

Additional file 5: Definitions of outcomes

| Outcome | Definition |
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| Death | N/S |
| Oropharyngeal dysphagia severity | N/S |
| Drooling | Severity and frequency of drooling |
| Salivary pooling | Salivary pooling in vallecula and pyriform sinuses |
| Orolingual bolus control | 3x N/S; Preswallow loss of bolus from lips/into pharynx; Premature spillage: materials spilled over the base of the tongue into the hypopharynx (including the valleculae, the lateral channels, and the piriform sinus) too early during the oral swallowing stage, meaning before the pharyngeal swallow was initiated. |
| Oral bolus transport | Swallow hesitancy; delayed onset oral transport |
| Swallowing related lingual movement pattern | Preswallow involuntary repetitive tongue movements |
| Timing of oropharyngeal swallow components | GPJo (glossopalatal junction opening): N/S |
| | GPJc (glossopalatal junction closure): N/S |
| | VPJo (velopharyngeal junction opening): Moment of separation of soft palate and posterior pharyngeal wall with re-entry of air in retrolingual space from nasopharynx (in seconds) |
| | VPJc (velopharyngeal junction closure): Moment of separation of soft palate and posterior pharyngeal wall with re-entry of air in retrolingual space from nasopharynx (in seconds) |
| | VPJd (velopharyngeal junction duration): ▲T between VPFc and VPJo (in seconds) |
| | Lvo (laryngeal vestibule opening): Moment of separation of arytenoid cartilages and underside of epiglottis with re-entry of air in laryngeal vestibule (in seconds) |

LVc (laryngeal vestibule closure): Moment when laryngeal elevation results in making contact between arytenoid cartilages and underside of epiglottis (in seconds)

LVd (laryngeal vestibule duration): ΔT between LVc and LVo (in seconds)

UESo (upper esophageal sphincter opening): N/S

UESc (upper esophageal sphincter closure): Moment of closure of esophagus after bolus transport (in seconds)

GPJo (glossopalatal junction opening) – LVc (laryngeal vestibule closure): ΔT between GPJo and LVc (in seconds)

Duration horizontal hyoid motion: Duration between initiation of swallow and moment of maximum horizontal (anterior) motion (in seconds)

Duration vertical hyoid motion: Duration between initiation of swallow and moment of maximum vertical motion (in seconds)

Pharyngeal transit time (PTT): From the point where the bolus head moved from the hold position and passed the posterior nasal spine until it fully entered the esophagus after the closure of the upper esophageal sphincter (in seconds)

Time required for max elevation of the hyoid bone: H2-H1: The time of the first superior-anterior movement of the hyoid bone was assigned as H1, and the time when the hyoid bone reached its maximum elevation was assigned as H2.

Bolus flow time: Measurement of the time when the bolus is seen in the hypopharynx until it triggers the swallowing reflex (0 = 0-1 s, 1 = 2-4 s, 2 = 5-7 s, 3 = 8 + s)

Oral transit time (OTT): N/S

Pharyngeal transit time (PTT): N/S

Pharyngeal response time (PRT): N/S

Duration of hyoid movement: measurement tags at 1) the initiation of hyoid movement which resulted in the swallow and 2) the point when the hyoid returned to rest following the completion of the swallow. These tags were then used to calculate the duration of hyoid (in seconds) movement.

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| Laryngeal elevation | N/S |
| Laryngeal sensation | The response of glottal closure reflex induced by toughing epiglottis with endoscope; Glottal closure and cough reflexes induced by touching epiglottis or arytenoids with endoscope |
| Piecemeal deglutition | Sequential swallowing of same bolus |
| Swallowing related hyoid bone movement | Movement patterns of hyoid bone: Anterior/superior corner of hyoid bone (x axis), anterior/inferior corner of third and fifth cervical vertebral bodies (y axis) |
| | Extent of movement of hyoid bone: Extent of movement in x-y coordinate system over time |
| | Vertical hyoid motion: Maximum vertical motion during swallowing act (in mm) |
| | Horizontal displacement of the hyoid bone: The distance (in cm) from the resting position to the maximal excursion position during swallowing; the most supero-anterior point of the hyoid indicates maximum displacement after swallowing |
| | Vertical displacement of the hyoid bone: The distance (in cm) from the resting position to the maximal excursion position during swallowing; the most supero-anterior point of the hyoid indicates maximum displacement after swallowing |
| | Hyoid displacement - Onset of bolus transit: Bolus head arrival at posterior edge of ramus of mandible |
| | Hyoid displacement - UES-opening: Forward displacement of cricoid cartilage from posterior pharyngeal wall |
| | Hyoid displacement - UES-widset: Widest part of bolus head passing through UES |
| | Hyoid displacement - UES-closure: Last point when UES is open |
| | Hyoid displacement - Laryngeal closure: Forward displacement of arytenoid cartilage to epiglottic petiole |
| | Hyoid displacement - Max laryngeal closure: Maximum contact of arytenoid cartilages with epiglottic petiole |
| | Hyoid displacement - Laryngeal opening: First separation of arytenoid cartilages from epiglottic petiole |

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| Initiation of pharyngeal swallow | Delayed initiation pharyngeal triggering; the location of the bolus at the time of swallow onset; Initiation of swallowing reflex; Bolus location when the swallowing reflex is triggered; Initiation time of the swallowing reflex |
| Postswallow oral residue | 1x N/S, Pooling in oral cavity after the swallow |
| Postswallow pharyngeal residue | 1x N/S; Material was insufficiently cleared from the hypopharynx during swallowing and remained after swallowing; The extent of pharyngeal clearance after swallowing; Residue location of the food |
| Postswallow pharyngeal pooling | Postswallow pooling in valleculae; Pooling in valleculae after the swallow; Pooling in pyriform sinuses after the swallow |
| Piecemeal deglutition | Sequential swallowing of same bolus |
| Penetration/Aspiration | 2x N/S; Definitions of penetration and aspiration according to Rosenbek et al. 1996, Penetration and/or aspiration; Penetration: material entered the laryngeal vestibule (defined by Langmore's epiglottis level 3) but remained at or above the level of the vocal cords; Aspiration: material entered the airway below the vocal cords; Penetration/aspiration of food/liquid before/after swallowing |
| Cortical reorganization | N/S |
| Motor evoked potential (MEP) | Amplitude: N/S Latency: the time in milliseconds from the point at which a TMS pulse was delivered to the onset of a MEP |
| Overall motor symptoms | N/S |
| Tremor | N/S |
| Rigidity | N/S |
| Bradykinesia | N/S |
| Axial symptoms | N/S |
| Freezing of gait | Number of Freezing of gait spells, time to complete test |
| Phonation | N/S |
| Loudness | N/S |
| Level of oral intake | N/S |

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| Aspiration pneumonia | Chest radiography: evidence of pneumonia Clinical evaluation: 3 or more of the following: sustained fever (temperature > 100 °F [38 °C]), rales or rhonchi on chest auscultation, sputum Gram stain showing substantial leukocytes, or sputum culture showing a respiratory pathogen |
| Activities of daily living | N/S |
| Pleasure of oral intake | Patient's degree of enjoyment from food |
| Swallowing related quality of life | N/S |
| Self-perception of swallowing | 4x N/S; Changes in patient subjective dysphagia symptoms as well as swallowing-related quality of life |
| Self-perception of walking | Patient's perception of walking difficulty |
| Self-perception of activities of daily living | N/S |
| Patient's satisfaction with intervention | 1x N/S; Preference for different interventions |
| Patient's adherence to intervention | N/S |
| Hospitalization | N/S |
| Adverse events | Any clinically significant event possibly related to the assigned intervention (for example, dehydration), no report of events expected as part of the participant's disease progression or aging process (for example, worsening of Parkinson disease symptoms), all adverse events were rated as mild, moderate, severe, or life-threatening |

N/S: not specified; T: time; TMS: Transcranial Magnetic Stimulation; UES: upper esophageal sphincter