



## Public Webinar Series

**Title: Life after DBS: How can LSVT BIG® and LSVT LOUD® help?**

**Presenters: Heather Cianci, PT, MS, GCS  
Jessica Galgano, PhD, CCC-SLP**

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## Life after DBS: How can LSVT BIG® and LSVT LOUD® help?



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## Greetings from....

### **Heather Cianci, PT, MS, GCS**

LSVT BIG Expert Clinician  
LSVT BIG Training and Certification Faculty  
LSVT Global, Inc.

### **Jessica Galgano, PhD, CCC-SLP**

LSVT LOUD Expert Clinician  
LSVT LOUD Training and Certification Faculty  
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## Plan for Webinar

### Logistics

### Brief Introduction

Review and discuss the application of  
LSVT BIG to those with  
Deep Brain Stimulation (DBS)

## Instructor Biographies

### **Heather Cianci, PT, MS, GCS**

Ms. Cianci is the Geriatric Team Leader and founding therapist of the Dan Aaron Parkinson's Rehab Center at Pennsylvania Hospital in Philadelphia, PA. She received her bachelor's in PT from the University of Scranton in Scranton, PA and her master's in gerontology from Saint Joseph's University in Philadelphia. Heather received her GCS in 1999. She is certified in LSVT BIG and is a graduate of the NPF's Allied Team Training for PD. She has written and lectured for both the NPF ("Fitness Counts") and PDF, and performed research on PD with respect to falls and bed mobility. Heather is also a board member for CurePSP, and the coordinator of their Medical Professionals Advisory Committee.

### **Jessica Galgano, Ph.D., CCC-SLP**

Dr. Galgano received her doctoral degree in Biobehavioral Sciences from Columbia University in NYC. Dr. Galgano conducts research in the area of neurologic communication disorders and the neurophysiologic underpinnings of normal, aging, and pathologic voice production using neuroimaging techniques such as EEG and fMRI. She is an associate research scientist at NYU School of Medicine and Executive Director of Open Lines Speech and Communication in NYC, where she provides LSVT LOUD and other types of therapy to adults and children with a wide variety of speech and language diagnosis. Dr. Galgano conducted research with Dr. Ramig at Columbia University and is a faculty member and workshop leader for LSVT Global.

## Information on CEUs

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## Disclosures

All of the LSVT Global faculty have both financial and non-financial relationships with LSVT Global. Non-financial relationships include a preference for the LSVT LOUD and LSVT BIG as a treatment technique.

Dr. Galgano and Ms. Cianci receive consulting fees, lecture honorarium and travel reimbursement from LSVT Global, Inc.



STATEMENT ON DISCLOSURE AND CONFLICT: All members of this research team have fully disclosed any conflict of interest. The conflict of interest management plan has been approved by the Office of Conflict of Interest and Commitment at the University of Colorado, Boulder (Ramig, Fox and Halpern).

## Learning Objectives

Upon conclusion of this webinar, participants will be able to:

- Describe the use of DBS in Parkinson Disease
- Identify who is a good candidate for DBS
- Explain the use of LSVT LOUD and LSVT BIG treatment in combination with DBS

## Medical Management

### Pharmacology

- Levodopa-Carbidopa (Sinemet®, Parcopa®, Stalevo®)
- Dopamine agonists (Requip®, Mirapex®, Neupro®)
- COMT Inhibitors (Comtan®, Tasmar®)
- MAOB Inhibitors (Azilect®, Eldepryl®, Zelapar®)
- Anti-cholinergics
- Amantadine

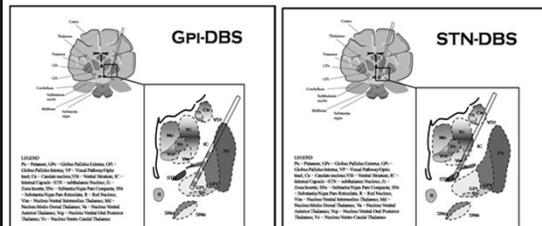
(Fox S. H. et al, 2010)

## What is Deep Brain Stimulation?

- Deep brain stimulation (DBS) uses a surgically implanted medical device to deliver electrical stimulation to a targeted area in the brain.
- It electrically stimulates specific structures that control unwanted symptoms.

## Deep Brain Stimulation in PD

- Placement of electrodes in the Subthalamic Nucleus (STN) or Globus Pallidus Interna (GPI)



Images from Parkinson.org

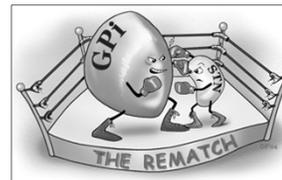
## Who is a good candidate?

- Must be responsive to medication (Carbidopa/Levodopa)  
\*\*Best outcome predictor for response to DBS
- Medication is no longer providing enough relief from symptoms despite trials of different doses, etc.
- Dementia is the most frequent exclusion criteria (Neuropsychological screening is required)

## Medical Management

### Surgical : Deep brain stimulation (DBS)

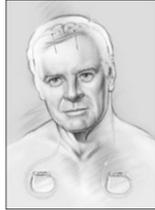
1. Subthalamic nucleus (STN)
2. Globus pallidus (Gpi)
  - Equally effective in controlling motor symptoms
  - Can reduce meds more with STN
  - STN can cause more cognitive & psych changes
  - Both can lead to speech changes



Follet et al., 2010, NEJM

## Deep Brain Stimulation in PD

- Connected to a neurostimulator (similar to a pacemaker) under the clavicle
- Can be done unilateral or bilaterally
- Consists of multiple surgeries to place electrodes and stimulators



## How does DBS affect voice and speech in PD?

- Significant differences in severity of perceived speech disturbance
- More severe symptoms reported
- More symptom interference with social interaction and daily experiences relating to functional, physical, and emotional issues of a voice disorder
- Low volume was the “most common” speech symptom
- DBS had the greatest adverse impact on “slurred speech.”  
(Wertheimer et al., 2014)

## How does DBS affect voice and speech in PD?

**Neurosurgical interventions do not consistently or effectively improve speech in PD**

(e.g., Freed et al., 1992; Gopherman, 2005; Pinto et al., 2004; Rousseaux et al., 2000)

**While some individual components of speech may improve, e.g., loudness of sustained phonation, oral force control of tongue (Pinto et al, 2003); overall speech intelligibility is not improved**

(Klostermann et al, 2008; Pinto et al, 2005; Tripoliti et al, 2006)

**Speech problems (dysarthria) reported after STN-DBS ranges: 5% - 61%**

(Krack et al, 2003; Rodriguez-Oroz et al, 2005; Gan et al, 2007; Guehl et al, 2006).

## Summary of speech post DBS-STN

- Both amplitude voltage settings and contact placement contribute to speech outcomes post-DBS
- Outcomes are variable
- Many factors contribute to speech outcomes and need to be addressed in treatment

## How does DBS affect voice and speech in PD?

**Impact on speech is highly variable across individuals and affected by multiple parameters:**

- Contact placement
- Voltage amplitude settings
- Medication
- Unilateral versus Bilateral stimulation (right versus left)
- Parkinson disease severity
- Severity of speech disorder pre-DBS

## Consensus on Medical Management in PD

**Magnitude and consistency of speech improvement with drugs and surgery not the same as limb improvement**

(Gopherman, 2005; Trail et al, 2005; Schulz & Grant, 2000)

## **Video Example: DBS/LSVT**

## **LSVT LOUD Adaptations For individuals post-DBS**

## **LSVT LOUD: Gold Standard**

For DBS patients:

- Greater variability in treatment effect;
- Show improvement
  - Gains not as significant
  - Difficulty maintaining tx effects

## **Stimulability testing**

Does “loud” have impact  
on improving speech and voice

- Maximum duration vowels “ah”
- High/low “ahs”
- Functional phrases (speech)

Try four consecutive initial sessions and evaluate impact

Monitor progress in treatment

Quantify treatment changes – is it making a difference?

### Are my voltage amplitude settings too high??

#### How can I tell?

- Breathy and hypernasal voice quality
- Vocal strain
- Significantly slowed lip, tongue and jaw movements
- Imprecise articulation
- Dystonic contractions of the larynx (voice box) and other muscles during connected speech

» (Tripoliti et al, 2008)

#### Feedback from clinicians:

- People have great difficulty producing target voice exercises and loud speech during drills
- Persistent hoarse voice quality, severe slurring, impaired tongue control
- Difficulty with carryover of improved voice into conversational speech

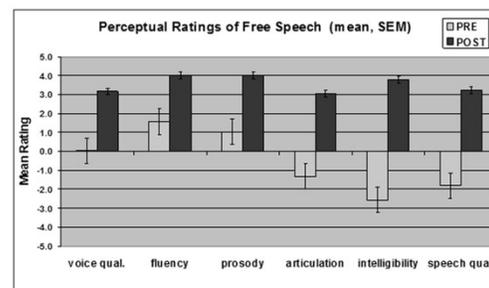
### Evidence Supporting LSVT LOUD for DBS

- Spielman, J., Mahler, L., Halpern, A., Gilley, P., Klepitskaya, O., & Ramig, L. (2011). Intensive voice treatment (LSVT@LOUD) for Parkinson's disease following deep brain stimulation of the subthalamic nucleus. *Journal of communication disorders, 44*(6), 688-700.
- Halpern, A., Spielman, J., Ramig, L., & Gilley, P. M. (2010). Speech treatment for individuals with IPD post deep brain stimulation: LSVT-DBS. In *MOVEMENT DISORDERS, 25, 7, S452-S453*.

One possible explanation for this is the high stimulator settings for three test subjects, which has been shown to negatively affect speech intelligibility

(Tornqvist et al., 2005; Tripoliti et al, 2008)

60 students raters (30 rated "pre" first, 30 rated "post" first)  
Scale (Eq. Interval): +5= optimal, -5= severely impaired/abnormal 0=borderline normal



## Recommendations

### Optimize stimulator settings for speech

- Work in a team
- Find the best contact placement and voltage parameters

### Behavioral Speech Treatment

- LSVT LOUD four weeks – gold standard
- Additional week or more (as needed)
- Quicker and additional follow-up (2-3 Months post)
- Pre-treat with LSVT LOUD (before DBS)

### Severe Speech d/o from Stimulation and Advanced Dz

- Trials of behavioral speech treatment
- May need addition of AAC

## How does DBS affect mobility symptoms of PD?

### Negatively:

- STN placement can lead to depression, apathy, impulsivity & worsening executive dysfunction which in turn can affect motivation and safety
- Not as effective on gait, freezing of gait, balance and falls...and can worsen
- Can lead to new dystonia

Brain Stimul. 2015 Jan-Feb;8(1):64-75. Rev Neurol (Paris). 2010 Feb;166(2):178-87. Arch Neurol. 2011 Feb;68(2):165. Mov Disord. 2014 Jun;29(7):949-53.

## Final LSVT LOUD Suggestions

- Add telehealth sessions to reduce fatigue from traveling (LSVT eLOUD Certified Clinicians can be found online at [www.lsvtglobal.com](http://www.lsvtglobal.com))
- Acknowledge a patient's fatigue within tx sessions (e.g., validate; longer rest periods)
- Advocate for the patient's speech
- Don't give up on the behavioral treatments
- Team approach both pre- and post- DBS is important to help the neurosurgeon determine lead placement and candidacy

## What is different after DBS?

- Increased freedom of movement
- Increased extension of postures
- "Wild" movement patterns possible
- Movements can get REALLY BIG
- Risk for falls can be increased

## How does DBS affect mobility symptoms of PD?

### Positively:

- Can only return to their best "on time"
- Can reduce &/or control rigidity, bradykinesia/akinesia, tremor & dyskinesia (less medication)
- Can improve function that was limited by tremor, dystonia, or dyskinesia

## Falls & Fear of Falls with DBS

*2013 survey by the Parkinson Alliance*

- 334 people with DBS (STN) and 819 without
- 50 states were represented
- Younger group - 50-69
- Older group - 70+

Those with DBS (controlling for age & disease duration) had:

- Increased Fear of Falls
- 2.52 times the risk of falling
- Greater frequency of falls (for those who had PD longer)
- Self reports of more difficulty with mobility, speech, & stigma

## LSVT Big Treatment Session

### Maximal Daily Exercises

1. Floor to Ceiling – 8 reps
2. Side to Side – 8 each side
3. Forward step – 8 each side
4. Sideways step – 8 each side
5. Backward step – 8 each side
6. Forward Rock and Reach – 10 each side (working up to 20)
7. Sideways Rock and Reach – 10 each side (working up to 20)

### Functional Component Tasks

5 EVERYDAY TASKS – 5 reps each  
For example:

- Sit-to-Stand
- Reaching for a drink
- Pull up covers

### Hierarchy Tasks

Patient identified tasks:

- Getting out of bed to BSC
- Transferring from w/c to toilet
- In and out of a car

Build complexity across 4 weeks of treatment towards long-term goal

### BIG Walking

- with device and help
- may be with w/c

## Implications of the study

“individuals with DBS therapy may have extra ability to move without functional impairment, but lack the feedback and control to do so safely”

“individuals may be more confident or capable to increase engagement in activities due to the reduced motor symptoms, but...”

## Choosing to begin LSVT BIG Before or After DBS?

### • LSVT BIG before DBS

- Can be beneficial before surgery to help maximize functional abilities, gait, balance, physical fitness, energy, and safety with the LSVT Big program
- Physician may want to establish a baseline activity level before surgery
- Collect outcomes to be able to compare pre and post DBS functional ability.

may neglect to attend to or take into account the continued difficulties related to PD (such as poor balance). Moreover, even though DBS therapy benefits some motor functions, the body/functional capability may still be constrained by other factors that may result in increased falls.”

## Choosing to begin LSVT BIG Before or After DBS?

### • LSVT BIG after DBS

- Can be beneficial after surgery to assist with:
  - persistent balance issues
  - to assist in retraining appropriate speed and size of movement
  - to maximize functional abilities, gait and balance with the combination of therapy and surgery now that symptoms or side effects of medications are decreased

## LSVT BIG after DBS

- Therapist uses LSVT BIG techniques to help shape movement quality and drive effort - this remains very important during exercises and functional training.
- Therapist uses cues to help with more controlled/appropriately sized (amplitude) of movement

## Summary

- LSVT treatments and DBS can very successfully be used together
- Recognize that motor control issues may still exist even post DBS
- Therapist may need to change their teaching techniques to focus more on control of amplitude
- Those who have had DBS still may have balance issues, possibly even increased fall risk
- Team approach both pre- and post- DBS is important to help the neurosurgeon determine lead placement and candidacy

## LSVT BIG after DBS

- Therapist models movements to demonstrate appropriate movement patterns with gait and function.
- Therapist will work to teach movement techniques to prevent and/or correct episodes of freezing of gait.
- Patient will continue to need repetition to learn appropriate size (amplitude) and control of movement.

## QUESTIONS???



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## LSVT BIG Considerations after DBS

- DBS settings may need to be stable prior to starting treatment.
- Therapist and patient need to stay in communication with MD regarding any changes in programming that may need to be done due to changes observed in treatment.