



Exercise Based Therapy for the Treatment of Dysphagia

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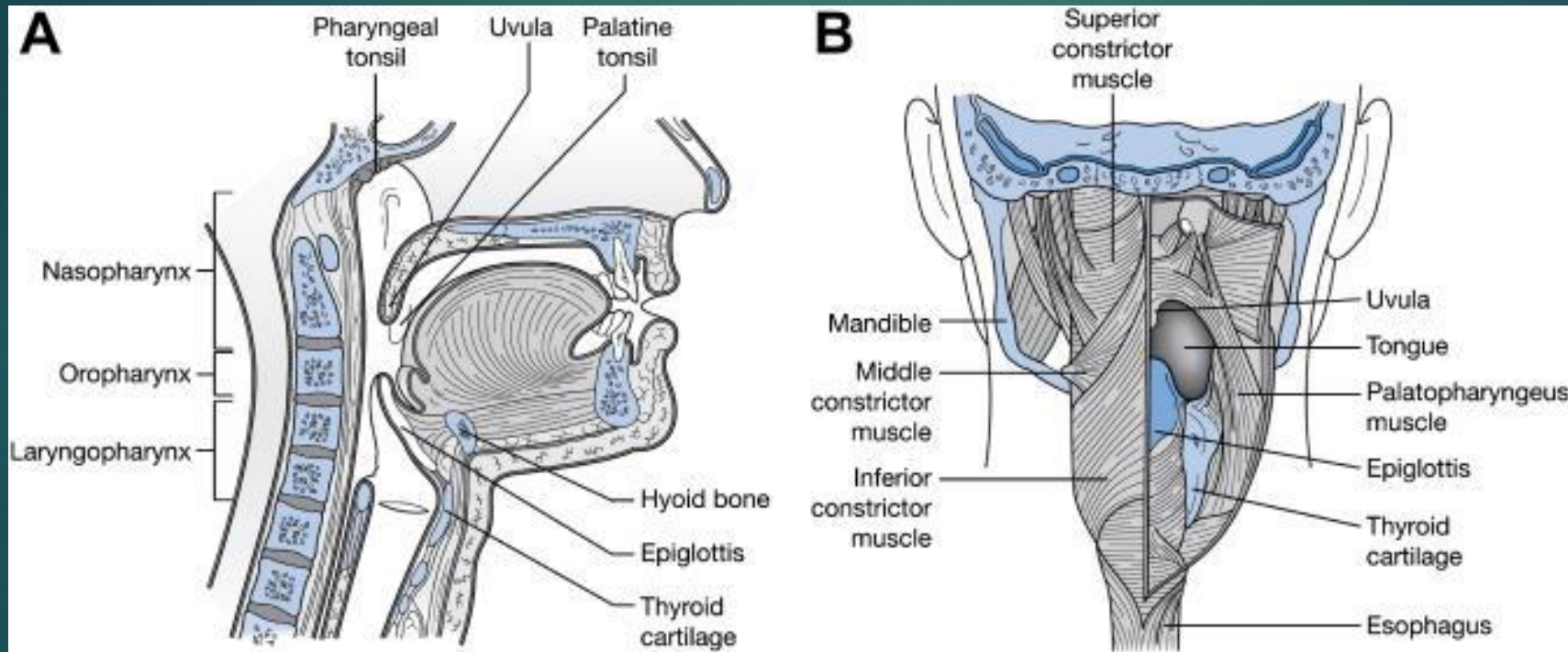
Dysphagia: The Basics

- ▶ Dysphagia, or difficulty with swallowing, is a medical disorder that impacts as many as 15 million Americans, with approximately one million people annually receiving a new diagnosis of the condition.(ASHA 1994)
- ▶ According to the Agency for Health Care Policy and Research (AHCPR), over 60,000 Americans die from complications associated with swallowing dysfunctions each year, most commonly aspiration pneumonia – caused by food or saliva going down the windpipe and into the lungs.

Dysphagia: The Basics

- ▶ A large proportion of these cases are due to dysphagia arising from a variety of causes, primarily stroke, degenerative neurological diseases, and head and neck cancer.
- ▶ One in 17 people will develop some form of dysphagia in their lifetime, including 50 to 75 percent of stroke patients and 60 to 70 percent of patients who undergo radiation therapy for head and neck cancer. Estimates of dysphagia's prevalence in such neurological diseases as Parkinson's Disease and ALS run as high as 90 percent. (AHRQ 1999)

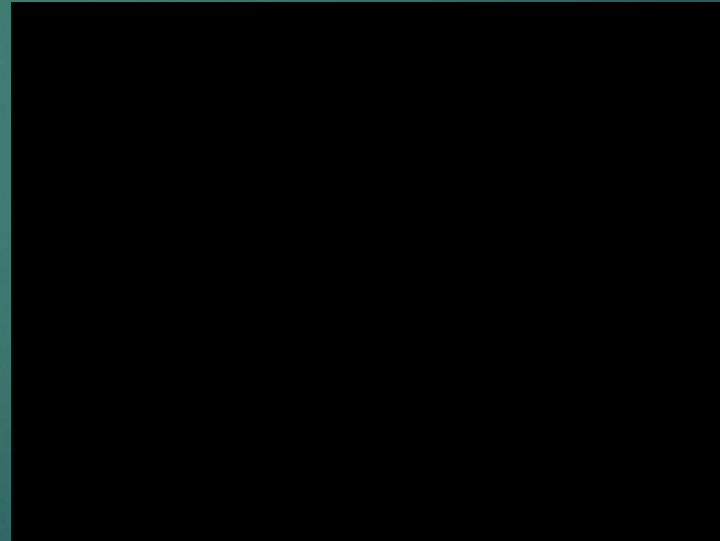
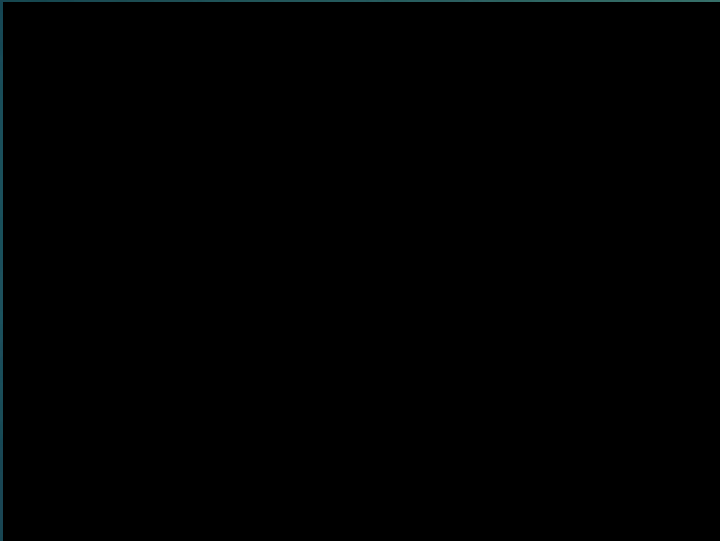
Basic Swallow Anatomy and Physiology



Normal vs. Disordered

Normal

Disordered



Normal vs. Disordered Swallow

Normal Swallow

- ▶ http://www.nature.com/gimo/contents/pt1/fig_tab/gimo28_V1.html

Disordered Swallow

- ▶ http://www.nature.com/gimo/contents/pt1/fig_tab/gimo37_V2.html

Goals of Dysphagia Therapy

- ▶ 1. Maintain a “safe” swallow or reduce the risk for penetration/aspiration (decrease risk of infection)
- ▶ 2. Increase p.o. intake

Traditional methods do all of the following, however the swallow is not “normal.” Which may result in repetition of abnormal swallow patterns.

Current Dysphagia Therapy Techniques

- ▶ 1. Evaluate with use of instrumental swallow testing: Typically Modified Barium Swallow Study (MBSS) or FEES
- ▶ 2. Determine area of weakness/deficits
- ▶ 3. Treatment based on results: Much of today's current treatments center around strength alone with little evidence based research documenting the benefits of therapeutic exercises in alleviation of swallow disorders
- ▶ Practicioners now looking towards established principles of exercise to see if they will translate to swallowing rehabilitation (Clark, 2005)

Common/Current Dysphagia Therapy Techniques


- ▶ 1. Compensation

- Short term adjustments**

- ▶ Posture

- Example: seated out of bed at 90 degrees

- chin tuck, head turn



Common Therapy Techniques

2. Diet and liquid consistency changes

Example: Level 2 diet with nectar liquids

Common Swallow Exercises Used in therapy

Effortful

Super-Supraglottic

Masako

Mendelsohn

Shaker's

▶ **HARD / EFFORTFUL SWALLOW**

PURPOSE

To increase tongue base retraction and pressure during the pharyngeal phase of the swallow and reduce the amount of food residue in the valleculae of the throat.

APPLICABILITY

Patients who exhibit residue in the valleculae after the swallow.

SUPPLIES

___ Only saliva swallow

___ Food/Liquid swallow

INSTRUCTIONS

Swallow normally but squeeze very hard with your tongue and throat muscles throughout the swallow. Excess effort should be clearly visible in your neck during the swallow.

Perform with each food/liquid swallow.

Perform ___ times throughout the day.

▶ **SUPER-SUPRAGLOTTIC SWALLOWING MANEUVER**

▶ PURPOSE

- ▶ To close the airway at the vocal fold level before and during swallow, to increase tongue base retraction and pressure generation, and to clear residue after the swallow.

APPLICABILITY

Patients who exhibit penetration into the airway with aspiration after the swallow. Patients who can follow multistep directions.

___ Only saliva swallow

___ Food/Liquid swallow

INSTRUCTIONS

1. Hold your breath very tightly, bearing down (lightly cover your tracheostomy tube, if present).
2. Continue to hold your breath tightly while swallowing. Swallow hard.
3. Clear your throat/cough immediately after swallowing.
4. Swallow again.

___ Perform with each food/liquid swallow.

Perform ___ times throughout the day.

WARNING

Patients with uncontrolled high blood pressure should not use this maneuver; bearing down may raise blood pressure. Talk with your Doctor before beginning any exercise regimen.

▶ **TONGUE HOLD EXERCISE (Masako)**

PURPOSE

- ▶ To increase the tongue base and throat muscles range of motion.

APPLICABILITY:

Patients who exhibit reduced tongue base/pharyngeal wall movement.

▶ SUPPLIES

___ Only saliva swallow

___ Liquid swallow between repetitions

INSTRUCTIONS

1. Protrude your tongue slightly from your mouth. Keeping your mouth moist is helpful for this exercise.
2. Hold the tongue gently with your teeth.
3. Swallow while keeping your tongue protruded.

Perform ___ times throughout the day.

Common/Current Dysphagia Techniques

- ▶ **Criticism for historical approaches to dysphagia therapy**
- ▶ Strong bias towards presumption of weakness and strength training only. Use of exercises that do not replicate desired task.

Examples: Shaker's exercise or tongue protrusion exercises

Criticism

- ▶ Use of motor repetition vs. motor learning: motor activity alone is not thought to result in functional recovery especially when impaired motor performance is baseline (Huckabee & Macrae, 2014)
- ▶ Practicing impaired swallowing through intake of safely tolerated food may facilitate pulmonary safety, but have no real therapeutic benefits (Huckabee & Macrae, 2014)



Is There A Better
Solution?

Rehabilitation: Rebuild Function

- ▶ Current studies show that some dysphagia programs based on the principles of exercise physiology can result in:
 1. Safe/functional swallow pattern leading to a decrease in infection
 2. Increased oral intake
 3. Increased efficiency

Without the use of unnatural postures and compensatory strategies moving towards “normal.”

Underlying Goal: Muscle Retraining

- ▶ Muscle retraining requires conditioning motor patterns
- ▶ Endurance and Resistance needed
- ▶ Endurance builds slow muscle fibers
- ▶ Resistance builds fast muscle fibers

- ▶ Traditionally, SLPs attempt to target endurance and resistance through swallow exercises

Examples: Masako, Mendelsohn, Effortful

However, not often a tailored systematic approach and exercises result in abnormal swallow pattern.

Exercise Principles and Dysphagia Therapy

New Programs aim to use the following principles of exercise for dysphagia therapy for reorganization of muscles

1. Frequency: sets/reps- at this time ill defined for swallow therapy: must rely on principles arising from studies of health limb musculature. (Clark, 2005)
2. Intensity: intensity must increase over time: progression protocols: still waiting for specific studies related to intensity for traditional swallow based exercises. (Clark, 2005)

Principles continued

- ▶ 3. Feedback and Specificity: regarding task performance: We know that improved performance is heavily influenced by the presence of guidance and feedback (Salomi, Schmidt, & Walter, 1984).
- ▶ Unlike limb movement, swallow produces no clear external movement patterns and intrinsic feedback systems are more likely impaired with neurological deficits, thus learning through just repetition alone is less likely (Huckabee & Macrae, 2014)
- ▶ Current research suggests superior outcomes for task-oriented skill training over strength training alone programs (Huckabee & Macrae, 2014).

Principles

4. Reversibility: “Use it or Lose it” Preliminary data supports strength training beyond the levels needed for minimal swallow competence may reduce risk for developing dysphagia in the presence of other risk factors such as acute illness (Kays & Robbins, 2004)

5. Variety: Training the entire muscle contraction spectrum

- ▶ Important to train in multiple planes of motion to elicit greater motor recruitment = integrated flexibility

(Carnaby-Mann & Crary, 2010).

Principles

- ▶ Recovery: Rest and pacing of exercises is important to overcome fatigue

If overload is in excess and rest is limited: will result in injury.

(Carnaby-Mann & Crary, 2010).

Current Researched Exercise Based Programs

- ▶ McNeil Dysphagia: Aim to use the normal swallow as exercise using a hierarchy of events that advance patient's towards more "normal" eating behaviors.

Program begins with instrumental evaluation and ends with a focus on eliminating maladaptive eating and swallowing behaviors.

(Carnaby-Mann & Crary, 2010)

This program utilizes many of the previously discussed principles

McNeil Dysphagia Therapy Program

- ▶ A case study in 2010 compared the following:
- ▶ A systematic exercise-based rehab framework for swallow remediation based on exercise principles (McNeil Dysphagia Treatment Program) to traditional swallow techniques paired with surface electromyography (sEMG) biofeedback.

Conclusion:

- ▶ Conclusion: Both approaches revealed improved swallow function. McNeil revealed superior outcomes compared with traditional dysphagia therapy supplemented with sEMG biofeedback.

Dysphagia Recovery: 75% resolved dysphagia with McNeil vs. 12% with traditional

Aspiration Reduction: 67% eliminated aspiration with McNeil vs. 36% with traditional

Elimination of tube feeding: 67% in study discontinues tube feeding vs. 27% with traditional.

(Carnaby-Mann & Crary, 2010)

Pilot Investigation for McNeil Dysphagia Therapy Program:

- ▶ Another study completed in 2012 aimed to investigate the functional and physiological changes in swallow performance with adults with chronic dysphagia.
- ▶ Results: Clinical and functional swallowing performance improved significantly and were maintained at a 3- month follow up 4 of 7 patients who were feeding tube dependent progressed to total oral intake after 3 weeks of intervention. (Crary, Giselle, Carnaby, LaGorio & Carvajal, 2012)

Clinical experience

1. 30 vs. 90 + swallows in 45 minute period
2. Use of exercises with clinical judgment vs. concrete systematic approach
3. 3-4 weeks of intervention vs. generally McNeil completed in 2 weeks (14 days)
4. Both may result in p.o. in take

Summary



Much literature states the basic philosophy of therapeutic exercises as a component of swallow rehabilitation.

However, clinicians still face the challenge of developing appropriate/research based strength training programs that meet unique criteria for a variety of patients.

The dysphagia research community is now exploring the benefits of therapeutic/exercise based therapies and preliminary studies like those for the McNeil program are promising. Revealing increased p.o. intake, decreased risk for infection and reduction in therapy treatment time.

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