

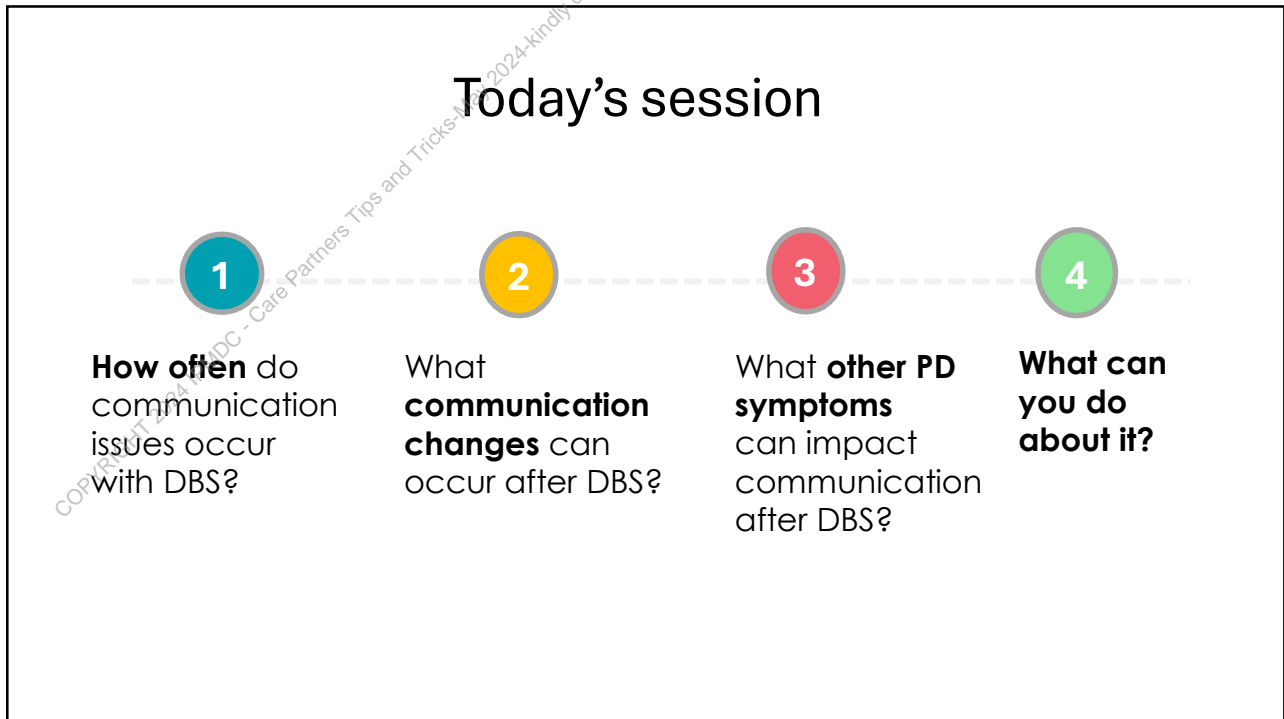


# Deep Brain Stimulation (DBS) communication difficulties

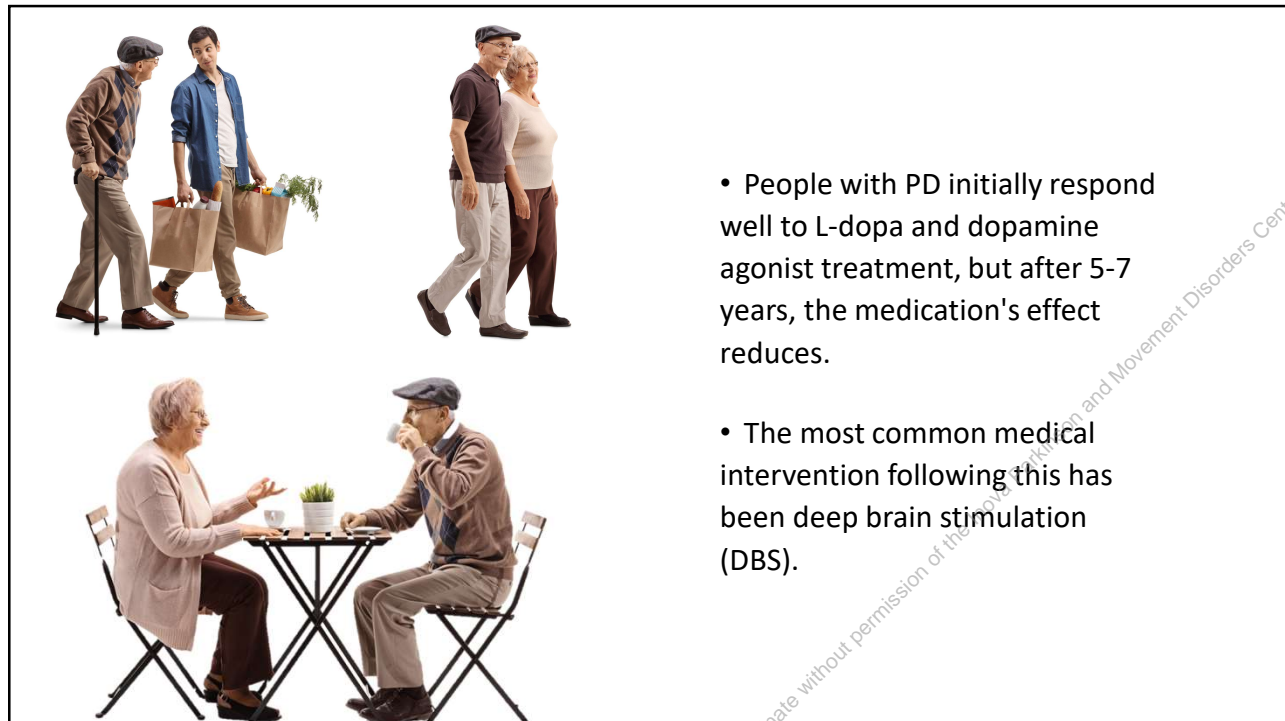
John Dean & Josefa Domingos, 2024

Care Partners Tips and Tricks  
May 2024

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- People with PD initially respond well to L-dopa and dopamine agonist treatment, but after 5-7 years, the medication's effect reduces.

- The most common medical intervention following this has been deep brain stimulation (DBS).

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## Deep Brain Stimulation (DBS)

- Surgical procedure that involves a mild electrical current delivered to a specific part of the brain.
- DBS is administered continuously and with fixed parameters.
- FDA-approved to treat some movement disorders, including Parkinson's.
  - 2002 – STN DBS for PD
  - 2003 – GPi DBS for PD

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## 3 manufacturers

### MEDTRONIC

- 1<sup>st</sup> manufacturer
- Latest innovation: Closed loop stimulation



### BOSTON SCIENTIFIC

- 1<sup>st</sup> with current steering



### ABBOTT

(Prev. St. Jude)

- Also has current steering
- iOS app for PwP
- Remote programming



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## Reasons for less positive outcomes

- A non-ideal initial DBS candidate
- Inadequate pre-operative evaluation
- Unreasonable expectations
- Hardware complications
- Suboptimal lead placement
- Suboptimal programming
- Disease progression
- Tolerance/habituation

*Okun et al, 2008*

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## Most important concerns about DBS:



Possibility of DBS  
not being effective  
/ having side  
effects



Not having  
enough  
information



Surgery  
complications

Parkinson Europe Survey Report 2023

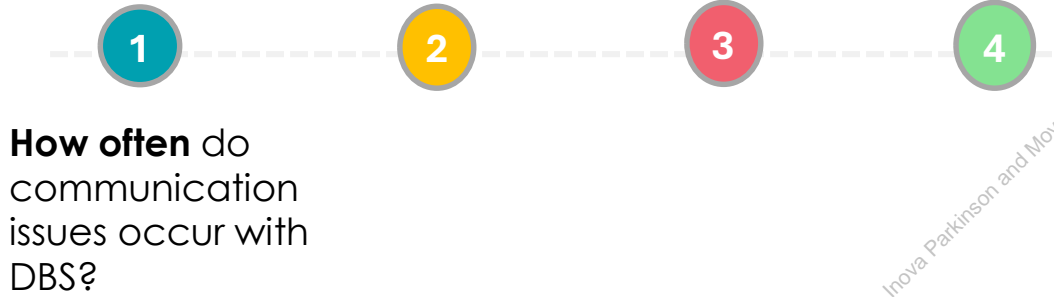
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People with PD  
often have  
concerns regarding  
the possible  
**negative effects of  
DBS on their  
communication  
abilities.**



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# Today's session



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RESEARCH PAPER

## Distinct phenotypes of speech and voice disorders in Parkinson's disease after subthalamic nucleus deep brain stimulation

Tsuboi T, et al 2015

Relatively good speech and voice function type n=19 (25%)	Stuttering type n=18 (24%)	Breathy voice type n=12 (16%)	Strained voice type n=14 (18%)	Spastic dysarthria type n=13 (17%)
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Table 2 Severity of speech and voice disorders in PD-DBS and PD-Med groups

	PD-DBS n=76	PD-Med n=33
<b>AMSD</b>		
Overall severity of speech disorders		
Intelligibility	2.7±1.0*	1.7±0.8
Naturalness	3.6±1.0*	2.4±1.0
Subparts		

Lower number = Better performance

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**Table 2**

Speech symptoms for Younger, Older, Advanced PD group 6–10 years, and Advanced PD Group 11+ years groups: DBS vs. Non-DBS groups.

Speech related questions	Younger PD group (50–69 yrs) (n = 336)		Older PD group (70+ years) (n = 339)		Advanced PD group (6–10 yrs) (n = 194)		Advanced PD group (11+ yrs) (n = 296)	
	DBS (n = 144)	Non-DBS (n = 191)	DBS (n = 73)	Non-DBS (n = 266)	DBS (n = 46)	Non-DBS (n = 148)	DBS (n = 176)	Non-DBS (n = 120)
<b>To what extent do you think other people can understand you?</b>								
No difficulty understanding me	10%	41%	3%	27%	9%	25%	7%	26%
A little bit of difficulty	29%	38%	21%	36%	41%	41%	22%	33%
Moderate difficulty	32%	15%	21%	25%	30%	23%	25%	28%
Quite a bit/extreme difficulty	29%	7%	56%	13%	20%	12%	45%	14%
<b>Are you communicating less because of speech problems?</b>								
No	15%	55%	8%	41%	17%	40%	12%	36%
A little bit	34%	28%	16%	31%	44%	36%	24%	29%
Moderately	24%	13%	22%	14%	22%	11%	24%	21%
Quite a bit/extremely	27%	4%	53%	15%	17%	13%	41%	14%
<b>Do you socialize less due to speech difficulties?</b>								
No	23%	67%	17%	52%	22%	56%	20%	48%
A little bit	32%	20%	19%	20%	39%	23%	23%	20%
Moderately	24%	6%	18%	15%	24%	12%	24%	13%
Quite a bit/extremely	21%	6%	46%	12%	15%	8%	34%	18%

Wertheimer et al 2014

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## Today's session

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How often do communication issues occur with DBS?

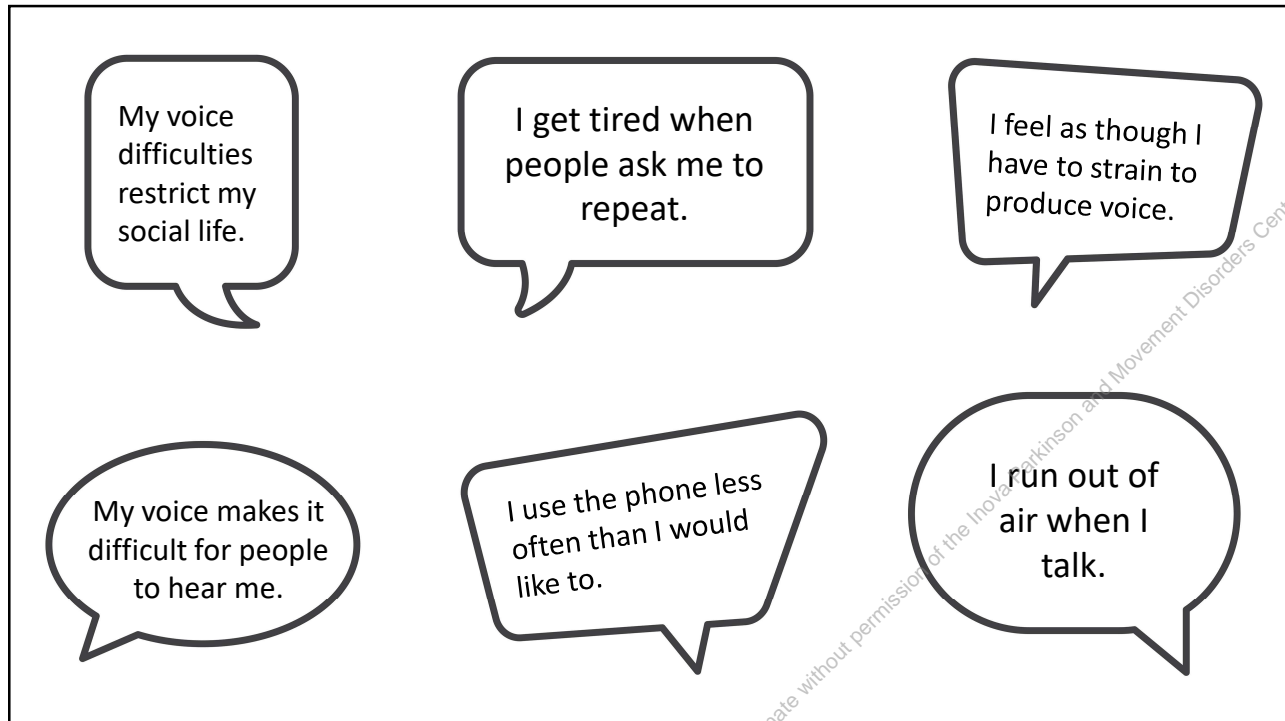
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What **communication changes** can occur after DBS?

3

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What kind of impact does DBS  
have on speech?  
PwP perspective

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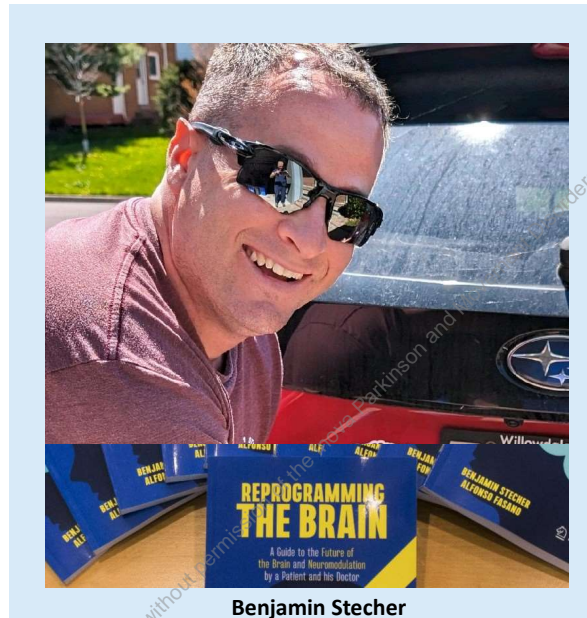
## What kind of impact does DBS have on speech? PwP perspectives

“Both I and my family have noticed that at times it is more difficult for me to communicate. My sister-in-law (a GP) once remarked that I **sounded drunk**.

Also, when too high I have a tendency to speak **too quickly** to be intelligible.

This issues did not entirely resolve. So, I yell :) I do have to speak up and make sure I am enunciating myself properly.

When I do those thing, the difficulties can be overcome but they do linger and are slightly troubling”.



Benjamin Stecher

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## What kind of impact does DBS have on speech? PwP perspectives

Issues with my voice was the #1 fear I had going in. As a 30-year broadcaster & podcaster, my voice was my identity.

My surgeon admitted it can happen, but it's not really an issue anymore because of the directional leads”.

During the procedure, my surgeon understood my voice was a concern. He had me vocalizing throughout the surgery.

At times it was weak and raspy. As they moved the electrodes around , they “locked in” as soon as my voice was broadcast worthy.



Larry Gifford

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## What kind of impact does DBS have on speech? PwP perspectives

I had my STN bilateral DBS installed and activated in August/September of 2019.

What I can say, very clearly, is that when I had the Abbott device in my chest I would stop simulation and my voice would go back to normal.

I now have the BostonScientific device in my chest. We remain challenged with finding the perfect programming for me.

I'm having a harder and harder time getting the correct words together in my brain. Is this DBS related? I don't know.



**Brian Toronyi**

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What does the research say about the impact of DBS on speech?

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Most Troubling Symptom	Advanced PD group 6-10yrs		Advanced PD Group 11+ yrs	
	DBS (n=54)	Non-DBS (n=148)	DBS (n=220)	Non-DBS (n=120)
Slurred Speech *,**	20%	5%	22%	8%
Low Volume	32%	31%	37%	43%
Hoarseness in Speech	7%	8%	4%	3%
Festinating Speech *	7%	0%	2%	2%
Rapid Speech *	7%	0%	4%	3%
Tremulous Speech	2%	0%	1%	4%
Difficulty Getting Started	0%	1%	5%	3%
Monotone Speech	4%	1%	5%	3%
Stuttering	2%	3%	4%	3%
Swallowing	11%	5%	7%	8%
Word-finding Difficulties	28%	25%	13%	19%

\* Statistically significant differences between the DBS and Non-DBS for the Advanced PD 6-10 years group.  
 \*\* Statistically significant differences between the DBS and Non-DBS for the Advanced PD 11+ years group.

Wertheimer et al 2014


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## Word finding problems

### “Tip of the tongue” syndrome

- DBS may influence negatively
- More pauses
- Fewer words a minute

Saldert and Bauer, 2017  
 Smith, et al, 2018



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JSLHR

Review Article

## The Effect of Deep Brain Stimulation of the Subthalamic Nucleus on Language Function in Parkinson's Disease: A Systematic Review

Sandra H. Vos,<sup>a</sup> Roy P. C. Kessels,<sup>a,b</sup> R. Saman Vinke,<sup>c</sup>  
Rianne A. J. Esselink,<sup>d</sup> and Vitória Piai<sup>a,b</sup>

“Pattern of decline in verbal fluency after STN-DBS, picture naming was unaffected.”

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### What other speech aspects can DBS impact?



- Slurring
- Low volume
- Fluency – word finding

- Articulation and speech clarity
- Non-verbal communication and emotional expression post-DBS
- Changes in facial expression and body language
- DBS affects on social interaction and mood, affecting communication

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## Today's session

1

How often do communication issues occur with DBS?

2

What communication changes can occur after DBS?

3

What **other PD symptoms** can impact communication after DBS?

4

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Review > Acta Med Port. 2014 May-Jun;27(3):372-82. doi: 10.20344/amp.4928. Epub 2014 Jun 30.

### Depression and anxiety following deep brain stimulation in Parkinson's disease: systematic review and meta-analysis

Maria Inês Couto <sup>1</sup>, Ana Monteiro <sup>2</sup>, Ana Oliveira <sup>3</sup>, Nuno Lunet <sup>4</sup>, João Massano <sup>5</sup>

- The pattern and course of depressive symptoms and anxiety following DBS in PD is not clear.
- Improvement of depression and anxiety is apparent after DBS, more pronounced in the short-term, an effect that seems to wane in later assessments.

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## Today's session

1

How often do communication issues occur with DBS?

2

What communication changes can occur after DBS?

3

What other PD symptoms can impact communication after DBS?

4

**What can you do about it?**

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### 1. Knowing how to recognizing problems early.



• Have you experienced speech difficulties since you have DBS?



• How severe would you rate your current overall speech problem?



• To what extent do you think other people can understand you?



• Are you communicating less because of speech difficulties?

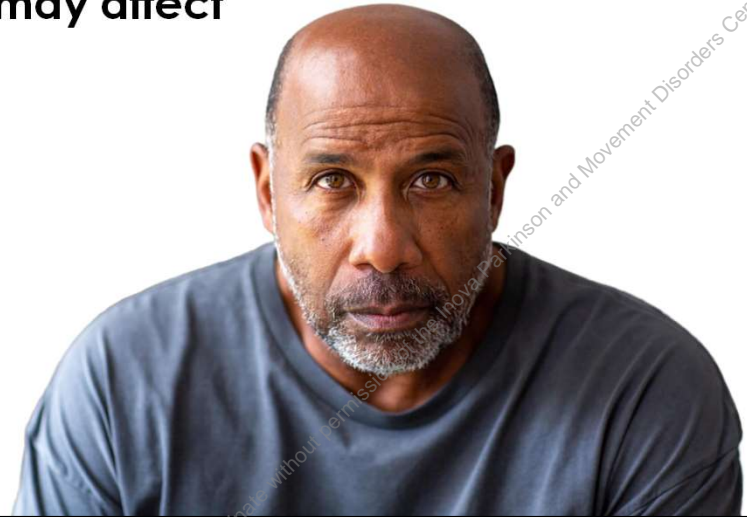


• Do you socialize less due to speech difficulties?

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## 2. Recognizing & managing other PD symptoms/factors that may worsen with DBS and may affect communication

- Depression, apathy
- Emotional distress
- Balance deficits
- Fatigue



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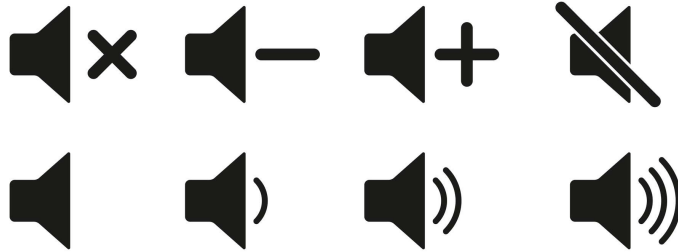
## 3. Recognizing & managing most common problems that can occur

- Slurring
- Low volume
- Fluency – word finding



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## Low volume problems



### Low volume – TIPS

- Voice strengthening activities/exercises
- LSVT LOUD
- Integrating communication as much as possible into daily activities.
- Improve lifestyle choices that impact cognition & functioning.

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## NIH Public Access Author Manuscript

*J Commun Disord.* Author manuscript; available in PMC 2012 November 1.

Published in final edited form as:

*J Commun Disord.* 2011 November ; 44(6): 688–700. doi:10.1016/j.jcomdis.2011.05.003.

### Intensive Voice Treatment (LSVT®LOUD) for Parkinson's disease following Deep Brain Stimulation of the Subthalamic Nucleus

Jennifer Spielman, MA, CCC-SLP<sup>a</sup>, Leslie Mahler, PhD, CCC-SLP<sup>b</sup>, Angela Halpern, MS, CCC-SLP<sup>a</sup>, Phillip Gilley, PhD<sup>c</sup>, Olga Klepitskaya, MD<sup>d</sup>, and Lorraine Ramig, PhD, CCC-SLP<sup>a,c</sup>

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## Word finding problems

### “Tip of the tongue” syndrome

- DBS may influence negatively
- More pauses
- Fewer words a minute

*Saldert and Bauer, 2017  
Smith, et al, 2018*



#### Word finding issues – TIPS

- Talk **around** the missing word (circumlocution)
- “**Crowdsource**” – see if the conversation partner can help identify (e.g. starts with an /s/, etc)
- Leave a “**placeholder**” and come back to it later.
- Integrating communication into daily activities.

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## Dual task problems

### “Stops talking while walking”

- DBS may worsen
- Increased risk behaviors



#### Dual task issues – TIPS

- Study which daily activities impact your thinking and communication.
- Reduce dual tasking in daily activities.
- Establish routines so there's less decision-making in daily activities.
- Training Dual task & balance, walking and talking.

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## 4. Assessment with your neurologist and/or programmer

Either during initial programming sessions or as needed

Identify if changes are related to the device, the stimulation, surgery, disease progression, disease complications...



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## 5. Get a formal assessment with a speech language pathologist

To identify for the **“risk of”** or **“presence of”** speech, cognitive, & language issues.

Identify treatment strategies.



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## 6. Staying updated on changes in DBS care.

People who have received information on:

quality of life improvements

details & risks of surgical procedure

device management

tend to be **more satisfied about** their DBS experience

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## Summary



Knowing how to recognizing problems early



Recognizing & managing other PD factors that affect speech post DBS



Recognizing & managing most common problems



Getting a formal assessment with your neurologist

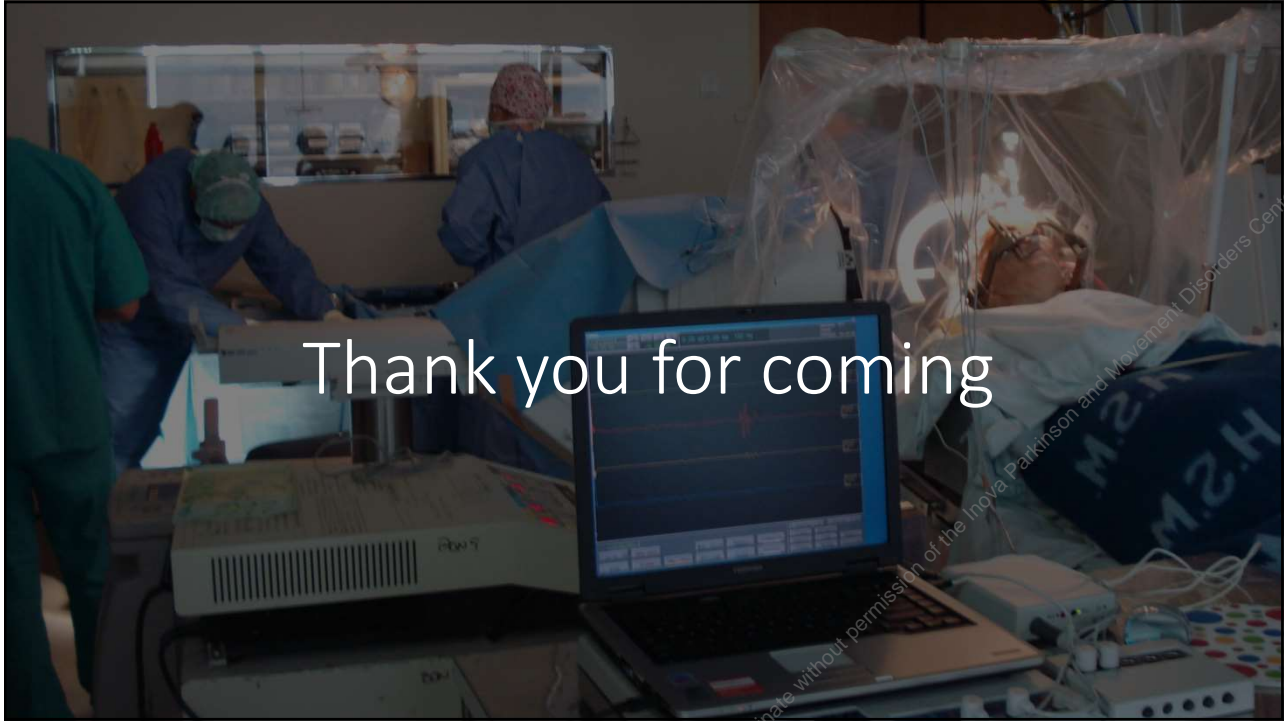


Getting a formal assessment with speech therapist.



Staying updated on changes in DBS care.

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