

### Appendix

**Table A1.**

Summary of significant differences found versus normal swallows for measures of pressure during the swallow for each of seven swallow therapy techniques.

<b>Pressure Measure</b>	<b>Chin Tuck</b>	<b>Head Rotation (on side of rotation)</b>	<b>Side Lying</b>	<b>Effortful Swallow</b>	<b>Mendelsohn Maneuver</b>	<b>Supraglottic Swallow</b>	<b>Super Supraglottic Swallow</b>
Pharyngeal Contraction	Decreased	Increased		Increased (0.44, 0.68), ND	Increased (0.45)	ND	ND
UES Contraction	ND	Decreased (opposite side)		ND	Decreased (1.16), ND	Decreased (0.58), ND	ND
Lingual Pressure				Increased (2.22, 2.50)			
UES Relaxation				Decreased (0.80), ND	ND	ND	Increased (1.59)
Intrabolus					ND		

Note: Effect sizes, when calculable, are indicated in parentheses. No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. UES = upper esophageal sphincter.

**Table A2.**

Summary of significant differences found for measures of time duration during the swallow for each of seven swallow therapy techniques versus normal swallows. Effect sizes, when calculable, are indicated in parentheses.

<b>Time (Duration)</b>	<b>Chin Tuck</b>	<b>Head Rotation</b>	<b>Side Lying</b>	<b>Effortful Swallow</b>	<b>Mendelsohn Maneuver</b>	<b>Supraglottic Swallow</b>	<b>Super Supraglottic Swallow</b>
UES Relaxation/Opening	ND			Increased (0.43), ND	Increased (1.69), ND	Increased (0.83), ND	Increased (1.88), ND
Pharyngeal Contraction	Decreased, ND			Increased (0.34 – 1.44), ND	Increased (4.29)	ND	ND
Lingual Pressure				Increased (0.34)			
Hyoid Excursion				Increased	Increased, ND	Increased (0.71)	Increased (0.71)
BOT-PPW Contact					ND	ND	
Laryngeal Movement/Closure				Increased	Increased	Increased (0.73)	Increased (0.60, 0.31)
Superior Pharyngeal Constrictor Contraction							ND
Longitudinal Pharyngeal Muscle Contraction							Increased (1.37)
Orbicularis Oris Contraction					Increased		
Submental Group Contraction					Increased		ND
Infrahyoid Group Contraction					Increased		
Genioglossus Contraction							ND
Thyroarytenoid Contraction							ND
Masseter Contraction					Increased		
Bolus Transit Time	ND			ND	Increased (0.94)	ND	Increased (0.85)

Note: No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. *Note.* UES = upper esophageal sphincter; BOT = base of tongue; PPW = posterior pharyngeal wall.

**Table A3.**

Summary of significant differences found for measures of onset times during the swallow for each of seven swallow therapy techniques versus normal swallows. Effect sizes, when calculable, are indicated in parentheses. No difference (ND) indicates a parameter was studied, but no differences were found.

Time (onsets)	Chin Tuck	Head Rotation	Side Lying	Effortful Swallow	Mendelsohn Maneuver	Supraglottic Swallow	Super Supraglottic Swallow
Pharyngeal Contraction – UES Relaxation	ND	Increased (opposite side)				ND	ND
Rise Time - Peak Pharyngeal Pressure				Decreased (0.57 – 0.73)			
Pharyngeal Pressure – Peak Submental EMG				Decreased (0.58 – 0.76)			
Submental EMG – Pharyngeal Pressure Onset				ND			
Lingual Pressure – Peak Submental EMG				Decreased (0.41)			
Inferior Pharyngeal Constrictor Contraction – UES Relaxation	ND				ND	ND	ND
UES Opening – Oral Swallow						ND	ND
UES Opening – Hyoid Excursion						Increased (0.63)	Increased (0.79)
UES Opening – Submental EMG				ND			
UES Opening – Laryngeal Movement/Vestibule Closure						Increased (0.83, 1.25)	Increased (0.92, 1.25)
UES Opening – Arytenoid/Vocal Cord Adduction						Decreased (1.29, 1.45, 1.76)	Decreased (1.04, 2.30, 3.86)
UES Opening – BOT Movement					ND	Increased (0.63)	Increased (1.04)
UES Opening – BOT/PPW Contact						Increased (0.63)	Increased (0.83)
SPC Contraction – PCA Activity							ND
SPC Contraction – SM Group Activity							ND
SPC Contraction – GG Activity							ND
SPC Contraction – LPM Activity							ND
SPC Contraction – TA Activity							ND
SPC Contraction – Suprahyoid Activity							ND

Note: No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. UES = upper esophageal sphincter; BOT = base of tongue; PPW = posterior pharyngeal wall; SPC = superior pharyngeal constrictor; PCA = posterior cricoarytenoid; SM = submental; GG = genioglossus; LPM = longitudinal pharyngeal muscle; TA = thyroarytenoid.

**Table A4.**

Summary of significant differences found for measures of offset times during the swallow for each of seven swallow therapy techniques versus normal swallows. Effect sizes, when calculable, are indicated in parentheses.

<b>Time (offsets)</b>	<b>Chin Tuck</b>	<b>Head Rotation</b>	<b>Side Lying</b>	<b>Effortful Swallow</b>	<b>Mendelsohn Maneuver</b>	<b>Supraglottic Swallow</b>	<b>Super Supraglottic Swallow</b>
SPC Contraction – PCA Activity							Earlier (0.93)
SPC Contraction – SM Group Activity							ND
SPC Contraction – GG Activity							ND
SPC Contraction – LPM Activity							ND
SPC Contraction – TA Activity							ND
SPC Contraction – Suprahyoid Activity							ND

Note: No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. SPC = superior pharyngeal constrictor; PCA = posterior cricoarytenoid; SM = submental; GG = genioglossus; LPM = longitudinal pharyngeal muscle; TA = thyroarytenoid.

**Table A5.**

Summary of significant differences found for measures of distance, displacement, or angle during the swallow for each of seven swallow therapy techniques versus normal swallows. Effect sizes, when calculable, are indicated in parentheses.

Distance/ Displacement	Chin Tuck	Head rotation	Side Lying	Effortful swallow	Mendelsohn maneuver	Supraglottic swallow	Super supraglottic swallow
Hyoid Movement	ND			Decreased (3.26), ND, Increased (superiorly)	Increased, ND	ND	Decreased (0.65), ND
Laryngeal Movement	ND			Decreased (4.84)		ND	Increased (1.59, 0.77)
Hyoid-Larynx Distance	Decreased			ND	Decreased	ND	
Epiglottis-PPW Distance	Decreased (0.60)						
Posterior Arytenoids-PPW Distance	ND						
Hyoid-Mandible Distance	Decreased			Decreased (5.23)		ND	
Arytenoid-Epiglottis Distance						Decreased	Decreased
Width Of Airway Entrance	Decreased (0.83)						
Width Of UES Opening	ND	Increased		ND	ND	ND	Increased
Postural Angle	Decreased (1.14)						
Epiglottic Angle	Decreased (0.60)						
Vallecular Angle	ND						

Note: No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. PPW = posterior pharyngeal wall; UES = upper esophageal sphincter.

**Table A6.**

Summary of significant differences found for muscle activity using electromyographic (EMG) measures during the swallow for each of seven swallow therapy techniques versus normal swallows. Effect sizes, when calculable, are indicated in parentheses.

EMG Measure	Chin Tuck	Head Rotation	Side Lying	Effortful Swallow	Mendelsohn Maneuver	Supraglottic Swallow	Super Supraglottic Swallow
OO Max Amplitude					Increased		
Masseter Max Amplitude					Increased		
Submental Max Amplitude				Increased (1.17 – 1.47)	Increased		
Infrahyoid Max Amplitude					Increased		
OO Mean Amplitude					Increased		
Masseter Mean Amplitude					Increased		
Submental Mean Amplitude					Increased		
Infrahyoid Mean Amplitude					Increased		

Note: No difference (ND) indicates a parameter was studied, but no differences were found. Blank boxes indicate that parameter was not studied in the included studies. OO = orbicularis oris.