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Emerging Treatments for Dysphagia: Where We're Headed

Suiter, SpeechPathology.com, 2016

Disclosures

- Financial
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- Nonfinancial
  - Chair, ASHA Board of Special Interest Group Coordinators
  - Member, American Board of Swallowing and Swallowing Disorders

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Learning Objectives

After this course, participants will be able to:

- List three principles of strength training and how they might be applied to dysphagia treatment.
- Describe three newly emerging treatments for swallowing disorders.
- Describe new findings pertinent to use of electrical stimulation treatment for swallowing disorders.

Traditional Dysphagia Treatment

- Based on our ability to determine swallow pathophysiology using currently available technology
- Often have no set protocol regarding frequency and duration of treatment

Principles of Training

- Specificity of training
- Muscle overload & Muscular force
  - Muscles must be exercised to the point of fatigue in order to improve strength
- Exercise frequency
- Exercise progression

Adherence

- Affects treatment outcomes
- Often an issue, even in research protocols
- Apps and other means of encouraging adherence to treatment protocols have been developed.

Swallow Strong Device

Suiter, SpeechPathology.com, 2016

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Swallow STRengthening OropharyNGeal (Swallow STRONG) Program

- Isometric progressive resistance oropharyngeal therapy (I-PRO)
  - 8-week program
- Swallow Strong Device
  - 4 sensors:
    - Front, Back, Left, Right portion of oral tongue
- 10 reps, 3x/day, 3 days/week
  - Max. pressures reassessed every 2 weeks and adjusted as necessary

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Swallow Strong Device

- Robbins et al., 2007
  - IOPI
  - Patients with dysphagia post-CVA
  - Pre- and post-tx VFSS, lingual pressures, swallow pressures
  - Results
    - Increased lingual pressures
    - Increased swallow-related pressures
    - Reduced Penetration-Aspiration scale scores
    - Improved quality of life ratings

Rogus-Pulia et al., 2016

- Evaluated use of Swallow STRONG program in individuals with dysphagia
  - Improvements on 8 of 11 subscales of SWAL-QOL
  - Higher FOIS scores
  - Decrease in pneumonia rate and hospital admissions

Chin Tuck Against Resistance
Jaw Opening Against Resistance

- Kraaijenga et al., 2015
  - 6 weeks of exercise in healthy individuals resulted in
    - Increased jaw opening strength
    - Increased chin tuck strength
    - Increased suprahyoid muscle strength
- Yoon et al., 2014
  - Tucked chin against rubber ball
  - Improved suprahyoid muscle strength

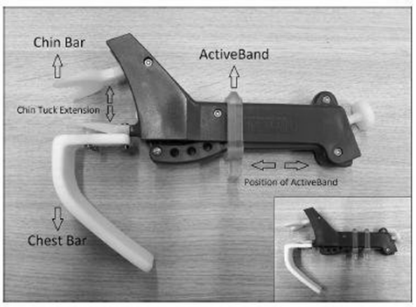
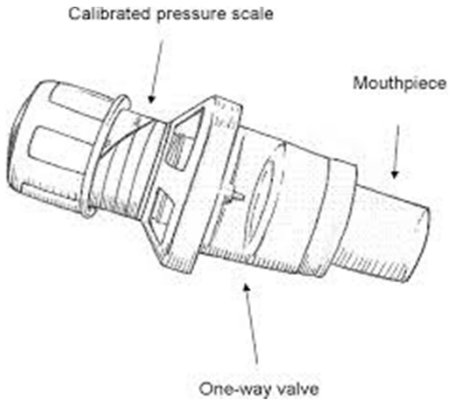


Fig. 1 Swallow Exercise Aid (SEA) with ActiveBand, chin tuck and jaw opening extension, chin bar, and chest bar; inset shows possible addition of a second ActiveBand to further increase resistance

Expiratory Muscle Strength Training (EMST)



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EMST

- Used for:
  - Healthy, older adults
  - Spinal cord injury
  - Parkinson's disease
  - Multiple sclerosis

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EMST Protocol

1. Program is 5-weeks long
   - 1st week the device is set at 75% max. expiratory strength
   - Weeks 2-5: Device is set at approx. 90% max. expiratory strength
2. 5 sets of 5 reps 5 days a week

EMST

- Increases
  - Expiratory muscle strength
  - Submental muscle strength
- May enhance ability to generate and maintain expiratory driving force for coughing, speaking, and swallowing.
  - Reduced occurrence of respiratory infections
  - Improved speech intelligibility, vocal quality

EMST

- Improved hyolaryngeal function and lower scores on Penetration-Aspiration scale (Troche et al., 2010)
  - Larger hyoid displacements during key swallowing events following EMST
  - Duration of hyoid movement remained stable following EMST, whereas those in sham tx group had significantly shortened duration times.

EMST

- Pitts et al., 2009
  - Evaluated impact of EMST on cough and swallow function in patients with Parkinson's disease
  - 4 weeks of treatment resulted in:
    - Increased cough volume acceleration
    - Significant decreases in Penetration-Aspiration scale scores
- Additional research with patients with Parkinson's disease has shown similar results (Sapienza et al., 2011)

McNeill Dysphagia Therapy

- Developed by Michael Crary & Giselle Carnaby
- "Systematic, exercise-based therapy framework for the treatment of dysphagia in adults" (Crary et al., 2012).

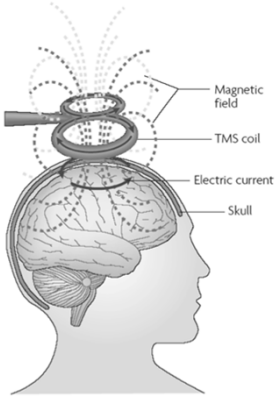
McNeill Dysphagia Therapy

- Incorporates principles of strength training by introducing a hierarchy of tasks to increase resistance and load on the muscles.
  - Does this by increasing
    - Volume & viscosity of materials swallowed
    - Number of swallows per session
    - Effortful swallow is used throughout
- 3-week program
  - 1 hour therapy/day + homework

McNeill Dysphagia Therapy

- Effectiveness has been studied in individuals with chronic dysphagia due to a number of different etiologies (Carnaby-Mann & Crary, 2010; Crary et al., 2012)
- Results indicate:
  - Improved clinical and functional swallowing performances immediately post-tx
    - Improved MASA scores
    - Improved hyolaryngeal excursion
    - Improved FOIS scores
  - Improvements maintained at 3-months post-tx

Transcranial Magnetic Stimulation



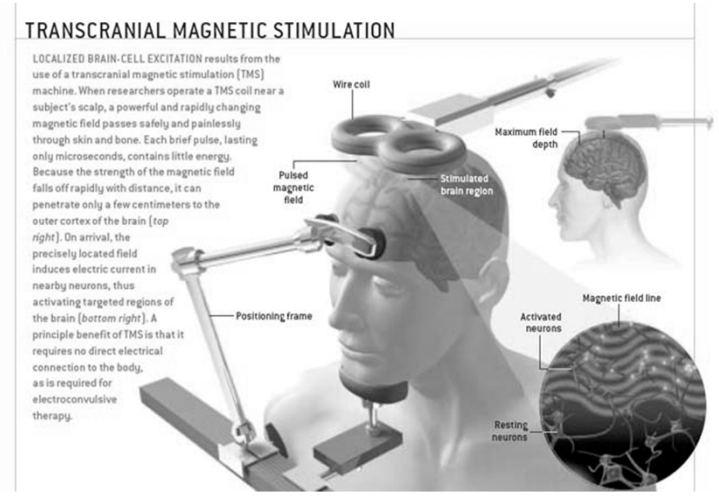
Transcranial Magnetic Stimulation

- Uses low-intensity direct currents applied to broad cortical areas that modify resting membrane potential of cortical neurons
- Two types of stimulation
  - Anodal: Enhances excitability of motor cortex
  - Cathodal: Reduces excitability of motor cortex

Transcranial Magnetic Stimulation

- In patients with stroke, TMS can be used to stimulate either the non-affected or the affected hemisphere.
  - High frequency stimulation to the **affected** hemisphere **increases** cortical excitability
  - Low frequency stimulation to the **unaffected** hemisphere **lowers** cortical excitability

Transcranial Magnetic Stimulation



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Transcranial Magnetic Stimulation

- Repetitive TMS (rTMS) applies magnetic stimulus to the pharyngeal motor cortex.
- rTMS applied to the contralesional pharyngeal motor cortex of individuals with dysphagia post-stroke improved swallow function (Park et al., 2013; Verin & Leroi, 2009)
  - Lower Penetration-Aspiration scale scores
  - Improved timing of the pharyngeal swallow
- Stimulation to the affected hemisphere in patients with dysphagia post-stroke resulted in significantly improved swallow function (Khedr et al., 2009; 2010)

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Conclusions

- Lots of new research in the area of adult dysphagia.
- Lots of work still needs to be done.
- New treatments are emerging, but we must carefully examine them before incorporating them into our clinical practice.