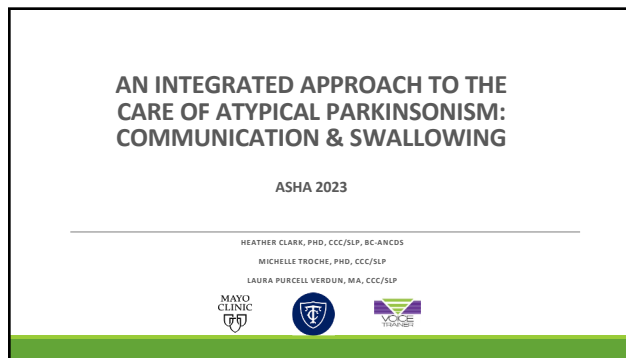
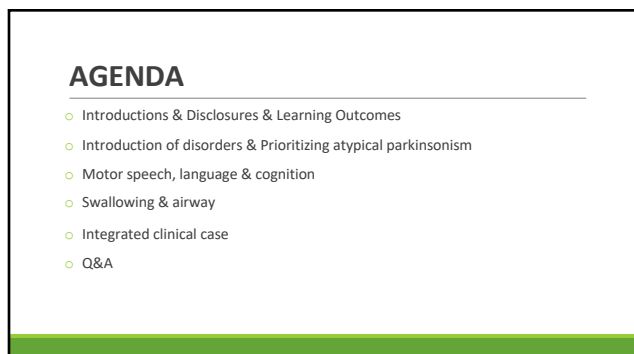




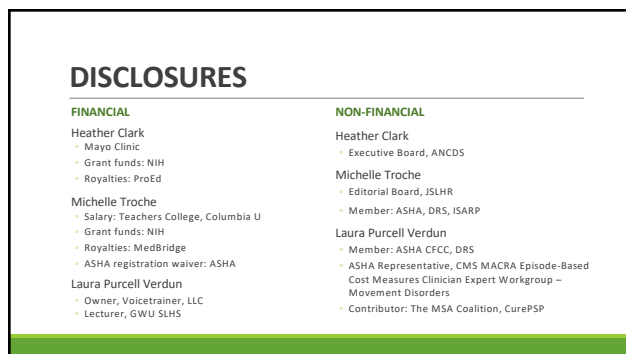
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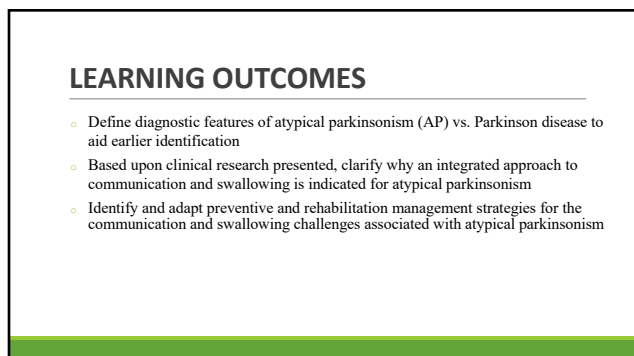
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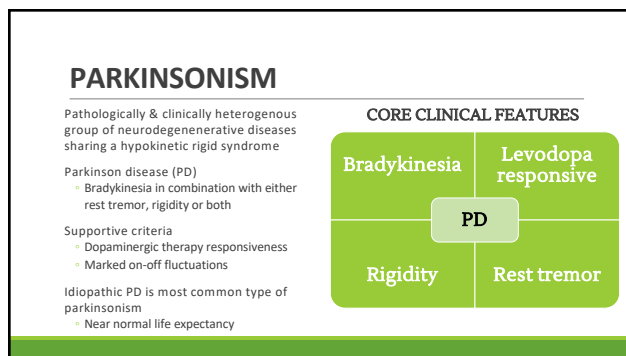
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6

### ATYPICAL PARKINSONISM

**2<sup>nd</sup> most common group of parkinsonian disorders**

Adult-onset  
 Sporadic  
 Rapidly progressive, fatal  
 Multiple neurodegenerations

Even with parkinsonian features, when is it likely **NOT** PD but another parkinsonian disorder (Schroter et al., 2023)

Rapid disease progression  
 Absence or paucity of tremor  
 Early gait abnormality  
 Postural instability  
 Pyramidal tract findings (UMN, pseudobulbar palsy)  
 Poor response to levodopa  
 Early dysphagia  
 Dysarthria other than hypokinetic (Duffy, 2013)

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### ATYPICAL PARKINSONIAN SYNDROMES

<p><b>TAUOPATHIES</b></p> <p>Abnormal accumulation protein Tau</p> <p><b>PSP</b> Progressive supranuclear palsy</p> <p><b>CBS</b> Cortico-basal syndrome</p> <p><b>FTDP</b> Fronto-temporal dementia w/Parkinsonism</p> <p><b>AD</b> Alzheimer's disease</p>	<p><b>ALPHA-SYNUCLEINOPATHIES</b></p> <p>Abnormal accumulation protein <math>\alpha</math>-Synuclein (<math>\alpha</math>Syn)</p> <p><b>PD</b> Parkinson disease</p> <p><b>MSA</b> Multiple system atrophy</p> <p><b>DLB</b> Dementia w/Lewy bodies</p>
--	---

8

### AP DIAGNOSTIC CRITERIA

Evolving based upon certain clinical features and neuropathologic confirmation

• MDS-PD	Postuma et al., 2015
• MDS-PSP	Hoglinger et al., 2017
• CBS	Armstrong et al., 2013
• MDS-MSA	Wenning et al., 2022

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### PSP Progressive Supranuclear Palsy

Most common parkinsonian disorder following PD

**CORE CLINICAL FEATURES**

Executive/cognitive dysfunction	Postural instability
<b>Parkinsonism</b>	
Oculomotor dysfunction	Akinesia

Most common phenotypes

- PSP-RS Richardson's Syndrome
- PSP-P Parkinsonism
- PSP-SL Speech/language

Additional possible clinical features

- Typically symmetric
- Hypokinetic, spastic dysarthria
- Early dysphagia
- Photophobia

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### CBD Cortico-Basal Degeneration

Least common parkinsonian disorder

**CORE CLINICAL FEATURES**

Cognitive dysfunction	Asymmetric
<b>Parkinsonism</b>	
Dystonia	Apraxia

Several phenotypes

- Cortico-basal syndrome (CBS)
- Frontal behavior-spatial syndrome (FBS)
- Nonfluent/agrammatic variant of primary progressive aphasia (nfvPPA)
- Progressive supranuclear palsy syndrome (PSPS)

Additional possible clinical features

- Progressive non-fluent aphasia
- Intention tremor
- Alien limb phenomena
- Myoclonus

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### MSA Multiple System Atrophy

Phenotypes

- MSA-P Parkinsonian
- MSA-C Cerebellar

**CORE CLINICAL FEATURES**

Autonomic dysfunction	Parkinsonism	Cerebellar syndrome
<b>MSA-P</b>		
<b>MSA-C</b>		

Additional possible clinical features

- Ataxia (gait, limb)
- Ataxic dysarthria
- Dysphagia
- Oculomotor dysfunction
- Craniocervical dystonia (anterocollis) – PSP with retrocollis

Inspiratory **stridor** >30% (Gandor et al., 2020)

- Discriminates from PD
- VF motion impairment, VF fixation, PVFM, irregular arytenoid cartilage movements (Mozzanica et al., 2023)

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**EARLY SLP CONSULTATION PRIORITIES**

- Inform earlier, accurate diagnosis
- Prognostic implications as functional decline is much more rapid
- Preserve health and improve quality of life
- Support and educate with regards to communication & swallowing to inform quality patient-centered decisions re: clinical interventions
- Enroll in research and participate with disease modifying therapies to prevent or slow down disability

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**Motor Speech Disorders**

Dysarthria is the most common motor speech disorder in atypical parkinsonism tends to be most severe in PSP but associated with disease severity across AP groups

Features of hypokinetic dysarthria:

- Reduced loudness
- Tight breathiness
- Monopitch/monoloudness
- Rapid rate with short rushes of speech
- Imprecise articulation associated with reduced range of motion of the articulators
- Dysfluencies

Hypokinetic is the most common subtype of dysarthria

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**Motor Speech Disorders**

Dysarthria

Patients with PSP often have light sensitivity and will wear dark glasses and/or a hat

Features of mixed spastic-hypokinetic dysarthria:

- Reduced loudness
- Phonatory strain
- Monopitch/monoloudness
- Normal or slow rate, possibly with short rushes of speech
- Imprecise articulation associated with reduced range of motion of the articulators

Mixed hypokinetic dysarthria should raise suspicion for atypical parkinsonism

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**Motor Speech Disorders**

Dysarthria

Features of mixed spastic-ataxic dysarthria:

- Uncontrolled loudness variation
- Phonatory strain
- Monopitch
- Slow rate
- Irregular articulatory breakdowns

Mixed ataxic dysarthria may be seen in PSP but is more common in MSA-C

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**Motor Speech Disorders**

Apraxia of Speech (AOS) is less common than dysarthria in atypical parkinsonism  
 However, the presence of progressive AOS is strongly suggestive of a 4R tauopathy

- PSP-SL
- CBS

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**AOS Phonetic Subtype**

Features include

- articulatory distortions
- distorted substitutions and additions
- increased errors with increased phonetic complexity
- silent or audible groping or restarts/revisions

More likely to develop aphasia and have CBD pathology

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## AOS Prosodic Subtype

### Features include

- slow rate
- syllable and word segmentation
- reduced words per breath group

More likely to develop parkinsonism and have PSP pathology

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## Language Disorders

Aphasia is most common in CBD pathology

- Agrammatism often present
- WAB profile often anomic as nonfluency may not as severe as Broca's profile
- It is important to include multiple measures of grammatic integrity because of cognitive and motor speech confounds
- Undistorted sound substitutions likely reflect phonologic errors and may co-occur with apraxic errors

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## Agrammatic writing

READING  
FATHER / WIFE IS WINE  
BOY W/ KITE RUNS  
DOG IS RUN WITH TO BOY  
2 people SAILING  
LIMB GROW IN FA  
HOME / CAR  
TREE

21

## Yes-no reversals

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## Cognitive Disorders

### Cognitive difficulties common in AP

- Cognitive difficulties more likely than aphasia in in PSP and MSA
- However, PPAOS (by definition) has no accompanying cognitive difficulties, at least at disease onset

### Common impairments

- Immediate and delayed episodic memory
- Executive function
  - Word fluency
- Processing speed
- Apathy
- Irritability
- Depression

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## “PEARLS” FOR ASSESSMENT OF SPEECH, LANGUAGE, AND COGNITION

- Standard motor speech exam (Duffy, 2020), including oral mech exam and tasks targeting motor planning
- Aphasia batteries may not be sensitive to subtle agrammatism, written language sample can be helpful
- Nonaphasic cognitive communicative impairments are often evident and influence performance on language tests. Neuropsychological assessment provides additional insight
- Periodic reassessment is needed to identify priorities for management

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### “PEARLS” FOR TREATMENT OF SPEECH, LANGUAGE, AND COGNITION

- Establish most reliable **yes-no response**; alert conversation partners to expect self-corrections
- Traditional therapies for hypokinetic dysarthria do not have as predictable outcomes for AP but may be helpful for select patients
  - Be mindful of mixed dysarthria features that make a **loudness-focused therapy contra-indicated** (e.g., increased phonatory strain in mixed spastic dysarthria)
- Prioritize **comprehensibility strategies and multimodal communication**
- Nonaphasic cognitive communicative impairments impact the patient’s ability to apply strategies, the conversation partner may bear a good deal of the burden
- Plan ahead for progression.** AAC may be helpful but must take into account language and cognitive limitations
- Focus on **function and quality of life**

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### Airway Protection

There are high rates of dysphagia and aspiration pneumonia in atypical PD

- Dysphagia is considered largely inevitable in atypical parkinsonism
- All phases of the swallow can be impacted by atypical parkinsonism
- There is marked heterogeneity in the presentation of swallowing-related dysfunction based on the distinct patterns of cortical and subcortical involvement, likely impacting swallowing in unique ways

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### Progressive Supranuclear Palsy: Swallowing

**Dysphagia in Progressive Supranuclear Palsy**

Heather M. Clark<sup>1</sup>, Julie A. G. Slorvick<sup>1</sup>, Nikolai Touloukian<sup>1</sup>, Hugo Botla<sup>1</sup>, Farooq A<sup>1</sup>, Jennifer L. Whitford<sup>1</sup>, Keith A. Joseph<sup>1</sup>

**Influences of motor speech impairments on the presentation of dysphagia in progressive supranuclear palsy**

Clark et al., 2019; Clark et al., 2021; Petro-Boch et al., 2023

- Predominant oral phase impairments, including back and forth rocking motion of the tongue, delayed initiation of the pharyngeal swallow, and oral residue.
- Disease severity correlated significantly with oral ( $r=0.42, p=0.002$ ) and pharyngeal ( $r=0.41, p=0.003$ ) total scores
- Differential patterns of neuroanatomical impairment corresponded to oral and pharyngeal phase swallowing impairments.
- Greater motor speech disorder severity was related to more severe pharyngeal phase impairments
- A trend for participants with spastic dysarthria and/or AOS to exhibit more severe dysphagia was observed

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### Progressive Supranuclear Palsy vs PD: Swallowing

**Quantifying Impairments in Swallowing Safety and Efficiency in Progressive Supranuclear Palsy and Parkinson’s Disease**

James C. Borders<sup>1</sup>, Jordanna S. Sevtz<sup>1</sup>, James A. Curtis<sup>1</sup>, Nora Vanegas-Arroyave<sup>1</sup>, Michelle S. Troche<sup>1</sup>

	PSP (n=24)	PD (n=24)	p-value
Age (year)	71.81 (7.34)	70.90 (6.86)	.991
Sex	Male = 15	Male = 19	.310
Female = 9	Female = 5		
McCA	20.70 (6.81)	25.90 (3.21)	.002
Disease Duration (year)	5.05 (2.19)	5.22 (2.39)	.818
Symptom Onset (year)			
Swallow and English activities of Daily Living	51.70 (21.50)	79.10 (13.40)	<.001
LSwing	PSP=83.16		
PSP Subtype (log)	PSP=3.7		
PSP=0.1			

Across all thin-liquid boluses, individuals with PSP were more likely (OR=4.82; 90% CI: 1.25–12.73) to have deeper airway invasion (i.e., higher PAS scores) compared to PD

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### Multiple System Atrophy: Swallowing

**Relationship Between Pneumonia and Dysphagia in Patients With Multiple System Atrophy**

Francisco Mazzotta<sup>1,2</sup>, Mizuki Pigeon<sup>1</sup>, Angèle Gallo<sup>1</sup>, Daniela Giacomini<sup>1</sup>, Anna Colombini<sup>1</sup>, Gabriela Mora<sup>1</sup>, Federico Andreati<sup>1</sup>, Silvia Kormanik<sup>1</sup>, Antonia Scheraga<sup>1</sup>

**Endoscopic Characteristics of Dysphagia in Multiple System Atrophy Compared to Parkinson’s Disease**

Mazzotta et al., 2023; Wada et al., 2022; Vogel et al., 2022

- More oral phase impairment when compared with PD
- Marked penetration and aspiration with liquids
- Residue in the pyriform sinus and vallecula with all consistencies
- Vocal fold motion impairment was frequent (56%)
- No significant differences between patients with MSA-P and MSA-C in the dysphagia characteristics and laryngeal movement alterations
- Patients with a history of pneumonia have more severe dysphagia.

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### Individuals with Parkinson’s Disease have progressive and pervasive disorders of BOTH cough and swallowing

Swallowing, Glottal stop/LAR, Exp reflex, Exp effort, Throat clear, Cough

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### Progressive Supranuclear Palsy: Cough

RESEARCH ARTICLE

#### Sensorimotor Cough Dysfunction Is Prevalent and Pervasive in Progressive Supranuclear Palsy

James C. Borders, MS, CCC-SLP<sup>1</sup>, Jordan S. Smitz, MS, CCC-SLP<sup>2</sup>, James A. Curtis, PhD, CCC-SLP, BCS-S<sup>1</sup>, Sara Vengas-Arroyave, MD<sup>3</sup>, and Michelle S. Troche, PhD, CCC-SLP<sup>4</sup>

<sup>1</sup>Laboratory for the Study of Upper Airway Dysfunction, Department of Biobehavioral Sciences, Teachers College, Columbia University, New York, New York, USA  
<sup>2</sup>Department of Neurology, Baylor College of Medicine, Houston, Texas, USA

	PSP (n = 26)	PD (n = 26)
Age, mean (SD), y	72.08 (7.47)	71.37 (6.63)
Sex (n)		
Male	16	20
Female	10	6
MoCA, mean (SD)	20.21 (7.00)	25.75 (3.12)
Disease duration from symptom onset, mean (SD), y	5.01 (2.14)	5.39 (2.57)
Schwab and England activities of daily living, mean (SD)	47.69 (23.38)	78.46 (16.42)
Swallowing severity <sup>a</sup>	3 (2-6)	3 (1-5)

<sup>a</sup>Prevalence-severity scale scores obtained from trials of 90 mL thin liquid during flexible endoscopic evaluation of swallowing. Median scores and interquartile ranges are provided.  
PSP, progressive supranuclear palsy; PD, Parkinson's disease; SD, standard deviation; MoCA, Montreal Cognitive Assessment.

- Decreased PEFR for PSP compared to PD for voluntary (P<0.001) and reflex (P=0.041) cough.
- Decreased CEV for PSP compared to PD for voluntary (P<0.001) and reflex cough (P<0.001).
- Decreased CVA for PSP compared with PD across cough types.

(Borders et al., 2021)

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### Progressive Supranuclear Palsy: Cough

RESEARCH ARTICLE

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<sup>2</sup>Department of Neurology, Baylor College of Medicine, Houston, Texas, USA

- Individuals with PSP showed significantly higher urge-to-cough sensitivity slopes compared to PD (P=0.041)
- All participants with PSP and PD demonstrated reduced UTC sensitivity compared to norms
- Reflex cough motor slopes were not significantly different between PD and PSP.
- Cough thresholds were also not significantly different between PD and PSP

(Borders et al., 2021)

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### Comparing PD, PSP, and MSA-C: Cough

	PSP (n = 26)	PD (n = 26)	Overall (N=77)
Age, mean (SD), y	72.08 (7.47)	71.37 (6.63)	
Sex (n)			
Male	16	20	3 (42.9%)
Female	10	6	4 (67.1%)
MoCA, mean (SD)	20.21 (7.00)	25.75 (3.12)	
Disease duration from symptom onset, mean (SD), y	5.01 (2.14)	5.39 (2.57)	
Schwab and England activities of daily living, mean (SD)	47.69 (23.38)	78.46 (16.42)	
Swallowing severity <sup>a</sup>	3 (2-6)	3 (1-5)	

<sup>a</sup>Prevalence-severity scale scores obtained from trials of 90 mL thin liquid during flexible endoscopic evaluation of swallowing. Median scores and interquartile ranges are provided.  
PSP, progressive supranuclear palsy; PD, Parkinson's disease; SD, standard deviation; MoCA, Montreal Cognitive Assessment.

	Healthy Controls	Parkinson's Disease	Progressive Supranuclear Palsy	Multiple System Atrophy-C
Peak Expiratory Flow Rate	5.38	2.74 (0.81)	1.82 (0.93)	1.85 (0.820)
Cough Expired Volume	0.77	0.54 (0.44)	0.37 (0.39)	0.504 (0.264)
CoV for PEFR	8.9%	14.4%	19%	---

(Borders et al., 2021; Lowell et al., in prep; Brandimore et al., 2015)

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### Comparing PD, PSP, and MSA-C: Voluntary Cough

	Healthy Controls	Parkinson's Disease	Progressive Supranuclear Palsy	Multiple System Atrophy-C
Peak Expiratory Flow Rate	5.38	2.74 (0.81)	1.82 (0.93)	1.85 (0.820)
Cough Expired Volume	0.77	0.54 (0.44)	0.37 (0.39)	0.504 (0.264)
CoV for PEFR	8.9%	14.4%	19%	---

(Borders et al., 2021; Lowell et al., in prep; Brandimore et al., 2015)

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### Comparing PD, PSP, and MSA-C: Reflex Cough

	Healthy Controls	Parkinson's Disease	Progressive Supranuclear Palsy	Multiple System Atrophy-C
Peak Expiratory Flow Rate	4.54	2.42 (0.64)	1.89 (0.62)	2.09 (0.92)
Cough Expired Volume	0.61	0.49 (0.21)	0.37 (0.39)	0.405 (0.273)
Urge-to Cough	6	3	3	2
CoV for PEFR	14.6%	14.3%	18.7%	---

(Borders et al., 2021; Lowell et al., in prep; Brandimore et al., 2015)

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What may underly some of these deficits?

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### Progressive Supranuclear Palsy: Vocal Fold Bowing

The Role of Vocal Fold Bowing on Cough and Swallowing Dysfunction in Progressive Supranuclear Palsy

Neelvi Elaver, MD, James C. Borders, MS, CCC-SLP, James A. Curtis, MS, CCC-SLP, Jordanna S. Sevitz, MS, CCC-SLP, Nora Vasquez-Arroyave, MD, Michelle S. Troche, PhD, CCC-SLP

Fig 3 Examples of mild-to-moderate vocal fold bowing (left; bowing index = 10.8) and severe vocal fold bowing (right; bowing index = 22.1).

All people with PSP had some degree of vocal fold bowing  
 47% → mild-to-moderate vocal fold bowing  
 52% → severe vocal fold bowing

(Elaver et al., 2020)

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### Comparing PD, PSP, and CA: Vocal Fold Bowing

The Role of Vocal Fold Bowing on Cough and Swallowing Dysfunction in Progressive Supranuclear Palsy

Neelvi Elaver, MD, James C. Borders, MS, CCC-SLP, James A. Curtis, MS, CCC-SLP, Jordanna S. Sevitz, MS, CCC-SLP, Nora Vasquez-Arroyave, MD, Michelle S. Troche, PhD, CCC-SLP

- BI in PSP was not influenced by age, sex, or disease duration ( $p > .05$ )
- Those with severe vocal fold bowing had significantly worse voluntary PEFR ( $p = .010$ ), voluntary CVA ( $p = .005$ ), and reflex CVA ( $p = .020$ ) as compared to those with mild to moderate vocal fold bowing
- Controlling for age, PSP demonstrated a 5.11% more bowing compared to PD and 6.27% more bowing compared to ataxia

(Elaver et al., 2020; Tipton et al., in prep) 40

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### Comparing PD, PSP, and MSA-C: Lingual Strength

	Healthy Controls	Parkinson's Disease	Progressive Supranuclear Palsy	Multiple System Atrophy- C
Max Anterior Pressure (in kPa)	57.42 (12.97)	45.45 (17-73)	37.3 (83-3)	34 (7-66)
Swallowing Pressure (in kPa)	20 (9)	18.91 (6.33-35)	14.4 (5.6 - 32)	14.9 (9-25)

(Fei et al., Yeates et al., Sevitz et al., 2022; unpublished data)

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### Comparing PD, PSP, and MSA-C: Respiratory Strength

	Healthy Controls	Parkinson's Disease	Progressive Supranuclear Palsy	Multiple System Atrophy- C
Maximum Expiratory Pressure (cm H <sub>2</sub> O)	175	102 (10-203)	74.57 (13.3 - 193.7)	52.7 (51-55)*
Maximum Inspiratory Pressure (cm H <sub>2</sub> O)	81	52 (F) 100 (M)	35.33 (5.3 - 87.3)	12.7 (11-16)*

(Enright et al., 1994; Troche et al., 2023; Silverman et al., 2008; unpublished data)

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### Take-home message:

**Comprehensive evaluations of swallowing (and cough) are necessary in APD**

- Distinct individual differences in airway protective dysfunction within and across APD
- Clear dysfunction across the continuum of airway protection (swallowing + cough)
- High rates of aspiration pneumonia
- Reminder - that which is influencing their speech-language production is likely also impacting their eating and drinking abilities (e.g., bradykinesia, difficulty with attention, disinhibition, etc)

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### Treatment

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### Respiratory Swallowing Training

Research Article

**Respiratory-Swallow Coordination Training and Voluntary Cough Skill Training: A Single-Subject Treatment Study in a Person With Parkinson's Disease**  
 James A. Curtis,<sup>1</sup> Avery E. Dakin,<sup>1</sup> and Michelle S. Troche<sup>1\*</sup>

Optimal RSC

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### Biofeedback in Swallowing Skill Training (BISSkIT)

Meppan  
 CLINICAL PRACTICE

**Skill Training Resulted in Improved Swallowing in a Person with Multiple System Atrophy: An Endoscopy Study**

- Training (as published) involves:
  - sEMG electrodes placed on skin overlying suprahyoid musculature
  - Real-time visual biofeedback of extent and timing of muscle contractions
  - Software provides dynamic 'swallow hit' target for **strength** and **skill** training
  - Intensity: 1 hr, 5 day/week therapy for 2 weeks
- We modified the treatment protocol
  - Weekly in-person BISSkIT training sessions (1 hr)
  - Daily home practice module (100 swallows)
  - Re-evaluated at 4 weeks and 6 weeks

Swallow SOFT

(Athakorala et al., 2014)

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Meppan  
 CLINICAL PRACTICE

**Skill Training Resulted in Improved Swallowing in a Person with Multiple System Atrophy: An Endoscopy Study**

First BISSkIT session: 68% accuracy, target size = 118 pixels  
 Sixth BISSkIT session: 78% accuracy, target size = 27 pixels

- Swallowing safety improved
- Patient reported improvements in swallowing symptoms and QOL (per SWAL-QOL)
- Returned for a 6 month follow up and improvements were maintained.

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### Expiratory Muscle Strength Training (EMST)

- 29 of 30 individuals with PSP attempted EMST
- 27 were able to successfully complete at least 10 repetitions of the EMST task
- Nearly half (48%) required a low threshold device at 30% of their MEP during initial trials
- The vast majority of participants (86%) attempted EMST with resistance greater than 30% of their MEP and were able to open the valve on at least one trial

(Villareal et al., in prep)

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Dysphagia (2022) 37:74-83  
 https://doi.org/10.1007/s00435-021-10201-1

ORIGINAL ARTICLE

**Immediate Effects of Sensorimotor Training in Airway Protection (smTAP) on Cough Outcomes in Progressive Supranuclear Palsy: A Feasibility Study**

James C. Borders<sup>1</sup> · James A. Curtis<sup>1</sup> · Jordanna S. Sevitz<sup>2</sup> · Nora Vanegas-Arroyave<sup>3</sup> · Michelle S. Troche<sup>1\*</sup>

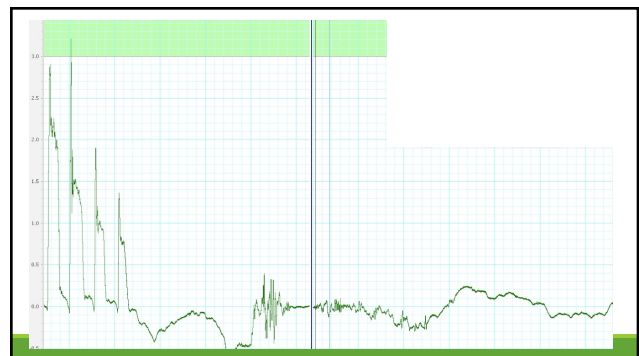
Table 1 Participant demographics

ID	Age (years)	Sex	PSP subtype	Disease duration since symptom onset (years)	Disease duration since diagnosis (years)	Maximum PAS Score	Median swallow strength
1	70	F	Probable PSP-BS	10.08	1.54	3	3
2	71	M	Probable PSP-BS	9.92	4.92	8	5
3	89	F	Probable PSP-BS	5.32	4.28	7	6
4	70	M	Probable PSP-BS	5.41	3.41	3	6
5	76	M	Probable PSP-BS	4.18	1.01	8	8
6	89	F	Probable PSP-BS	4.13	1.01	5	3
7	77	M	Probable PSP-BS	4.03	2.02	5	4
8	47	F	Probable PSP-BS	2.36	2.36	1	4
9	69	F	Probable PSP-BS	2.14	3.28	5	3
10	66	M	Suggestive PSP-BS	3.56	14.02	8	5
11	64	M	Probable PSP-P	4.03	4.02	3	7
12	71	M	Suggestive PSP-P	6.49	3.48	8	8
13	62	F	Suggestive PSP-P	6.01	5.01	1	7
14	70	M	Suggestive PSP-P	3.98	2.14	8	1
15	79	M	Probable PSP-P	6.62	3.87	5	2

PSP-BS PSP with Richardson's syndrome, PSP-P PSP with predominant Parkinsonism, PSP-P PSP with predominant frontal lobe degeneration, PAS posterior-anterior swallow screen, Median swallow strength obtained from 20 sEMG

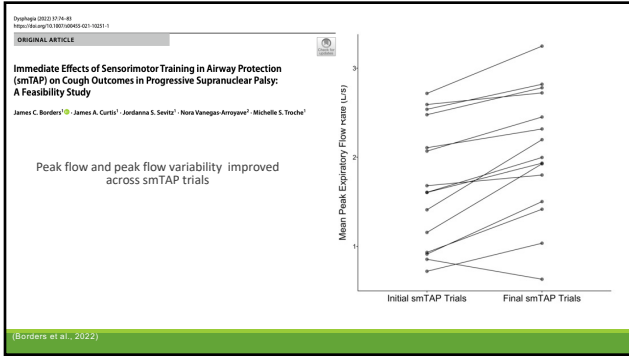
(Borders et al., 2022)

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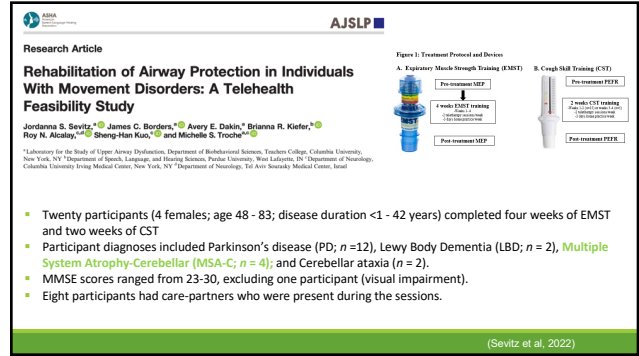


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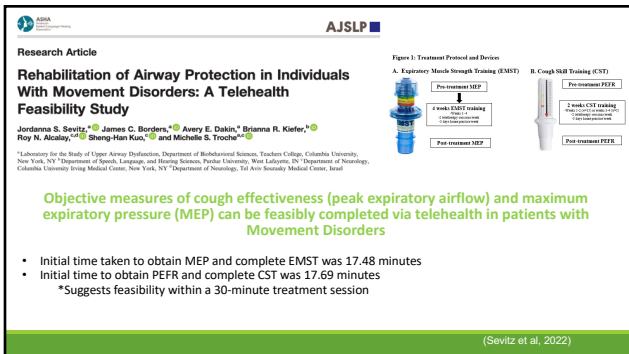




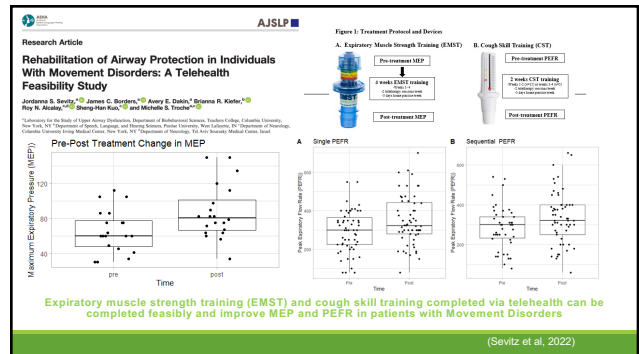
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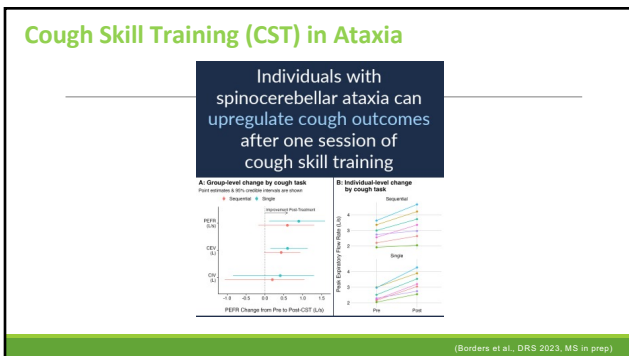
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Take-home message:

Treatment of airway protection can be feasible and efficacious in APD!!!

- There are multiple treatment modalities for swallowing and cough dysfunction which are feasible and show some immediate and sustained effects in people with APD.
- Biofeedback and strength training approaches for the upregulation of swallowing and cough function are both potential therapeutic modalities which should be further explored in APD
- However, people with APD will likely require additional cueing and modifications to usual training protocols
- We should consider the role of executive dysfunction and memory deficits and their intersection with airway protective treatment in APD.

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## INTEGRATED CLINICAL CASE

- 69 year old
- Symptoms began 2.5 years ago
  - Brain fog, lack of initiative
  - Personality change
  - Imbalance
- One year ago
  - Falls
  - Dysarthria, greatest complaint is voice

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## CLINICAL TAKEAWAYS

- Take a curious approach
  - Address AP through its own lens vs. PD
- SLP is in unique position to contribute to AP
  - Particularly clinical diagnosis with respect to motor speech
  - Clinical care and prognostication
- Integrated & comprehensive approach
  - Prioritize speech and swallowing goals with consideration to rapid progression and multiple impairments
  - Counseling and education re: anticipated disability due to progressive dysarthria & dysphagia
- Because HOPE matters
  - CurePSP

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Heather Clark, PhD, CCC/SLP

[Clark.heather1@mayo.edu](mailto:Clark.heather1@mayo.edu)

Mayo Clinic

Michelle S. Troche, PhD, CCC/SLP

[Mst2139@tc.columbia.edu](mailto:Mst2139@tc.columbia.edu)

Teachers College, Columbia University

Laura Purcell Verdun, M.A., CCC/SLP

[laura@voicetrainer.com](mailto:laura@voicetrainer.com)

Voicetrainer, LLC



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