Caring for Voice and Swallowing Disorders in Parkinson’s Disease

Lori Ellen Sutton, MA, CCC-SLP
Clinical Voice and Swallowing Specialist
CEENTA Voice and Swallowing Center
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The Statistics

• Prevalence of PD
  • 1.5 million USA
  • 5.7 million worldwide
• Prevalence of voice/speech issues
  • 89% (>1 million) --> Eventually 100%
  • Only 3-4% receive treatment
• Some report volume, hoarseness or monotone as the 1st PD symptom. (Aronson, 1990)
• 80% die of aspiration pneumonia

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Normal Voice & Speech Production

• Air passes into the lungs through open vocal folds
• Vocal folds close as the lungs release the air
• Vocal folds begin to vibrate
• Vibrations reverberate throughout the head/neck
• Move lips and tongue to form words

But with PD...

“if we could only understand her...”
“Tired when I talk.”
“My spouse needs a hearing aid.”

Oral communication is a vital element in education, employment, social functioning, and self expression. (2007 LSVT training manual)

“People can’t understand me.”
“I always have to repeat myself.”
“People don’t pay attention to me.”

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Typical Voice & Speech Complaints

- Soft Voice
- Mumbled Speech
- Shaky Voice
- Speak Too Fast
- Hoarseness
- Breathy Voice
- Monotone
- Hearseness
- Stuttering

Voice/Speech Treatment Options

**Behavioral & Compensatory Treatment**

- Therapy Programs
  - Lee Silverman Voice Treatment - LOUD (LSVT)
  - Speak Out!
- Devices
  - Delayed Auditory Feedback
  - Augmentative Communication
  - Personal Amplification

**Medical Treatment**

- Vocal Fold Augmentation
  - For significantly bowed/weak vocal folds
  - Improves vocal fold closure
  - This alone does not address the sensory input aspect related to soft voice production.
- Botox Injections
  - For essential tremor or the voice

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**What is LSVT?**

- Scientifically documented efficacious program for treating voice/speech disorders in pts w/ PD
  - 20 yrs & $8 million in NIH Research Funding
- Intensive & High-End Modality
  - 4x/week for 4 consecutive weeks
  - Daily home practice during & after treatment
  - Regular follow-ups with SLP after completion (6 mon)
- Targets Vocal Loudness ONLY
  - “spill over” effect into articulation, facial expression, respiratory support, and swallowing
- GOAL = Pt uses LOUD voice “automatically” in daily communication

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**Is LSVT For Me?**

- Not all patients w/PD are candidates for LSVT
- Best results with Idiopathic PD
  - Improvements seen w/ other types of Parkinsonism & the neurologic disorders
- Determined w/ evaluation & testing
- May need to address other problems with the vocal folds first
  - Bowing (weak vocal folds)
  - Lesions
  - Infections

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**Ready v. Not-Ready for Behavioral Voice/Speech Therapy**

- Mildly weak vocal folds
  - Ready for therapy
- Severely weak vocal folds
  - Need augmentation before therapy
STN-DBS and Voice/Speech in PD

**Considerations**

- Placement of DBS electrodes
- One or both sides of the brain
- Stimulator adjustments
- Amount of medications
- Overall severity of PD

**When STN-DBS impacts voice/speech...**

- Not always the same issues as seen w/ typical PD
- More jaw/tongue hyperkinesias
- Hypernasality (velopharyngeal insufficiency)
- Some impact on learning/cognition

When STN-DBS impacts voice/speech...

STN-DBS and LSVT

- Pilot Study (3 patients)
- Outcomes comparable to those without DBS
- Treating SLP’s noted:
  - more difficulty reaching target loudness
  - persistent hoarseness, more severe slurring, & impaired tongue control
  - more difficulty with carryover into daily conversations
- Possible explanations (Tongqvist et al, 2005; Tripodii et al, 2008)
  - high stimulator settings = negative impact on speech intelligibility
- Recommendations
  - Optimize DBS settings for speech
  - May need more than 4 weeks of therapy
  - 1-month or 3-month follow-ups
  - Pre-treat with LSVT

Essential Tremor of the Voice

- a.k.a. Laryngeal tremor
- consistent rhythmic modulations of the voice
  - most notable during sustained vowels
  - can affect connected speech
  - can affect just the vocal folds or the whole voice box (larynx)
- Treatment
  - Botox if confined to the vocal folds
  - Speech therapy to train behavioral compensations

Swallowing Disorders in Parkinson’s

Anatomy of the Swallowing Mechanism

- Oral
- Pharyngeal
- Esophageal

A Shared Passageway
Normal Physiology of Swallowing Mechanism

Oral Prep Phase | Oral Phase | Pharyngeal Phase | Esophageal Phase

- Sensory recognition
- Mastication
- Pharyngeal squeeze
- Opening of UES
- Primary peristalsis
- Secondary peristalsis

Oral Prep Phase

- Food introduced
- Salivation begins
- Labial seal

Pharyngeal Phase

- Lubrication
- Positioning of bolus
- Palatal closure
- Laryngeal elevation
- Epiglottic inversion
- Vocal fold closure

Esophageal Phase

- Tongue elevation & retraction
- UES
- Primary peristalsis
- Secondary peristalsis

Swallowing Disorder's in PD

- Dysphagia = swallowing problem
- Can occur at ANY stage of disease progression
- Eventually 100% of pts with PD will have dysphagia
- Multifactorial dysphagia
  - oral prep phase = difficulty w/ reach-to-eat movements
  - oral phase = tongue pumping, difficulty organizing bolus
  - pharyngeal phase = impaired motility, delayed HLE, aspiration
  - esophageal phase = weak peristalsis, spasm, hiatal hernia, higher incidence of GER
- Aspiration pneumonia is the leading cause of death

Signs/Symptoms of a Swallowing Difficulty

- Difficulty starting the swallow
- Coughing during/after eating
- Regurgitation
- Recurrent pneumonia
- Food sticks in the mouth, throat, or chest
- Drooling/ Losing food or drink from the mouth
- Unintentional weight loss
- Excessive meal time
- Recurrent pneumonia
- Unintentional weight loss

FEES v. MBS

FEES
- Swallowing assessed w/ a flexible endoscope passed through the nose & into the throat
- can only see the throat, not the mouth or the upper esophagus
- Better assessment of pharyngeal/laryngeal anatomy
- Can assess secretion management
- Sensory testing an option

MBS - Pros & Cons
- Swallowing assessed under x-ray
- Preferred in PD so that the oral phase (mouth) and upper esophagus can be visualized as well as the throat
- Better assessment of UES function

Objective Swallowing Evaluations

FEES/FEEST
- Clinical/Bedside Swallow Evaluation
- Modified Barium Swallow
- Barium Swallow

Management of Dysphagia

Medical
- Secretion management
- Treatment of reflux
- Surgical/structural management
- Airway protection
- Enteral nutrition

Behavioral
- Compensatory strategies
- Diet modification
- Rehabilitative Treatment/Exercise
- Biofeedback

GOAL = to improve the safety & efficiency of swallow function
Behavioral Management of Dysphagia

**Compensatory Treatment**
- Dietary modification
  - thicken liquids
  - softer/puree foods
  - NPO
- Compensatory/facilitating strategies
  - adjust bolus sizes
  - alternate solids/liquids
  - weighted utensils
  - specialized cups
- Behavioral strategies
- Postural maneuvers

**Rehabilitative Treatment**
- Lingual & pharyngeal strengthening exercises
- McNeill Dysphagia Therapy Protocol
- Mendelsohn and Masako exercises
- IOPI & MOST devices
- Oral motor exercises
- Neuromuscular electrical stimulation
  - Vidal film
  - Myofascial release
  - Biofeedback
  - sEMG

Because of the risk to overall health, treating swallowing problems may take priority over treating voice and speech problems!!

**The Bottom Line**
- You don’t have to live with a soft or shaky voice or swallowing problems
- Help is available.
- With or without DBS there are treatments for addressing the voice/speech problems that accompany Parkinson’s disease.
- Improving your voice/speech is a life-long commitment.
- Don’t wait until your voice or swallowing difficulties have become severe!
- Tell your doctor about your voice/speech or swallowing difficulties as soon as you notice them. **The sooner the better!!!**

**References**

Any questions? Thank you!!