

## Additional file 3: Data extraction chart

## Complete data extraction

1st author's name, year	Country	Study design	N (dropouts)	Intention to treat analysis	Age	Gender	PD severity	OD severity	Intervention	Comparator	Applied outcome measures + way of measurement	Timepoints	Frequency
Ayres, 2017	Brazil	CCT	32 (8)	No	IG: 62.0 (SD±11.5) CG1: 62.8 (SD±6.2) CG2: 64.5 (SD±5.6)	m=18, f=6	IG: 2.8 (SD±0.8) CG1: 2.5 (SD±0.7) CG2: 2.5 (SD±0.8)	FOIS: IG: 5.9 (SD ±1.3) CG1: 6.8 (SD±0.5) CG2: 6.8 (SD±0.4)	Chin-down posture maneuver	CG1: no intervention CG2: swallowing orientations	> FEES: - prior state of secretion in nasopharyngeal structures, oropharynx, laryngopharynx - presence/absence of: thickening on the posterior laryngeal wall, tremor in structures (BOT, vallecula), early escape, vallecular stasis in glossoepiglottic folds and pyriform sinus, penetration, tracheal aspiration, cough reflex > CSE (presence/absence) - history of aspiration pneumonia - alert state, interaction attention/ability, postural control, fatiguability - awareness of the swallowing problem & of secretion - ability to manipulate flows - anatomy and oral, pharyngeal and laryngeal physiology - orofacial tones & sensitivity - oral apraxia, swallowing apraxia - gag pharyngeal contraction, cough and hawk - saliva swallowing - oral residue - delayed swallowing reflex, multiple swallowing - reduction in laryngeal elevation > wet voice > FOIS > SWAL-QOL	pre, post (4w)	2
Bajjens, 2012	Netherlands	Feasibility pilot study with control group	20 (N/S)	No	65.5 (46-81)	m=14, f=6	median: 2 (1-3)	mild to severe	SES (VitalStim), 3 different electrode positions applied in random order per subject	Healthy controls with same intervention	VFS: - moment of opening and closing of: glossopalatal junction, velopharyngeal junction, laryngeal vestibule, upper esophageal sphincter - PAS - movement patterns of hyoid bone - extent of movement of hyoid bone - pre-swallow anterior spill - pre-swallow posterior spill - lingual pumping - swallow hesitancy - piecemeal deglutition - delayed initiation of the pharyngeal reflex - postswallow oral oral residue - postswallow vallecular pooling - postswallow pyriform sinus pooling - PAS	during	1
Bajjens, 2013	Netherlands	quasi-RCT	109 (19)	No	median: 68	m=66, f=24	median: 2(1-4)	mild to severe	IG1: traditional logopedic dysphagia treatment + SES of submental region; motor-level stimulation; IG2: traditional logopedic dysphagia treatment + SES of submental region; sensory-level stimulation	Traditional logopedic dysphagia treatment	> FEES: - Preswallow posterior spill - Piecemeal deglutition - Delayed initiation pharyngeal reflex - Postswallow vallecular pooling - Postswallow pyriform sinus pooling - PAS > VFS: - Preswallow anterior spill - Preswallow posterior spill - Lingual pumping - Swallow hesitancy - Piecemeal deglutition - Delayed initiation pharyngeal reflex - Postswallow oral residue - Postswallow vallecular pooling - Postswallow pyriform sinus pooling - PAS	pre, post (15d)	2

Byeon, 2016	Korea	RCT	33 (N/S)	No	IG: 63.8 (SD ± 8.2) CG: 65.1 (SD ± 9.5)	m=31, f=2	IG: 15 ≤ H&Y 3; 3 > H&Y 4 CG: 11 ≤ H&Y 3; 4 > H&Y 4	N/S	Postural techniques + EMST	EMST	> VFS: - Functional Dysphagia Scale (FDS)	pre, post (4w)	2
Claus, 2021	Germany	RCT	53 (8)	No	IG: 67.3 (54-83; SD ± 9.5) CG: 67.1 (49-82; SD ± 7.7)	IG: m=19, f=5 CG: m=18, f=3	IG: 2.5 (2-4), CG: 2.6 (2-4)	N/S	EMST (calibrated)	EMST (sham)	> FEES (5-point scales): - premature spillage - penetration-aspiration events - residue - total FEES score (0-108) > SWAL-QOL (German) > Swallowing Disturbance Questionnaire (SDQ) (German) > MEG (only 22 patients, sub-group): - frequency bands: theta (4–8 Hz), alpha (8–13 Hz), beta (13–30 Hz), low-gamma, (30–60 Hz), and high-gamma (60–80 Hz) - In all frequency bands: source localization of each subject's swallowing-associated event-related desynchronization (ERD) of cortical rhythms	pre, post (4w, 3m)	3
Feng, 2019	China	CCT	60 (N/S)	No	IG: 65.20 (SD ± 6.84) (54-84) CG: 64.66 (SD ± 5.27) (56-75)	m=38, f=22	N/S	>18 on the SSA (inclusion criterion)	Vocal training + conventional swallowing treatment	Conventional swallowing treatment	> SSA > Evaluation of salivation: - UPDRS II - Drooling Severity and Frequency Scale (DSFS) > Voice evaluation - Maximum phonation time (MPT) - Maximum phonation decibel	pre, post (4w)	2
Heijnen, 2012	Netherlands	quasi-RCT	109 (21)	No	Median 68 (42-81)	m=65, f=23	Median 2 (1-4)	FOIS: median 7 (1-7)	Traditional logopedic dysphagia treatment + NMES (VitalStim) of the supra hyoid musculature; Group 2 (NMES-M); motor level, Group 3	Group 1: traditional logopedic dysphagia treatment	> FOIS > SWAL-QOL (Dutch) > MD Anderson Dysphagia Inventory (MDADI) (Dutch) > Dysphagia Severity Scale (DSS) > FEES	pre, post, 3m (DSS post each treatment session)	3 (15)
Khedr, 2019	Egypt	RCT	33 (3)	No	IG: 60.7 (SD ± 8.8) CG: 57.4 (SD ± 10.0)	N/S	IG: 3.1 (SD ± 1.1) CG: 3.5 (SD ± 1.0)	SDQ: IG: 17.4 (SD ± 6.1) CG: 16.2 (SD ± 5.8)	Repetitive Transcranial Magnet Stimulation	Sham	> H&Y > UPDRS III > Instrumental Activities of Daily Living (IADL) > Self-assessment scale of swallowing > SDQ > Arabic DHI > VFS (for 9 in IG, 6 in CG, pre, post) - pharyngeal transit time (PTT) - time of first superior-anterior movement of hyoid bone H1 - time when hyoid bone reached its max elevation H2 - time required for max elevation of the hyoid bone H2-H1 - PAS - postswallow residue	pre, post (2w, 1m, 2m, 3m)	5
Kondo, 2017	Japan	RCT	20, thereof 3 with PD (N/S)	No	IG: 80.4 (SD ± 9.5) CG: 80.1 (SD ± 5.9)	m=19, f=1	N/S	N/S	Aural stimulation with capsaicin ointment	Aural stimulation with placebo ointment	> Endoscopic swallowing scoring: - Salivary pooling in vallecula and pyriform sinuses - The response of glottal closure reflex induced by touching epiglottis with endoscope - The location of the bolus at the time of swallow onset assessed by endoscopic whiteout - The extent of pharyngeal clearance after swallowing of blue-dyed water - Total swallowing function > Sensory-Motor-Reflex Clearance (SMRC) scale: - Sensory: Initiation of swallowing reflex as assessed by endoscopic whiteout - Motion: holding bolus in oral cavity and inducing laryngeal elevation according to instructions - Reflex: glottal closure and cough reflexes induced by touching epiglottis or arytenoids with endoscope - Clearance: pharyngeal clearance of bolus after swallowing	pre, post (5, 30, 60 min)	4
Logemann, 2008	United States	RCT	742, thereof 360 with PD (31)	No	range: 50-95	m=498, f=213	N/S	Aspiration of water on VFS (inclusion criterion)	Chin-down posture while consuming thin liquids	No postural adjustment during swallows of nectar and honey-thickened liquids	> VFS: - Aspiration - Preference for different interventions	during	1

