=11)	before exercise	~4.5
	after exercise	~6.5

- 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

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Facilitative Methods

- Electrical stimulation
- Many studies, mostly poor design


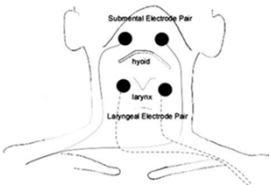


Fig. 1. Schematic of the placement of the surface electrodes over the submental region and the laryngeal region relative to palpation of the hyoid bone and the thyroid cartilage in the neck

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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***

*Fujiu et al. (1994); **Rosenbek et al (1991, 1996, 1998); ***Logemann et al (1994)

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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

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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 58

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Medical Treatment

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

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Medical Treatment

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

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Diet modification

- Should be the last compensatory evaluated in testing
 - Logemann, 1993.
- Issues:
 - What does texture modification do for patient?
 - Is patient amenable to modification?
 - Is patient will not eat the prescribed diet
 - Malnutrition, dehydration

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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

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Thick liquids

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

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Water

- Intake of water: ~2300 mL per day
 - 2100mL through intake
 - 200 mL synthesized by body (CHO metabolism)
- Variations in water intake
 - Climate, habits, physical activity

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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

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Thickened liquids

BUT IT ALSO:

- 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

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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

Whelan, 2001, Finestone et al, 2001 67

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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

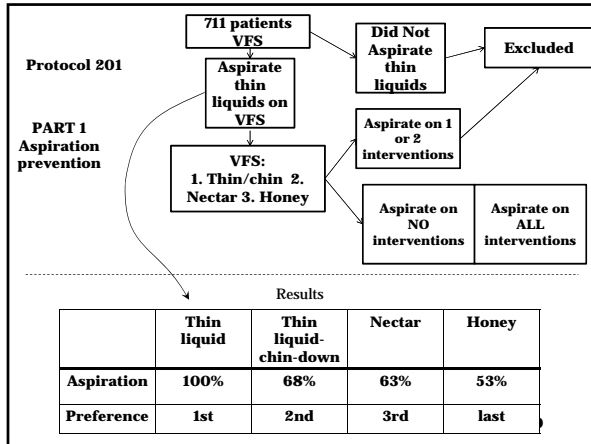
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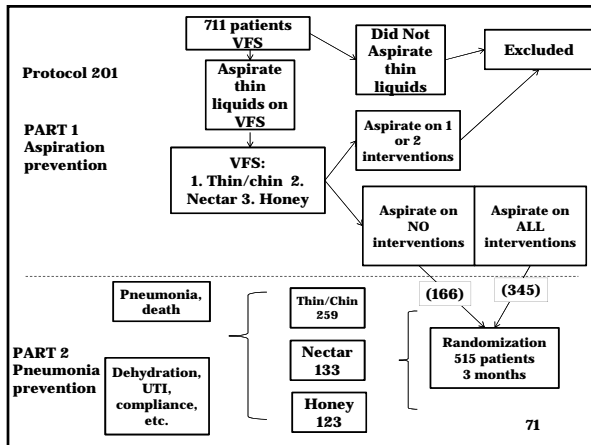
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Thick liquids

- Do thick liquids reduce aspiration?
 - Logemann, J. A., et al. (2008). *Journal of Speech Language & Hearing Research*, 51(1), 173-183.
- Do thick liquids reduce pneumonia risk?
 - Robbins, J., et al. (2008). *Annals of Internal Medicine*, 148(7), 509-518.

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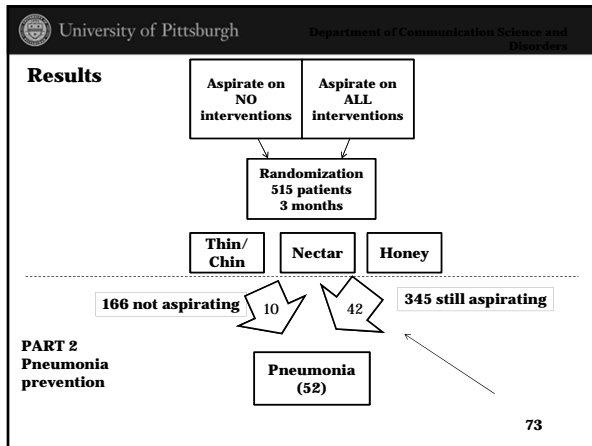


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Thick liquids

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

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	Pneumonia			
	Chin-thin	All thick liquid	Nectar	Honey
Pneumonia Overall (52)	24 (10%)	28 (11%)	10 (8%)	18 (15%)
Aspiration eliminated Part 1 (10)	6 (7%)	4 (5%)	0 (0%)	4 (10%)
Aspirated all in Part 1 (42)	18 (9.8%)	24 (14%)	10 (11.5%)	14 (19%)

Overall, patients randomized to thin or thick liquids had similar pneumonia incidence
 People who aspirated thick liquid on the VFSS, 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

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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.)

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Thick liquids

- Do thick liquids reduce aspiration?
 - Yes
- Do thick liquids reduce pneumonia risk?
 - No
- Are aspirators more likely to get pneumonia?
 - Yes

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Thick liquids

- 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?

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Evidence Summary for using Free Water Protocols

**“FREE WATER”
PROTOCOLS**

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- 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/SLP/April212003.htm>

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“Free Water” Protocol Principles

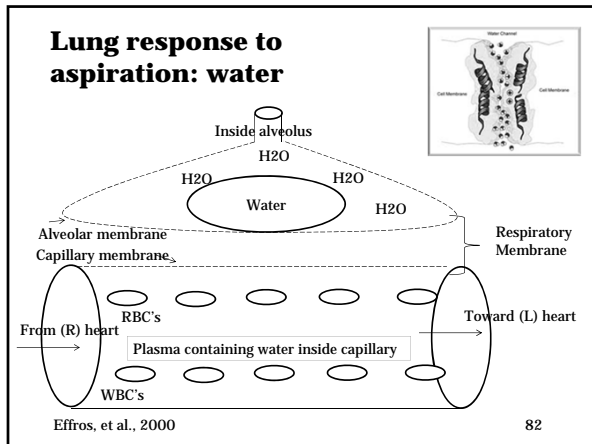
- Developers discuss
 - Safety of Water
 - Hydration
 - Compliance

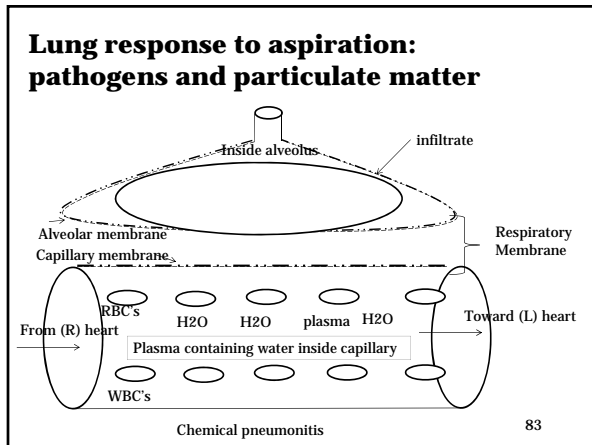
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How do the lungs respond to aspiration?

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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

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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

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- Garon et al., 1997
 - 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

} Half of daily needs

– “Much less water than expected” by investigators (“we were surprised...”)

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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.

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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 88

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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 89

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- 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

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- 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

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“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)

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“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

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Surgical Management

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

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Surgical-airway protection

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

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Surgical-airway protection

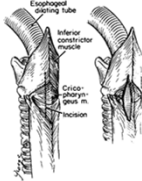
- Reduced glottic closure
 - Vocal Fold Augmentation/Injection
 - Thyroplasty, medialization
 - Arytenoid adduction
 - Airway separation

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Cricopharyngeal Myotomy

- Reduced UES compliance
- Low GE reflux risk
- BUT IT ALSO:
 - Adequate intrabolus pressure (Ali et al, 1997) predictive of postoperative success
 - preoperative manometric confirmation

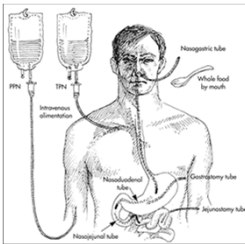


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Non-Oral Nutrition

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

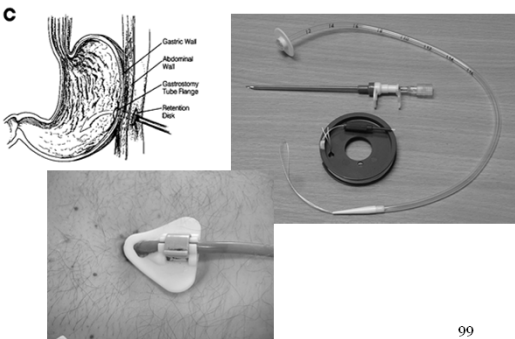


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Gastrostomy

c



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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

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Contraindications

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

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Feeding Tubes

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

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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%

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Complications

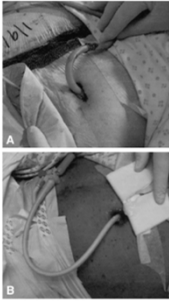
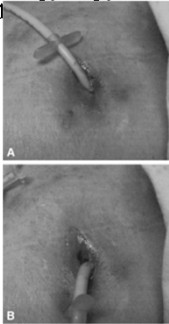


Figure 6. Liberation from side traction on PEG.

Figure 7. PEG site breakdown because of absence of external bolster. A. Because of disruption of suture securing a Maloney tube used as a surgically placed PEG tube. B. Because of failure to create an external bolster on a Foley catheter used as a replacement PEG.

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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

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Prosthetic Intervention-examples

- Etiologically guided
- Palatal lift, obturator
- Maxillary denture “build-down”

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Combined Treatment

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

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Patient Compliance

	Always complied	Never complied	<i>p</i>
N	68 (79%)	18 (21%)	na
Live at home > Institution >	28 40	12 6	<0.05
Hospitalizations for chest infection, “AP”	1	4	<0.001
Chest infections per patient	1.13	0.94	NS

Low et al. (2001) 108

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Patient Compliance and Outcomes

- 21% noncompliance
 - Younger, living at home 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) 109

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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

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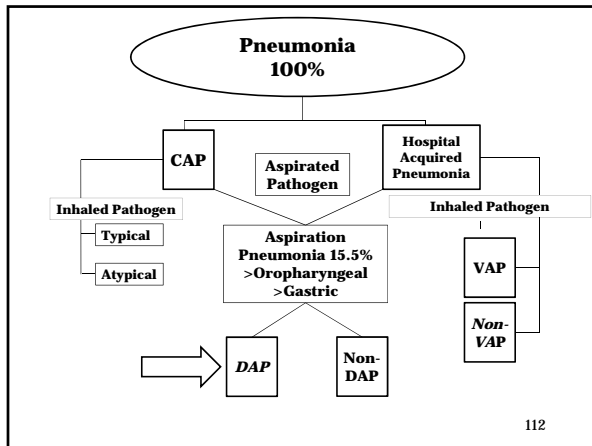
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Nosocomial Pneumonia

FIGURE 1. Pathogenesis of nosocomial bacterial pneumonia

```
graph TD; HF[Host factors] --> OC[Oropharyngeal colonization]; AM[Antimicrobials and other medications] --> OC; S[Surgery] --> OC; ID[Invasive device] --> OC; CR[Contaminated respiratory therapy, testing, and anesthesia equipment] --> OC; CC[Cross-colonization hand, glove] --> OC; IDC[Inadequate device disinfection/sterilization] --> OC; CWS[Contaminated water, solutions] --> OC; OC --> A[Aspiration]; OC --> G[Inhalation]; G --> A; A --> B[Bacteremia]; A --> T[Translocation]; B --> L[Lung defenses are overcome]; T --> L; L --> P[Pneumonia];
```

CDC MMWR (1997) Vol. 46, RR-1



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Who is at risk for DAP?

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

HCAP Prevention

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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)

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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 115

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Other pneumonia risk factors


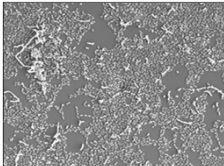
- PPI usage
 - Up to 3 fold increase in pneumonia risk*
 - Higher in new recipients & early in usage
 - Also, Eurich et al, 2010, Laheij et al, 2004, Herzig et al, 2009
 - 2-6 fold increase in pneumonia risk
 - Ambulatory community dwellers → inpatients

*Sarkar et al., 2008 116

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GOSP

- Geriatric Oral Science Project
 - Langmore, et al., 1998. Predictors of aspiration pneumonia: how important is dysphagia? *Dysphagia* 13: 69-81.



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Significant predictors

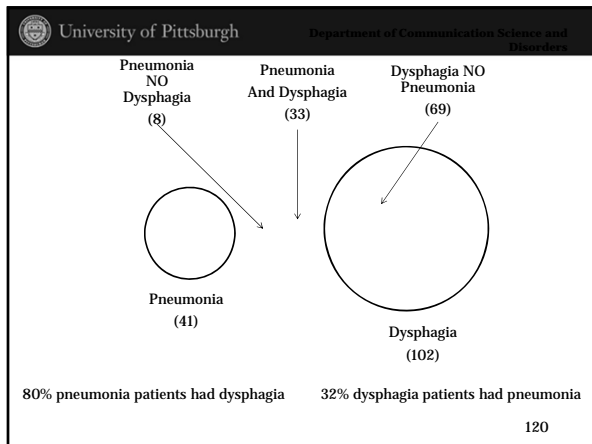
	Pneumonia	No pneumonia
Dysphagia	81%	47%
Tube feeding at pneumonia dx	27%	9%
Low or no activity	59%	28%
Dependent oral care	34%	10%
Dependent feeding	41%	6%
Brush teeth occasionally or never	40%	12%
# decayed teeth	5.2	2.4
Dry or excess oral secretions	38%	17%

But, EACH WAS SIGNIFICANT IN PRESENCE OF OTHER RISK FACTORS

Independent predictors (OR)

	All patients	Patients eating orally	Dentate patients	Dentate patients eating orally
Dependent for feeding	-	19.98	ns	11.8
Multiple Diagnoses	ns	ns	4.9	7.3
Now smoking	ns	4.1	ns	ns
Tube fed before pneumonia	3.0	-	ns	-
Dependent for oral care	2.8	ns	ns	ns
# decayed teeth	-	-	1.2	ns
Number of meds	ns	1.16	ns	ns
Dysphagia	ns	ns	ns	ns

Increase in likelihood of pneumonia, when patient has the single risk factor 119




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Hype & enthusiasm

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Evidence. What is Evidence?

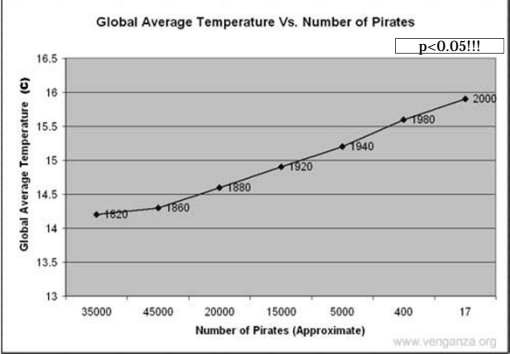


Parachutes reduce the risk of injury after gravitational challenge, but their effectiveness has not been proved with randomised controlled trials

Smith et al., 2003

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Global Average Temperature Vs. Number of Pirates



Global Average Temperature (C)

Number of Pirates (Approximate)

$p < 0.05!!!$

www.venganza.org

“... significant inverse relationship between pirates and global temperature.”

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Search for Products: **Frazier Water Protocol: Safety, Hydration, and Quality of Life**

Product Categories: Audio Professional Development, Consumer Education, School Based Issues, Reimbursement and Billing, Service Delivery and Practice Management, Assessment Tools

Audio CD and Manual
 Member: \$74.00
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 Additional Manual(s)
 From 1 to 5: \$44.00
 From 6 to 10: \$40.00
 11 or more: \$38.00

Author(s): Kathy Farther, MS, CCC-SLP

Description:
 For 23 years the Frazier Rehab Institute has allowed free water to dysphagic patients. The Frazier Water Protocol raises concerns about the safety of water, absorption of water in the lungs, and pathogenic bacteria. Balancing safety, hydration, and quality of life are central to the protocol. This program presents the options for the Frazier Water Protocol, along with supporting literature that includes aspiration pneumonia risk factors, as well as dehydration risks and consequences. A review of literature on

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Swallow SOLUTIONS

Swallowing Difficulties

BELIEVE IN THE POWER OF NUTRITION TO HANDLE SWALLOWING DIFFICULTIES TO EASE THE BURDEN OF MEALTIMES

Madison Oral Strengthening Therapeutic (MOST) Device

The MOST device comprises an oral mousetrap that traps into a sandwich device. The oral component of the device is a plastic respiratory risk-reducing barrier to reduce tongue pressure at the distal esophagus.

Mark Information: [Click About the MOST device](#)

Easing the burden of swallowers
 For a person with an eating disorder (dysphagia), eating and drinking can be challenging. Though swallowers may be difficult, it's vital to ensure enough volume and calories - especially protein - to avoid malnutrition and dehydration. These essential foods and nutrients together may be easier to manage.

To learn more about thickened liquids and instant thickeners, follow the links below.
 Thickened liquids, instant thickeners

VitalStim® Therapy
 A breakthrough therapy for the treatment of dysphagia (difficulty swallowing)

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Bad evidence

- Carnaby-Mann, G. D., & Crary, M. A. (2007). Examining the evidence on neuromuscular electrical stimulation for swallowing: A meta-analysis. *Archives of Otolaryngology--Head & Neck Surgery*, 133(6), 564-571.
- Meta-analysis – the highest level of evidence
 - If it is a good meta-analysis

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- “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
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Hype & Myths

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

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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-205), connected to a pressure transducer,
4. perform a traditional Valsalva maneuver,
5. perform a “modified Valsalva.”
6. say the word /ki/.
7. say the word /hsk/.
8. “suckle” on their index finger,
9. produce /a/ at a comfortable pitch and intensity,
10. produce /a/ using a falsetto voice,
11. produce /a/ using vocal fry,
12. laugh,
13. gag.

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

Task	Percent of Swallow activity
Baseline	2.79 %
Ah	5.90 %
Suck tube	6.79 %
Key	7.21 %
Fry	7.50 %
Valsalva	8.80 %
Suckle	8.98 %
Laugh	12.25 %
Falsetto	14.51 %
Modified Valsalva	20.60 %
Hawk	23.46 %
Gag	63.13 %
Swallow	100.00 %

"Hawk", modified valsalva produced 20% of muscle activity seen during swallow

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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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How to decide?

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Evaluating the evidence

- PEDro

1. Eligibility criteria were specified	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
2. Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
3. Allocation was concealed	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
4. The groups were similar at baseline regarding the most important prognostic indicators	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
5. There was blinding of all subjects	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
6. There was blinding of all therapists who administered the therapy	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
7. There was blinding of all assessors who measured at least one key outcome	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
8. Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
9. All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome were analyzed by "intention to treat"	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
10. The results of between-group statistical comparisons are reported for at least one key outcome	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:
11. The study provides both point measures and measures of variability for at least one key outcome	No <input type="checkbox"/> Yes <input type="checkbox"/> Where:

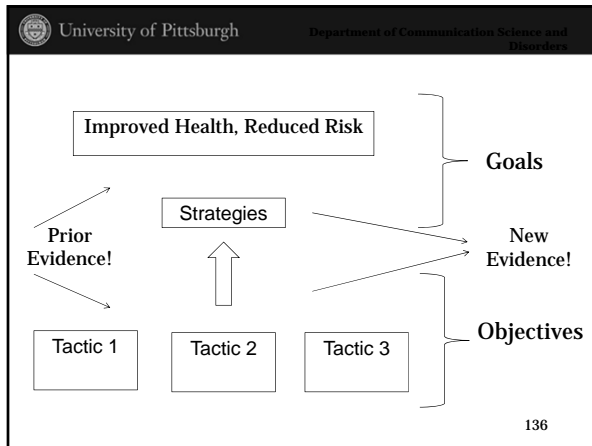
Figure 1. The Physiotherapy Evidence Database scale was developed to facilitate analysis of research trial design and evidence-based clinical practice guidelines.

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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!

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The slide features the University of Pittsburgh logo and the text "University of Pittsburgh Department of Communication Science and Disorders" in the top left corner. The main content is a single bullet point: "• Thank you!". The email address "jcoyle@pitt.edu" is located in the bottom right corner. The number "137" is in the bottom right corner.

James L. Coyle, Ph.D., CCC-SLP, BRS-S
Michigan Speech Language and Hearing Association 2012 Convention
Course Title: Treatment of Dysphagia: Current Controversies, Evidence and Hype

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

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