Unlocking Medical SLP's Super Power- A Crash Course in Adult Dysphagia Management

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EBP

Introduction

- Patient specific
- Reasoning:

1. What is the purpose of the technique?
   - Management (Compensatory strategies)
   - Treatment
2. What are the details of the technique?
3. What is the impact in swallowing mechanism?

Postural Adjustments

- General postural adjustment
  - Sit upright
  - Side lying down
- Head postural Adjustments
  - Head Extension
  - Head Flexion (chin down/chin tuck)
  - Head Rotation

Thickening Liquid

Liquid Consistency!!

- Thin liquid
- Nectar thick liquid
- Honey thick liquid
- Pureed thick liquid

http://swallowingdisorderfoundation.com/thicken-liquids/

Evidence!!

Research study 1

"A randomized Study of three intervention for aspiration of thin liquids in patient's with Dementia or Parkinson's disease." Logemann et al., 2008

Research study 2

"Comparison of 2 intervention for liquid aspiration on pneumonia incidence" Robbins et al., 2008

"The generally accepted clinical notion that manipulation of thicker (more viscous) substances reduces occurrence of aspiration, or modifies other bolus flow characteristics in dysphagic persons that produce an "improved swallow," has little support, other than anecdotal, in the literature."

Robbins, Nicosia, Hind, Gill, Blanco & Logemann, 2002

"Thickening liquids has been and continues to be one of the most frequently used compensatory interventions in hospitals and long-term care facilities."

Robbins, Nicosia, Hind, Gill, Blanco & Logemann, 2002

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"A randomized Study of three intervention for aspiration of thin liquids in patient's with Dementia or Parkinson's disease"

Logemann et al., 2008

Logemann et al, 2008

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Subjects
- 47 acute care hospital
- 79 sub acute care (such as SNF)
- b/n 50-95 years old

Medical condition
- Parkinson's
- Dementia
- Parkinson's + Dementia

Exclusion Criteria
- h/o of smoking
- alcohol abuse
- Head and neck cancer
- 20+ year insulin dependent
- sudden-onset, progressive, or infectious neurological disease
- No pneumonia in last 6 months

Logemann et al, 2008

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Protocol

Step 1: suspicious for aspiration at bedside

Step 2: VFFS

Step 3: 6 trial swallows of thin liquid (3x, 3-ml swallow by spoon and 3 self regulated swallow by cup)

Step 4: Aspiration? Then qualified for study and randomization

Step 5: Intervention

- Primary interventions:
  - Chin down posture
  - Nectar thick liquid (without postural adjustments)
  - Honey thick liquid (without postural adjustments)

Logemann et al, 2008

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Protocol continues:

Step 6: Parkinson's disease and no dementia patient were asked to rate the intervention as
- easy/pleasant
- average
- difficult/unpleasant

- 742 patients randomized
- 711 patients included in analysis

Results

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346 patients (49%) aspirated on all three intervention

177 patients (25%) of participant didn't aspirate on any of the three interventions

105 patients (39%) PD aspirated on all three intervention

258 patient's (53%)with dementia (with or without PD) aspirated on all three intervention

Significantly more participants aspirated on thin liquids despite using chin-down posturing than when using nectar-thick liquids (68% vs. 63%) or honey-thick liquids (68% vs. 53%)

Significantly more participants aspirated on nectar-thick liquids than on honey thick liquids (63% vs. 53%)

Logemann et al, 2008

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- Researchers hypothesis was "chin down posture would be better"
- However, result revealed:

  Honey thick liquid "better" than nectar thick followed by chin- down posture to eliminate immediate aspiration
- Patient's preference: Chin down compared with honey thick liquid

Logemann et al, 2008

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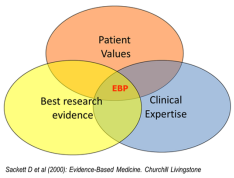
Clinical Implications

- All intervention was not effective in 49%
- Instrumental evaluation
- Patient's preference
  - Compliance



Sackett D et al (2000): Evidence-Based Medicine. Churchill Livingstone

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"Comparison of 2 intervention for liquid aspiration on pneumonia incidence"

Robbins et al, 2008

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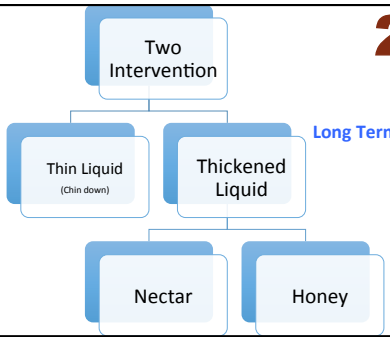

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Robbins et al, 2008

Eligibility

- Patient who aspirated during all three intervention (No condition eliminated aspiration)
- Patient who did equally well on all three intervention (all condition eliminated aspiration GOOD!!)

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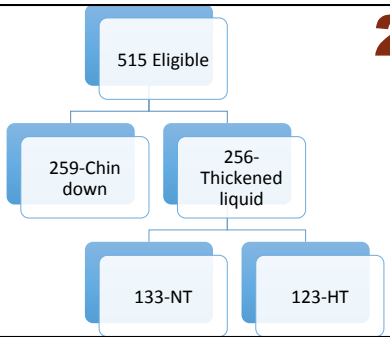

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Robbins et al, 2008

- 413 completed 3 months follow-up without incidence of pneumonia
- 39 without incidence of pneumonia followed until death
- 52 developed pneumonia (21 subsequently died)
- 11 incomplete follow-up

Result

- 11% incidence of pneumonia across all groups
- No difference between chin-down posture and thickened liquid intervention
- Nectar thick liquid had lower incidence of pneumonia compare with honey thick liquid

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Clinical Implications

- Honey thick liquid short term benefit only
- Adverse events (Long Term):
  - Dehydration, UTI, or fever (> thickened liquid groups)
  - Median length of stay in hospital
    - 18 days (honey thick liquid)
    - 6 days (chin down posture)
    - 4 days (nectar thick liquid)

Other Liquid Modification

- Carbonated liquid
- Sour bolus vs. regular bolus
- Sweet vs. regular bolus
- Frazier Free Water Protocol
  - Oral hygiene

Changing the Swallow: Active Therapy Technique

- Improving the mechanism: Oral Motor Exercises
  - "K" sound
  - "Hawk"
- Tongue strengthening exercises
  - Tongue resistance exercises
  - Iowa Oral Performance Instrument
  - Swallow Strong Device

Protecting the Airway

- Breath hold
- Supraglottic Swallow
- Super-supraglottic swallow

Supra Glottic: Directions

- Take a deep breath and hold your breath
- Keep holding your breath
- Keep holding your breath while you swallow
- Immediately after you swallow, gentle cough

Super Supraglottic Swallow

"Inhale and hold your breath very tightly, bearing down. Keep holding your breath and bearing down as you swallow. Gentle cough when you finish"

Swallow Exercises

- Effortful swallow
- Masako
- Shaker
- Chintuck against resistance
- WADA

Tongue Hold (Masako)

Three negative consequences

1. Reduced duration of airway closure
2. Increased post swallow residue
3. Increased delay in the initiation of pharyngeal component of the swallow

Thermal Tactile Stimulation

- Logemann introduced
- Stroke the anterior faucial pillar with a cold stimulus (#00 or #0 laryngeal mirror)
- Reduction in delayed swallow initiation
- Rosenbeck et al; 1991
- Rosenbeck et al; 1996
  - Two weeks: 150,300, 450 or 600
- Short term benefit for delayed swallow initiation

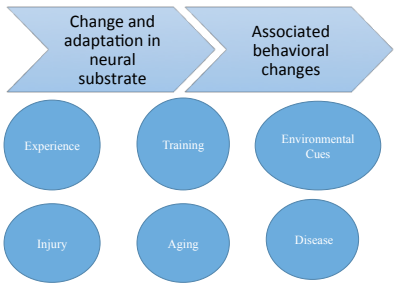
NMES

Exercise Principles and Dysphagia Therapy

- Intensity
  - More repetitions
  - Increasing intensity
- Specificity
  - "The best way to rehabilitate swallowing is to have patient's swallow"

Plasticity

- " Ability of the brain to change" (Cohen et al., 1998)
- "Ability of neuronal system to alter function in response to changes in input both physiologically and pathophysiologically"
  (Buonomano & Merzenich, 1998)



Plasticity

- Neural plasticity and behavior modeling or reshaping is unclear
- Neural plasticity may result in a behavioral changes
- Not all behavioral change necessarily involves neuroplasticity
- So, what we know!!

Current Status

- Neural plasticity plays a substantial role in centrally remodeling human function after cerebral injury
- Understanding of how it relate to pathophysiology and functional recovery remains limited
- Its role in recovery of swallowing behavior is even less understood

Ten Principles

"Use it or Lose it"

- If a neural substrate is not biologically active, its function can degrade (Ludlow et al, 2008)
- Swallowing "warm-up time" (Robbins & Levine, 1993)
- NPO status
- Tubefeeding

"Use it or Lose it"

Practical application

- During evaluation (1st swallow, IGNORE)
  - CSE, FEES, VFSS
- Swallowing drills (with/without bolus) for NPO patients
  - Example ???
  - Effortful swallow

"Use It and Improve It"

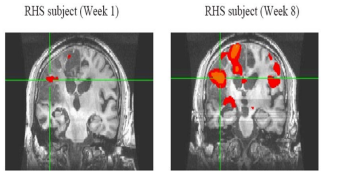
- Extension of 1st principle
- Increased biological activity, future functioning is enhanced
- Skilled training/Target practice
- Not merely use function
- Use with increased competency, efficiency/ accuracy

"Use It and Improve It"

Practical Application

- Identify exercises which has maximum effects on both behavioral and neural plasticity

1. Lingual Strengthening exercises
2. Respiratory Strengthening exercises
3. Pharyngeal exercises
4. Shaker exercises



t=1.97 (uncorrected p = 0.05) [x= 69; y= 145; z = 182]

Neural activation during liquid swallows at week 1 (baseline) and at week 8 (post-treatment). Increased amplitude and extent of activation ipsi- and contralesionally are observed at week 8. Images are shown in MNI convention.

Malandraki GA, Johnson S, Robbins J. Functional magnetic resonance imaging of swallowing: From neurophysiology to neuroplasticity. Head and Neck. 2011

"Plasticity is Experience Specific"

- Changes may occur only in the neural substrate involved in the particular behavior being treated (Kliem et al., 2002)
- Swallowing training induces changes in neural network involved in swallowing (Martin et al., 2004)
- Might not alter function in other cortical regions involved in voice production (Huang, Carr, & Cao, 2002)
- BUT…. LSVT (Sharkawi et al., 2002)

"Repetition Matters"

- To make CHANGE in neural substrates
- Extensive practice
- Prolonged practice
- Consistent practice

To maintain function

- Dose response (We don't know)

e.g: 6-8 weeks, 8-12 weeks

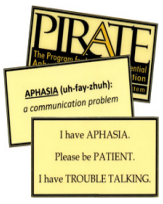
"Repetition Matters"

Practical application

- Insurance problems
- Train care-takers/family members
- Home Exercise program
- Individualize plan for treatment
  - Don't give all the swallowing exercises

"Intensity Matters"

- Training must be continues over long periods to induce neural change in animals (Fisher and Sullivan, 2001)
- Evidence in language treatment for stroke patients*
- No strong evidence in OT and PT*
- More intense treatment in short period of time is key*



* Teasell & Kalra, 2005.

"Intensity Matters"

Practical Application

- Collect the data

i.e.: Internal evidence

- Moderate amount of exercise is even beneficial in ALS subjects!!

Drory et al., (2001); *Harkawik & Coyle (2012)*

"Time Matters"

- Longer & continuous (rather intermittent) training may maximize neural changes (Fisher & Sullivan, 2001)
- Early tx in post stroke
- Cost effective

(Odderson, Keaton & McKenna, 1995)

"Salience Matters"

- Neural plasticity is best induced when:
  1. purposeful/meaningful
  2. related to behavior being trained

"Simple repetitive movement and strength training likely do not enhance *skilled* movement" (Ludlow et al. 2008)

Practical application:

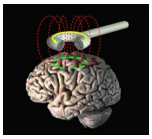
- Pair appropriate environmental stimuli
- Taste/Smell/texture
- Natural puree/thickened liquid

"Age Matters"

- Younger nervous systems are more responsive
- But most of our patient are geriatric.
- Sarcopenia (loss of muscle mass)
- Lingual exercises, increased tongue volume and tongue pressure (Robbins et al., 2005)
- Preventive dysphagia
- Practical application???

"Transference"

- One function may enhance related behavior
- Inconsistent with principle 3
- LSVT
- Electrical stimulation (BE CAUTIOUS!!)
  - Need more research evidence



"Interference"

- "The ability of plasticity within a given neural circuitry to impede the induction of new, or expression of existing plasticity within the same circuitry" (Kleim & Jones, 2008)
- E.g. use of unimpaired limb may impede recovery of impaired limb
- No dysphagia studies so far…
- Consequence of NPO

THANKS