Speech-Language Pathology & Parkinson's Disease

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AGENDA

- Discuss the role of a Speech-Language Pathologist
- Discuss potential changes in communication, swallowing & cognition related to Parkinson's Disease
- Discuss general speech therapy treatment options to address communication, swallowing & cognition
- Q & A

What does a Speech-Language Pathologist (SLP) Do?

Cognition

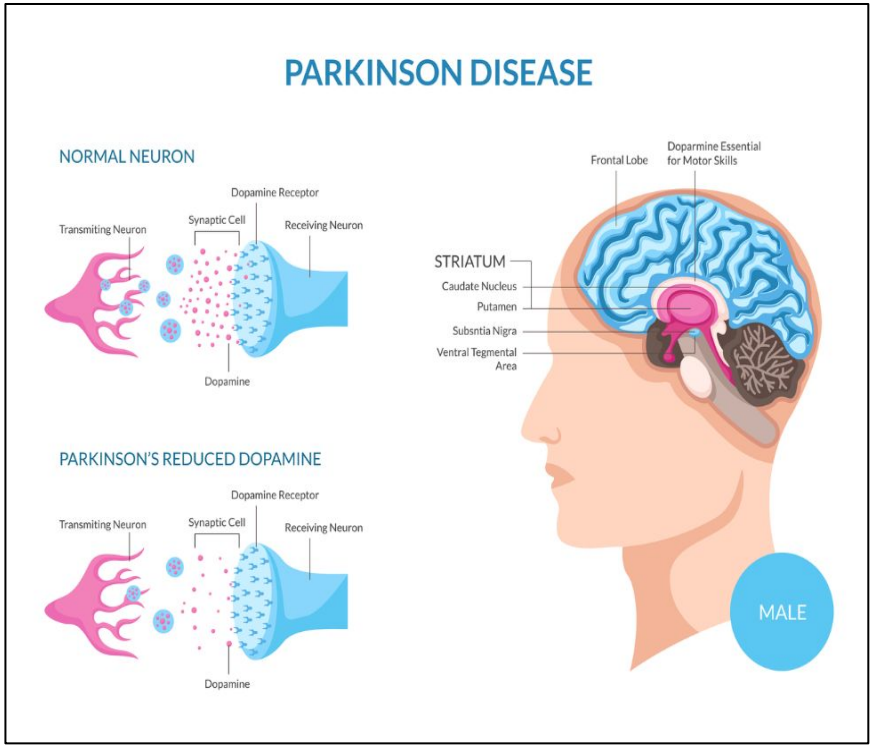
Speech & Language

Voice & Swallowing

All of these areas can be affected by Parkinson's Disease

Why All of These Changes?

Reduced Dopamine

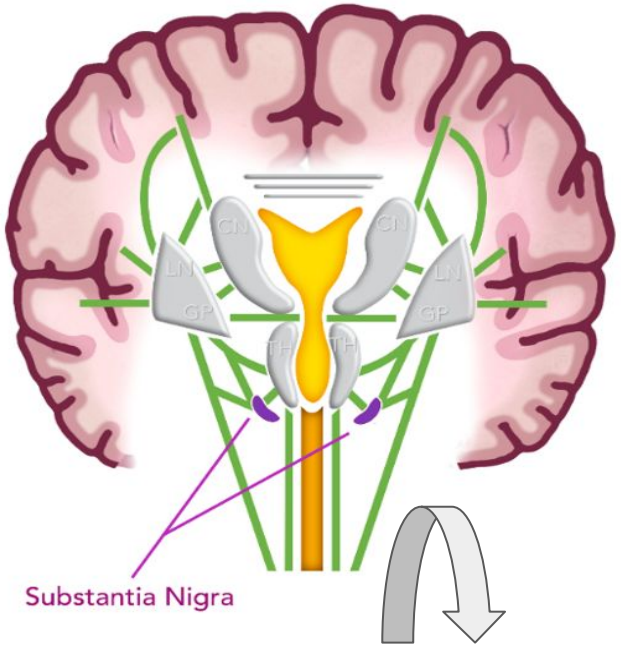


Common Muscle/Movement Symptoms in Parkinson's Disease That May Impact Communication & Swallowing

- Tremor
- Slowed movements (bradykinesia)
- Rigid muscles
- Difficulty initiating/continuing movements
- Impaired coordination
- Impaired automatic muscle control

Extrapyramidal System

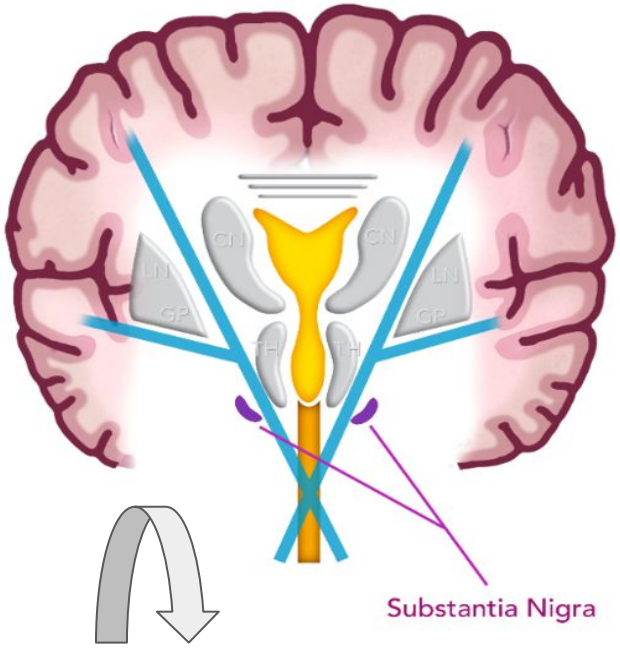
Automatic System



-complex network of neurofibers
-interacts w/ SN where Dopamine is produced
-automatic movements are therefore impaired

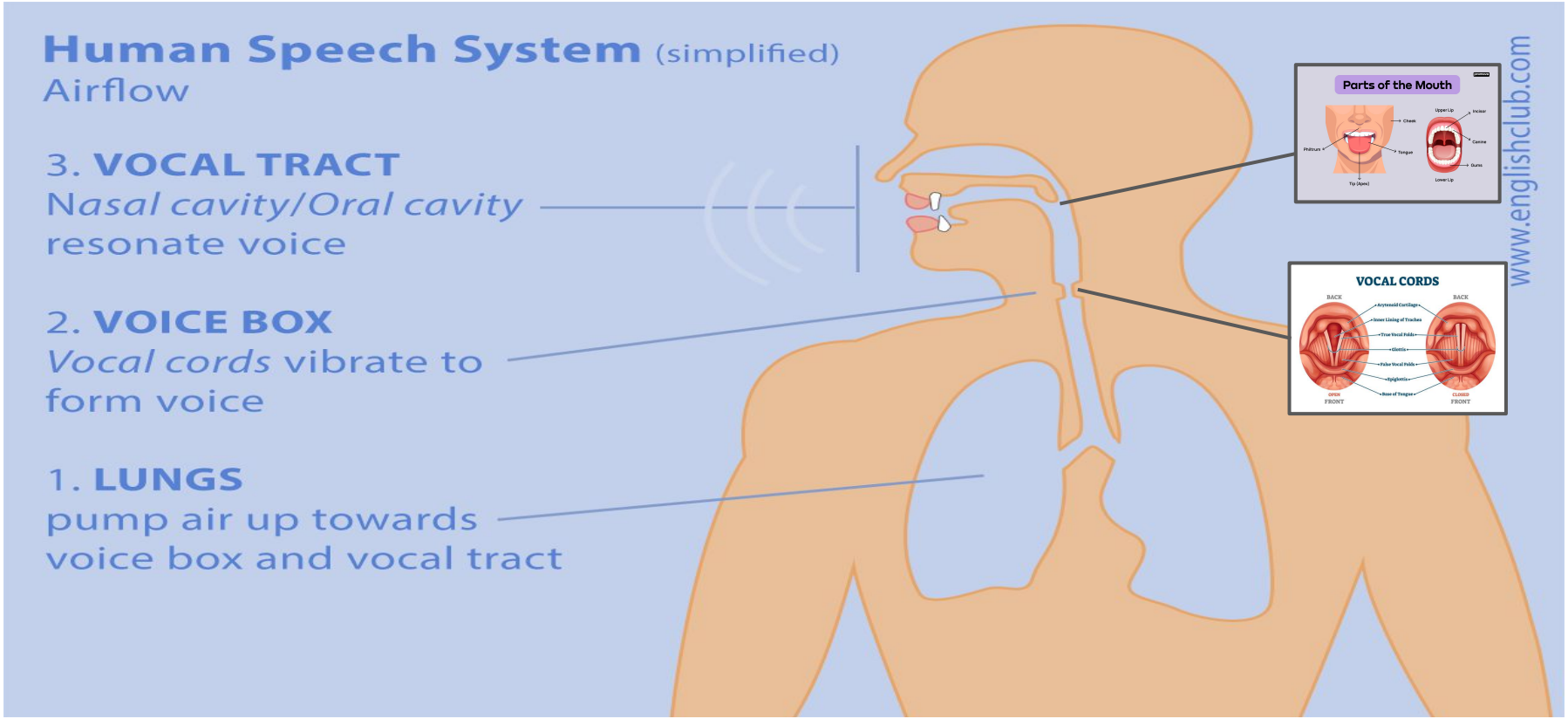
Pyramidal System

Intentional System



-info travels uninterrupted from brain thru brain stem
-doesn't communicate w/ SN/not Dopamine dependent
-works better for Parkinson's

Communication Changes in Parkinson's Disease: How is Voice/Speech Produced?



Images from www.englishclub.com, iStock, , Promova

Communication Changes and Parkinson's Disease

Potential changes to voice may include:

-Difficulty projecting voice for others to hear

-Inconsistent, gravely, hoarse, or breathy vocal sound

-Running out of air before the end of the sentence

-Decreased pitch changes, leading to possible monotone sound

WHY?
-reduced automatic muscle control
-difficulty coordinating movements
-difficulty regulating size of movements (small)
-muscle rigidity

Communication Changes and Parkinson's Disease

Potential changes to speech may include:

-Slurring of speech or mumbling

-Onset of stuttering/dysfluency

-Difficulty forming initial words in a message

-Pauses and rushes of speech

-Word retrieval difficulty

WHY?
-reduced control of automatic movements
-difficulty regulating speed/size of movements
-difficulty coordinating movements
-cognitive challenges; initiation difficulty

Communication Changes and Parkinson's Disease

Potential changes to sensory awareness may include:

-Misperceiving the effort being put into actions

-Poor awareness of low volume when speaking

-Increased belief that those around you are hard of hearing

-Reduced awareness of decreased facial movement

What Have We Learned So Far?

✅ The Role of a Speech-Language Pathologist

✅ The Role Dopamine Plays in Muscle Movement, Coordination, & Regulation, and How This Can Impact Voice & Speech

Next: Swallowing Changes

Swallowing Changes in Parkinson's Disease: How Do We Swallow?

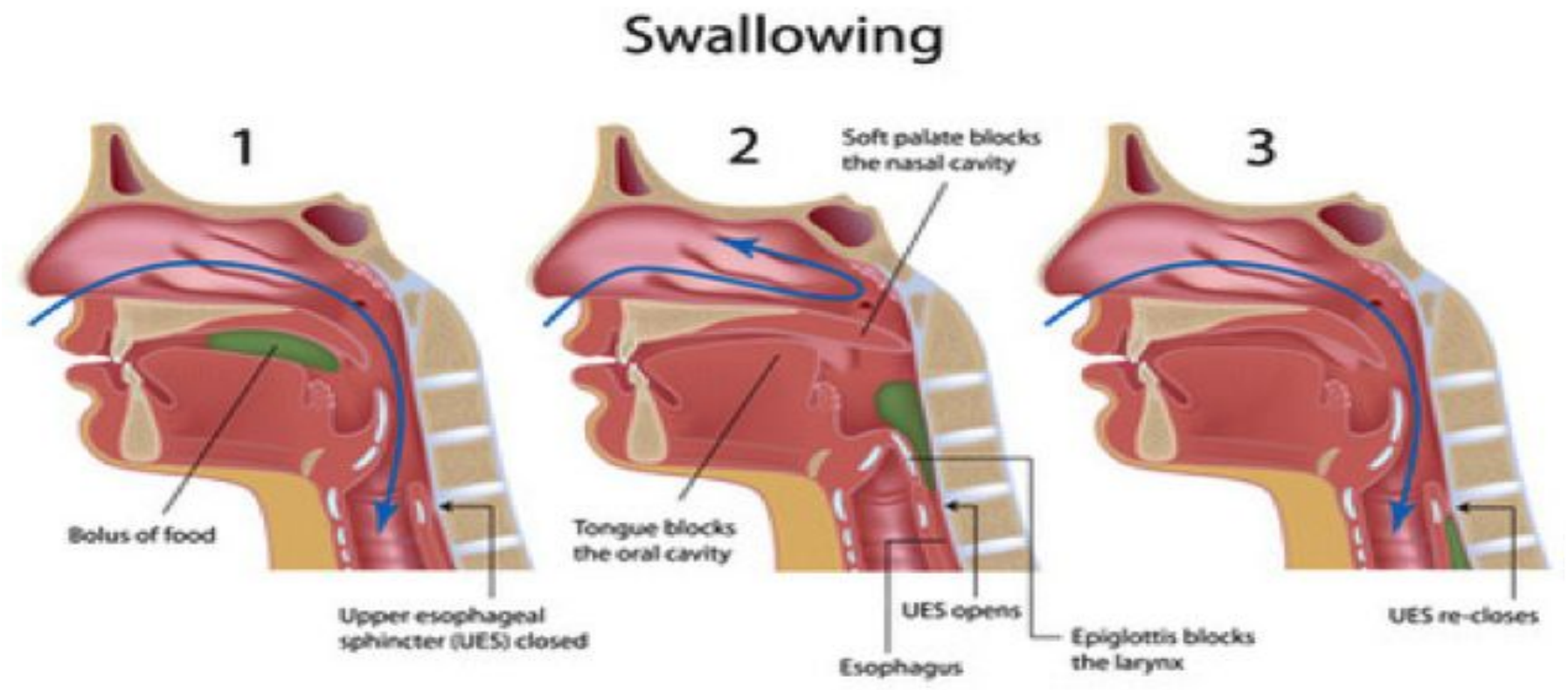


Image from Physiopedia

Swallowing Changes in Parkinson's Disease (Dysphagia)

-Chewing for longer than normal

-Drooling

-Having food or drink fall out of the mouth

-Difficulties with coordinating tongue movements

-Difficulty starting a swallow

-Having food or drink stick in the throat

-Having food or drink go down the wrong tube

-Coughing or choking

-Difficulty feeding oneself

-Complications such as weight loss / dehydration / malnutrition/Pneumonia

WHY?
-difficulty w/ motor control & coordination; rigidity
-difficulty regulating size/speed of movements

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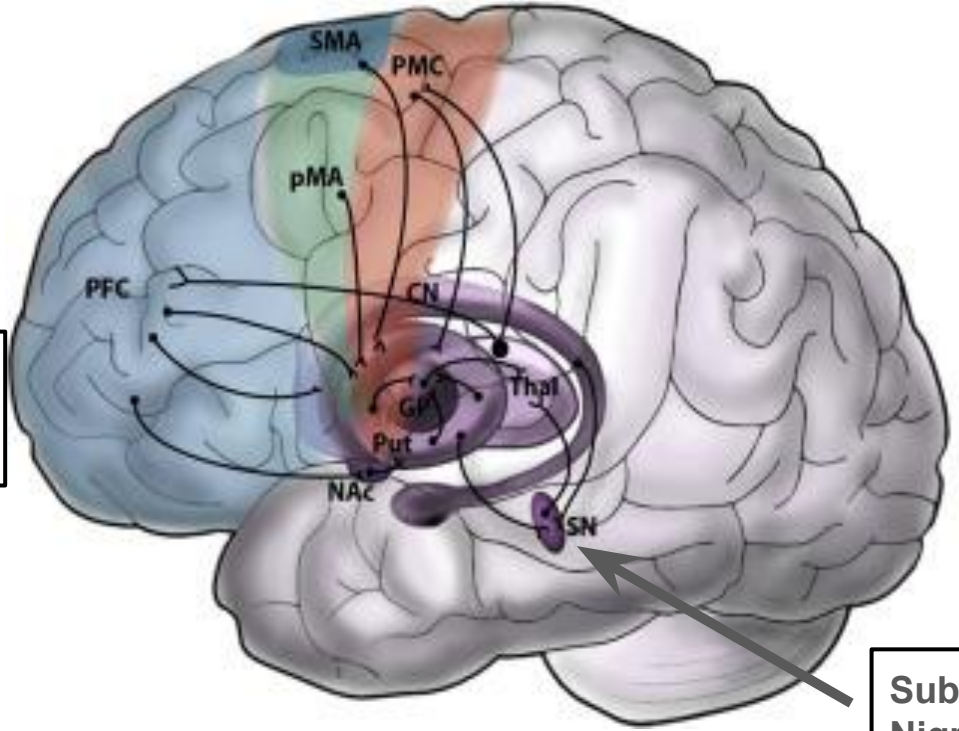
Next: Cognitive Changes

Brain Pathways That Contribute to Non-Motor Symptoms of Parkinson's Disease (i.e. Cognitive Changes)

Frontal Lobe

-Voluntary movement
-Expressive Language
-Executive Functions

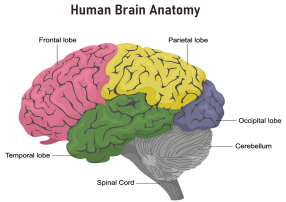


PFC: prefrontal cortex
SMA: supplementary motor area
pMA: premotor area
PMC: primary motor cortex
CN: caudate nucleus
NAc: nucleus accumbens
SN: substantia nigra
Thal: thalamus
Put: putamen
GP: globus pallidus

Substantia Nigra–Dopamine Produced Here

Image from ScienceDirect.com

Possible Cognitive Changes Associated With Parkinson's



- Executive function changes - poor time management, decreased impulse control, difficulty with complex decision making, decreased organization
- Reduced initiation - not as interested in doing things, takes longer to start
- Memory changes - difficulty remembering or learning new information
- Attention - difficulty doing two tasks at once
- Planning changes -difficulty completing multiple steps
- Slowed thinking/processing
- Delusions (false beliefs), Hallucinations (seeing things that are not there)

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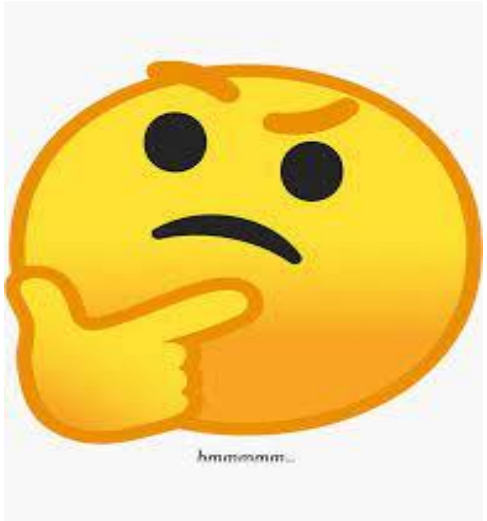
Next: Management of Communication, Swallowing, and Cognitive Changes

So What Can We Do?

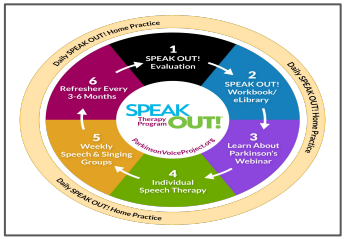


Improving Speech & Voice in Parkinson's Disease

Remediation Options:

- LSVT LOUD (Lee Silverman Voice Treatment)
- SPEAK OUT! ® Therapy Program for Parkinson's
- Visual Feedback Devices
- Exercise Apps and Websites
- EMST (Expiratory Muscle Strength Training)

LSVT LOUD™



Adapted from Tactus Therapy

LSVT Loud vs Speak Out!

To improve vocal intensity, speech intelligibility, facial movements, & possibly swallowing

Both require a certified/licensed provider

LSVT LOUD is not provided at Riderwood

Focus

-think/speak loud
-high-effort exercises
-sensory perception of normal loudness

Speak Out!® therapy is provided at Riderwood

Focus

-speak w/ INTENT
-speech, voice, & cognitive exercises

*Communication Club now at Riderwood!

Websites That Offer Online Exercises

not an exclusive list

- Parkinson Voice Project (SPEAK OUT! ®)
- Parkinson Foundation of the National Capital Area (PFNCA)
- Power for Parkinson's
- YouTube

Visual Feedback/Speech Apps

To Help You Know if You Are Being Loud Enough

- **Sound Level Meters**
  - measures volume of speech in decibels
  - many options available
  - search in Apple app store or Google Play store on your phone/tablet

Reprinted from Tactus Therapy

Visual Feedback/Speech Apps (continued)

check reviews first

- **Speak Up For Parkinson's App**
  - free
  - words/phrase practice
  - shows your face using camera
  - volume meter gives feedback
- **Loud and Clear app**
  - free
  - daily, guided speech and physical exercise
- **StrivePD app**
  - free
  - symptom tracking and caregiver/doctor data sharing capabilities
- **Beats Medical app**
  - paid
  - provides tailored, evidence-based daily speech and language therapy exercises.
- **Understand Me for Life**
  - tracks speech intelligibility over time to help you monitor changes
- **SingAppParkinsons**
  - daily voice training sessions

Reprinted from Google/AI Overview

Expiratory Muscle Strength Training (EMST)

- Strengthens muscles that push air out of lungs for speech.
- Stronger voice
- Better voice endurance
- May improve some muscles involved in swallowing
- May improve cough strength
- ~$50

Improving Speech & Voice in Parkinson's Disease

Compensation Tools

- Speech Vive
  - worn in ear
  - feeds background noise into ear
  - prompts you to talk louder (Lombard Effect)
  - can try w/ free iOS SpeechVive app & a headset
- Voice Amplifiers
  - Amazon (~$30)
  - Chattervox (~$300; may be covered by Medicare)
- AAC (Augmentative & Alternative Communication)
  - Pacing Boards
  - Communication Boards/Apps
  - Text-to-speech Apps/Devices

Improving Speech & Voice in Parkinson's Disease

Participation Approaches

- **Partner Training**
  - Working with communication partners to improve communication success (strategies, environmental modifications)
- **Singing**
  - Works on breath support, vocal projection, pacing
  - Great social opportunity

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✅ The Role Dopamine Plays in Non-Motor Functions Like Cognition & Motivation

✅ Management of Speech & Voice Changes Via Direct Remediation, Compensation, and Participation Approaches

Next: Management of Swallowing Changes

Improving Swallowing in Parkinson's Disease

How do we test swallowing?

Clinical Assessment

- Requires an MD referral
- Completed by SLP in the clinic
- Involves:
  - Case history
  - Examination of oral-motor skills
  - External assessment of swallowing process with a variety of solid/liquid consistencies
  - Recommendations
    - strategies
    - exercises
    - changes in consistencies
    - further testing

Instrumental Assessment

- Requires an MD referral
- Completed off campus (outpatient hospital procedure w/ SLP & Radiologist (for MBSS) or possibly an ENT (for FEES)
- Internal assessment of swallowing process
- 2 Types:
  - *Modified Barium Swallow Study (MBSS)* → moving xray
  - *Fiberoptic Endoscopic Evaluation of Swallowing (FEES)* → nasal endoscopy

Improving Swallowing in Parkinson's Disease

How do we treat swallowing?

- Compensatory Strategies
- Exercises
- Modifications to food/drink consistencies
- Education
- Treatment plans are individualized
- Goals:
  - Minimize adverse consequences of aspiration
  - Promote nutrition/hydration
  - Promote quality of life

Let's Talk About Drooling

Why Does it Happen?

- Not fully understood/multifactorial
- Possibilities Include:
  - Unintentional mouth opening
  - Flexed head position
  - Less frequent/complete swallowing
  - Dysphagia (swallowing disorder)
  - Slowed movements/reflexes
  - Possible increased flow of saliva
  - NOT an overproduction of saliva

What Can I do About it?

- Behavioral Management:
  - Adjust your posture (head up)
  - Intentionally seal your lips
  - Intentionally swallow more frequently
    - Swallow Prompt App
    - Set alarms
  - Chew gum

- Medical Management (talk with doctor):
  - Medications to dry secretions
    - adverse side effects possible including cognitive
  - Botox to salivary glands
    - improvements, but temporary
    - lasts 3-5 months
    - can weaken swallowing muscles
    - candidacy, efficacy, safety unclear
  - Drying drops/sprays
  - BEWARE OF RISKS & SIDE EFFECTS

Cochrane Database Syst Rev. 2016; 2016(10): CD012408. Published online 2016 Oct 28. doi: 10.1002/14651858.CD012408. PMCID: PMC6457984
Botulinum toxin for drooling in Parkinson's disease Fiona Hill,corresponding author Nick Miller, Richard A Walsh, David Mockler, Ronald McDowell, and Margaret Walshe

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✅ The Role Dopamine Plays in Non-Motor Functions Like Cognition & Motivation

✅ Management of Speech & Voice Changes Via Direct Remediation, Compensation, and Participation Approaches

✅ Assessment & Management of Swallowing Changes, Including Drooling

Next: Management of Cognitive Changes & Other Treatment Options Being Studied to Manage Speech and Cognition

Managing Cognitive Deficits in Parkinson's Disease

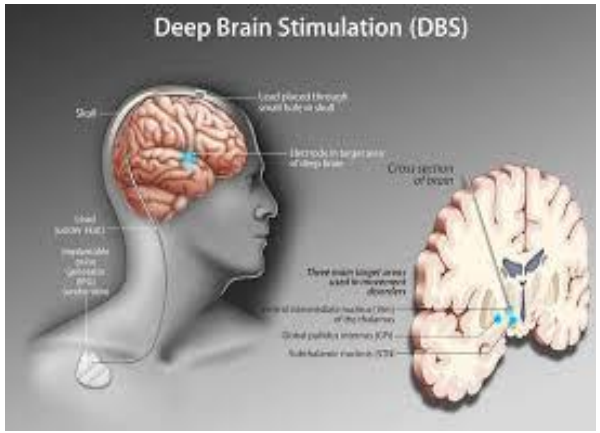
Goal of Speech Therapy = improve participation in daily activities and maximize overall cognitive function

3 MAIN APPROACHES:

1. Compensatory Strategy Training
2. Environmental Modification Training
3. Caregiver/Partner Training

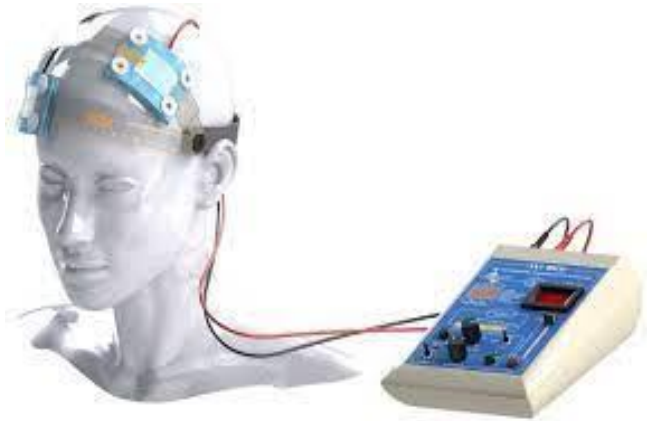
Treatment Options Still Being Studied

Deep Brain Stimulation (DBS)



-Effects on speech are unclear
-May worsen memory/thinking problems

Transcranial Direct Current Stimulation (tDCS)



-Some evidence of positive impact on speech and executive functions
-Further study is needed

Images from The Health Site & Neurotherapy Montreal; Speech Changes After Transcranial Direct Current Stimulation in Individuals Diagnosed With Parkinson's Disease ASHA Perspectives: Ciara Leydon,a Kaitlin Brooks,b Guanchao Feng,c David T. Hsu,d Guy Schwartz,e and Renee Fabusf (2021); Michael J Fox Foundation

What Have We Learned Today

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- ✅ The Role Dopamine Plays in Non-Motor Functions Like Cognition & Motivation
- ✅ Management of Speech & Voice Changes Via Direct Remediation, Compensation, and Participation Approaches
- ✅ Assessment & Management of Swallowing Changes, Including Drooling
- ✅ Management of Cognitive Changes
- ✅ Other Treatment Options Being Studied to Manage Speech and Cognition

In Summary

- Parkinson's Disease can potentially impact speech, voice, language, swallowing, and cognition.
- Consider pursuing a Speech Therapy Evaluation if you notice:

Difficulty being heard/understood by others	Difficulty chewing/swallowing	Memory changes
Breathy, hoarse, gravelly, monotone voice	Food/drink falling from mouth	Difficulty concentrating
Running out of air when talking	Food/drink 'sticking' in throat	Difficulty planning/organizing
Slurred/rushed speech	Coughing/choking when eating/drinking	Difficulty managing time
Trouble finding words	Drooling	Difficulty making decisions
Trouble organizing thoughts	Malnutrition, dehydration, weight loss, pneumonia	Difficulty processing information

Procedure for Pursuing Speech Therapy

1. **Obtain a referral from your doctor** for an evaluation to address your speech/voice, swallowing, cognition, and/or language concerns.
   a. Primary Care Physician
   b. Neurologist
   c. ENT

2. **Schedule an appointment** for an evaluation at the outpatient rehab clinic in Montgomery Station once the referral is received.
   (301) 572-8372

3. **Complete the evaluation** & discuss treatment candidacy/options with the SLP.


Q&A