

Swallowing Strategies

1) POSTURAL CHANGES:

a) Chin Tuck:

i) *Used For:*

- (1) Delayed onset pharyngeal swallow
- (2) Reduced base of tongue retraction to posterior pharyngeal wall approximation
- (3) Decreased airway protection
- (4) Aspiration DURING the swallow

ii) *Instructions:*

- (1) Bring chin to chest

iii) *Rationale:*

- (1) Pushes base of tongue towards pharyngeal wall
- (2) Expands vallecular recesses
- (3) Narrows the entrance to the laryngeal vestibule by moving the epiglottis posteriorly

b) Head Turn (to weak side):

i) *Used For:*

- (1) Unilateral pharyngeal weakness
- (2) Unilateral laryngeal weakness
- (3) Cricopharyngeal dysfunction

ii) *Instructions:*

- (1) Turn your head to the side as though you are looking over your shoulder

iii) *Rationale:*

- (1) Blocks bolus from traveling down weak side by twisting the pharynx
- (2) Applies pressure to the vocal fold to increase approximation
- (3) Reduces resting pressure on the cricopharyngeus by pulling the larynx away from the posterior pharyngeal wall (increasing the space)

c) Head Tilt (to stronger side):

i) *Used For:*

- (1) Unilateral oral weakness
- (2) Unilateral pharyngeal weakness

ii) *Instructions:*

- (1) Tilt your head like you are trying to touch your ear to your shoulder

iii) *Rationale:*

- (1) Directs bolus to stronger side of oral/pharyngeal cavities

d) Head Back:

i) *Used For:*

- (1) Oral transit dysfunction

ii) *How To:*

- (1) Tilt your head back like you are looking up

iii) *Rationale:*

- (1) Gravity helps clear the oral cavity

e) Chin Tuck w/ Head Turn:

i) *Used For:*

- (1) Reduced airway closure

ii) *How To:*

- (1) Bring chin to chest while simultaneously rotating head to the weaker side

iii) *Rationale:*

- (1) Increases epiglottic deflection to narrow the entrance to the laryngeal vestibule
- (2) Increases vocal fold approximation by applying extrinsic pressure

2) **SWALLOW MANEUVERS:**

**not appropriate for patients with cognitive deficits*

a) Supraglottic Swallow:

i) *Used For:*

- (1) Reduced airway protection (at the vocal fold level)
- (2) Aspiration DURING the swallow

ii) *Instructions:*

- (1) Inhale deeply first, then hold your breath
- (2) Continue to hold your breath and swallow
- (3) Immediately after you swallow (before you inhale) cough then immediately swallow again (before you inhale)

iii) *Rationale:*

- (1) Voluntarily holding your breath closes the vocal folds (during and before the swallow)

b) Super-Supraglottic Swallow:

i) *Used For:*

- (1) Reduced airway closure (at the laryngeal vestibule level)
- (2) Aspiration BEFORE and DURING the swallow

ii) *Instructions:*

- (1) Take a breath and hold it tightly while bearing down
- (2) Continue to hold your breath and bear down as you swallow
- (3) Immediately after you swallow (before you inhale) cough then immediately swallow hard again (before you inhale)

iii) *Rationale:*

- (1) Effortful breath hold causes the arytenoids to tilt forward which closes the laryngeal vestibule entrance before and during the swallow

c) Mendelsohn Maneuver:

i) *Used For:*

- (1) Decreased range/duration hyolaryngeal elevation
- (2) Decreased range/duration cricopharyngeal opening
- (3) Decreased pharyngeal swallow coordination

ii) *Instructions:*

- * Let the patient first feel the elevation, then tell them: Dry swallow a few times and pay attention to the movement in your neck as you swallow, feel it lift?
- (1) Now swallow, and when you feel your adam's apple lift, don't let it drop
 - (2) Hold at the peak of your swallow (when you feel your adam's apple lifted) for several seconds before finishing the swallow

iii) *Rationale:*

- (1) Increased laryngeal movement stretches/opens the CP
- (2) Prolonging hyolaryngeal elevation keeps the CP open longer

d) Effortful Swallow:

- i) *Used For:*
 - (1) Residue in valleculae
 - (2) Reduced BOT retraction to the posterior pharyngeal wall
- ii) *Instructions:*
 - (1) Squeeze all the swallowing muscles hard when you swallow
- iii) *Rationale:*
 - (1) Increased effort increases the posterior movement of the base of tongue

3) BEHAVIORAL STRATEGIES:

- a) Liquid Wash:
 - i) *Used For:*
 - (1) Residue after the swallow (oral, vallecular, pharyngeal wall, pyriform sinus)
 - ii) *Instructions:*
 - (1) Alternate bites of solids/semi-solids with sips of thin/thick liquids
- b) Larger Bolus:
 - i) *Used For:*
 - (1) Delay triggering pharyngeal swallow
 - ii) *Rationale:*
 - (1) A larger bolus enhances the sensory input in some patients
- c) Multiple Swallows/Bolus:
 - i) *Used For:*
 - (1) Significant oropharyngeal residue
 - ii) *Instructions:*
 - (1) Swallow 2-3 times with each bite/sip
 - iii) *Rationale:*
 - (1) Decrease risk for aspiration by clearing residue before additional bolus is attempted

Logemann, JA. (1998). Evaluation and treatment of swallowing disorders. Austin: Pro-ed.

Rehabilitative Swallowing Exercises

Head and Neck Radiation Therapy Patients

Radiation to the head and neck can lead to long-term swallowing problems called **dysphagia**. Patients with dysphagia have a hard time swallowing food, liquid or saliva. Swallowing problems can occur during treatment, or may develop or continue long after radiation treatment has ended.

These exercises may help improve swallowing function. Your speech pathologist will show you how to do these exercises. If you have any questions about these exercises, please ask your speech pathologist.

Strap Muscle Exercises

The strap muscles in the neck move the voice box up and out of the way to keep food and liquid from entering the lungs when you swallow. These exercises are designed to increase flexibility and strength.

Do the Shaker exercise (parts 1 and 2) 3 times each day for six to eight weeks.

1. Shaker Exercise (Part 1)

- Lie down on your back on the bed or floor. Do not use a pillow because your shoulders must be flat against the surface.
- Keep your shoulders flat against the bed or floor, and lift up your head, bringing your chin down to your chest (until you can see your toes).
- Keep your head lifted for 60 seconds, and then lower your head and rest for 60 seconds.
- Repeat these steps **three times**.

2. Shaker Exercise (Part 2)

- Lie down on your back on the bed or floor. Do not use a pillow because your shoulders must be flat against the surface.
- Keep your shoulders flat against the bed or floor, and lift up your head, bringing your chin down to your chest. Then immediately lower your head.
- Repeat these steps **30 times**.

Do five to 10 sets of the remaining exercises below each day for _____ months.

3. Mendelsohn Exercise

- Put your fingers over the bulge at the front of your throat. This is sometimes called the Adam's apple in men. Swallow, and feel the Adam's apple lift and lower while you swallow.

- Now, swallow and hold the Adam's apple up for at least three seconds by squeezing your throat muscles.
- Repeat this exercise **five times**.

4. Stretch Exercise

- Tilt your head back, and open your mouth.
- Stick out your jaw forward, and then push your jaw upward toward your nose. You should feel a stretch along the front of your neck.
- Hold this position for five seconds.
- Repeat this exercise **five times**.

Airway Protection Exercises

As you swallow, it is important for the voice box to close tightly to keep food or liquid from entering the lungs. These exercises are designed to help the voice box close during swallowing.

5. Supraglottic Swallow

- Hold your breath tightly. Now, swallow twice, release your breath with a sharp cough, and swallow again.
- Repeat this exercise **five times**.

6. Pitch Glides

- Sing "ee" starting in a low tone and then slowly raise your tone to your highest pitch. Hold pitch for 10 to 20 seconds.
- Repeat this exercise **five times**.

Base of Tongue Exercises

The base of tongue is the "pump" that pushes food through the throat and into the food pipe (esophagus). These exercises are designed to strengthen the base of the tongue.

7. Masako Exercise

- Stick out your tongue and hold it between your lips or teeth and try to swallow.
- Repeat this exercise **five times**.

8. Effortful Swallow

- Swallow as hard as you can with food or saliva. Push as hard as you can with the tongue against the roof of your mouth while you swallow.
- Repeat this exercise **five times**.

9. Gargle

- Pull your tongue back during a gargle and hold for one second.
- Repeat this exercise **five times**.

XRT Swallowing Exercise References

1. Shaker R, Easterling C, Kern Met al. Rehabilitation of swallowing by exercise in tube-fed patients with pharyngeal dysphagia secondary to abnormal UES opening. *Gastroenterology* 2002;122:1314-1321.
2. Kahrilas PJ, Logemann JA, Krugler C, Flanagan E. Volitional augmentation of upper esophageal sphincter opening during swallowing. *The American journal of physiology* 1991;260:G450-456.
3. Ohmae Y, Logemann JA, Kaiser P, Hanson DG, Kahrilas PJ. Effects of two breath-holding maneuvers on oropharyngeal swallow. *The Annals of otology, rhinology, and laryngology* 1996;105:123-131.
4. Fujii M, Logemann JA. Effect of a tongue holding maneuver on posterior pharyngeal wall movement during deglutition. *Am J Speech-Lang Pathol* 1996;5:23-30.
5. Huckabee ML, Steele CM. An analysis of lingual contribution to submental surface electromyographic measures and pharyngeal pressure during effortful swallow. *Archives of physical medicine and rehabilitation* 2006;87:1067-1072.
6. Lazarus C, Logemann JA, Song CW, Rademaker AW, Kahrilas PJ. Effects of voluntary maneuvers on tongue base function for swallowing. *Folia Phoniatr Logop* 2002;54:171-176.
7. Veis S, Logemann JA, Colangelo L. Effects of three techniques on maximum posterior movement of the tongue base. *Dysphagia* 2000;15:142-145.

Important Brain Regions for Swallowing

Cortical and subcortical regions:

<i>Left Hemisphere</i>	<i>Right Hemisphere</i>	<i>Subcortex</i>	<i>Cerebellum</i>
<ul style="list-style-type: none"> ▪ Swallow apraxia ▪ Pharyngeal swallow may be motorically normal 	<ul style="list-style-type: none"> ▪ Increased duration of oral phase ▪ Greater delay in pharyngeal trigger ▪ Pharyngeal dysmotility 	<ul style="list-style-type: none"> ▪ Mild delay in pharyngeal trigger ▪ Impairment in timing of pharyngeal component 	<ul style="list-style-type: none"> ▪ Uncoordinated swallow ▪ Poor bolus control ▪ Impaired sequencing/timing

Brainstem regions:

<i>Pons</i>	<i>Medulla</i>
<ul style="list-style-type: none"> ▪ Delayed pharyngeal swallow ▪ Reduced hyolaryngeal excursion with cricopharyngeal dysfunction 	<ul style="list-style-type: none"> ▪ Absent pharyngeal swallow ▪ Reduced hyolaryngeal excursion ▪ Unilateral vocal fold paresis/paralysis

Cranial nerves:

<u>CRANIAL NERVE</u>	<u>MOTOR/ SENSORY</u>	<u>FUNCTION</u>
I OLFACTORY	Sensory	<ul style="list-style-type: none"> • Smell
II OPTIC	Sensory	<ul style="list-style-type: none"> • Vision
III OCULOMOTOR	Motor	<ul style="list-style-type: none"> • Movement of eyeball, pupil and upper eyelid (All eye muscles except lateral rectus and superior oblique muscles)
IV TROCHLEAR	Motor	<ul style="list-style-type: none"> • Eye movement (contralateral , superior oblique)
V TRIGEMINAL	Motor	<ul style="list-style-type: none"> • Movement of muscles for mastication
	Sensory	<ul style="list-style-type: none"> • Tactile facial sensation
VI ABDUCENS	Motor	<ul style="list-style-type: none"> • Opens eyes. (ipsilateral lateral rectus)
VII FACIAL	Motor	<ul style="list-style-type: none"> • Movement of facial muscles • Extrinsic and intrinsic ear muscles, stapedius muscle
	Sensory	<ul style="list-style-type: none"> • Taste (anterior 2/3 of tongue)
VIII ACOUSTIC	Sensory	<ul style="list-style-type: none"> • Hearing • Equilibrium and orientation of head in space
IX GLOSSOPHARYNGEAL	Motor	<ul style="list-style-type: none"> • Elevation of palate, movement of pharynx and larynx • Contributes to swallowing by controlling the stylopharyngeus muscle
	Sensory	<ul style="list-style-type: none"> • General sensation from palate, posterior 1/3 of tongue and oropharynx • Taste from posterior 1/3 of tongue and oral pharynx
X VAGUS	Motor	<ul style="list-style-type: none"> • Muscles of soft palate, pharynx and larynx • Base of tongue (palatoglossus muscle only)
	Sensory	<ul style="list-style-type: none"> • Sensation from pharynx and larynx • Taste in the epiglottis and pharynx
XI ACCESSORY	Motor	<ul style="list-style-type: none"> • Movement of head and shoulders • Movement of palate, pharynx and larynx
XII HYPOGLOSSAL	Motor	<ul style="list-style-type: none"> • All of the intrinsic muscles of the tongue • All of the extrinsic muscles of the tongue except the palatoglossus

Cranial nerve impairments & speech/swallowing:

CRANIAL NERVE	DISORDERED PHYSIOLOGY	SWALLOWING SYMPTOMS	SPEECH SYMPTOMS
CN V	<ul style="list-style-type: none"> • ↓ jaw movement • ↓ face, mouth & jaw sensation 	<ul style="list-style-type: none"> • ↓ mastication • ↓ oral containment 	<ul style="list-style-type: none"> • Unilateral: insignificant • Bilateral: severely ↓ articulatory precision
CN VII	<ul style="list-style-type: none"> • ↓ facial movement & sensation • ↑ salivation 	<ul style="list-style-type: none"> • Residue in the lateral sulci • Drooling 	<ul style="list-style-type: none"> • Mild distortion of b, p, f, v,
CN VIII	<ul style="list-style-type: none"> • ↓ hearing • ↓ balance 	N/A	<ul style="list-style-type: none"> • Distortion of resonance • ↓ articulatory precision of all sounds over time
CN IX	<ul style="list-style-type: none"> • Delayed pharyngeal trigger • ↓ velopharyngeal closure • ↓ laryngeal elevation 	<ul style="list-style-type: none"> • Aspiration before & during the swallow 	<ul style="list-style-type: none"> • Hypernasality
CN X	<ul style="list-style-type: none"> • ↓ palatal, pharyngeal, laryngeal excursion • ↓ true vocal cord abduction and/ or adduction • ↓ pharyngeal sensation 	<ul style="list-style-type: none"> • Stasis/residue in the valleculae, posterior pharyngeal wall & pyriform sinuses • Aspiration during or after the swallow • Inability to cough 	<ul style="list-style-type: none"> • Hypernasality • Breathiness & hoarseness • ↓ pitch range • ↓ vocal loudness
CN XII	<ul style="list-style-type: none"> • ↓ lingual range of motion & strength 	<ul style="list-style-type: none"> • ↓ bolus consolidation • ↓ anterior to posterior movement of the bolus • oral residue 	<ul style="list-style-type: none"> • Imprecise articulation of l, t, d, s, z, sh, ch, k, g,