



LSVT LOUD® Professional Webinar Series

**Title: Application of LSVT LOUD® to neurological
 conditions beyond Parkinson disease**

**Presenters: Elizabeth Peterson, MA, CCC-SLP
 Heather Hodges, MA, CCC-SLP**

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Application of LSVT LOUD® to neurological conditions beyond Parkinson disease



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Webinar Presenters

Elizabeth Peterson, MA, CCC-SLP
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Heather Hodges, MA, CCC-SLP
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Instructor Biographies

Elizabeth Peterson, MA, CCC-SLP
Ms. Peterson received her master's degree in Speech, Language and Hearing Sciences from the University of Colorado-Boulder. She began working with Dr. Lorraine Ramig's research team while completing her master's thesis. Ms. Peterson is LSVT LOUD certified and primarily delivers LSVT LOUD in the research setting. She has worked as a research associate at the National Center for Voice and Speech-Denver and the University of Texas Health Science Center, San Antonio. Ms. Peterson is currently involved in Dr. Ramig's research investigating the short and long-term impact of LSVT LOUD on neural underpinnings of speech in Parkinson disease.

Heather Hodges, MA, CCC-SLP
Ms. Hodges received her master's degree in Speech, Language, and Hearing Sciences from the University of Colorado, and began working on Dr. Lorraine Ramig's research team as a graduate student. She now works at the National Center for Voice and Speech as an ASHA certified speech-language pathologist and research associate. In addition to studying neurogenic voice and speech disorders and being LSVT LOUD certified, Ms. Hodges also works in Denver, CO where she specializes in diagnosing and treating upper airway disorders and swallowing disorders in adult and pediatric populations.

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- Logistics (handouts)
- Presentation of content
- Address your questions
- Survey

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Disclosures

- All of the LSVT LOUD faculty have both financial and non-financial relationships with LSVT Global.
- Non-financial relationships include a preference for the LSVT LOUD as a treatment technique.
- Financial Relationships include:
 - Ms. Peterson is an employee of and receives lecture honorarium and travel reimbursement from LSVT Global, Inc.
 - Ms. Hodges receives lecture honorarium, consulting fees and travel reimbursement from LSVT Global, Inc.

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INFORMATION TO SELF-REPORT CONTINUING EDUCATION ACTIVITY

- This LSVT Global webinar is NOT ASHA or state registered for CEUs, but it may be used for self-reported CEU credit as a non-registered CEU activity.
- If you are a speech therapy professional and would like to self-report your activity, e-mail webinars@lsvtglobal.com to request a certificate after completion of the webinar which will include your name, date and duration of the webinar.
- Licensing requirements for CEUs differ by state. Check with your state licensing board to determine if your state accepts non-ASHA registered CEU activities.
- Attendance for the full hour is required to earn a certificate.

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Learning Objectives

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

1. Discuss how a voice treatment based on principles of neural plasticity has the potential to improve voice and speech in individuals with dysarthria secondary to neurological diagnoses other than PD
2. Explain the process for determining if a client with a diagnosis other than PD may be a good candidate for LSVT LOUD
3. Discuss specific examples of the application of LSVT LOUD to conditions beyond PD

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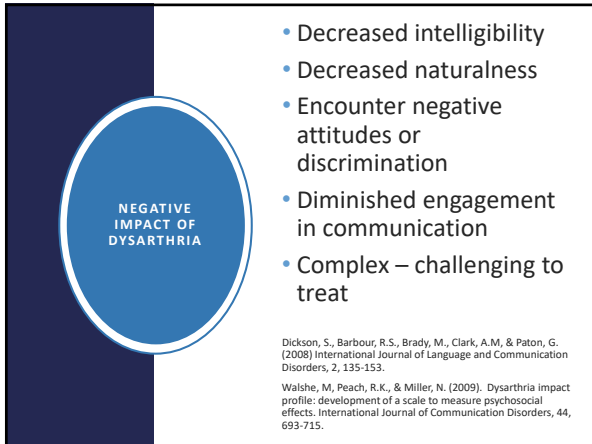
POLLING QUESTION: WHO IS JOINING US?

- Person with Parkinson's
- Family member, friend or caregiver
- Speech Language Pathologist/Assistant (including students)
- Physical or Occupational Therapist/Assistant (including students)
- Other

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**EFFICACIOUS TREATMENTS FOR
PEOPLE WITH DYSARTHRIA
SECONDARY TO A
NEUROLOGICAL DIAGNOSIS ARE
NEEDED.**

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- Decreased intelligibility
- Decreased naturalness
- Encounter negative attitudes or discrimination
- Diminished engagement in communication
- Complex – challenging to treat

Dickson, S., Barbour, R.S., Brady, M., Clark, A.M., & Paton, G. (2008) International Journal of Language and Communication Disorders, 2, 135-153.

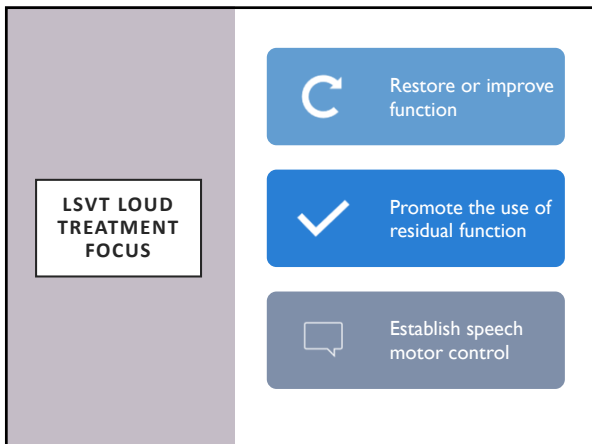
Walshe, M, Peach, R.K., & Miller, N. (2009). Dysarthria impact profile: development of a scale to measure psychosocial effects. International Journal of Communication Disorders, 44, 693-715.

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WHY LSVT LOUD?

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LSVT LOUD TREATMENT FOCUS

-  Restore or improve function
-  Promote the use of residual function
-  Establish speech motor control

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EXERCISE BASED TREATMENTS CAN WORK

- Basic science evidence for the **value of exercise** in PD (classically drugs, surgery)
- Identified **key principles of exercise** that drive activity-dependent neural plasticity
- Demonstrated that exercise can **improve brain functioning** (neural plasticity) and may **slow symptom progression**
- Exercise is Medicine!

**JSHLR Kleim & Jones, 2008; Kleim et al, 2003; Zigmond et al, 2009

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LSVT LOUD KEY CONCEPTS

Incorporate principles of neuroplasticity

- TARGET:** Amplitude - Vocal loudness
- MODE:** Intensive and High Effort
- CALIBRATION:** Generalization

These **Key Concepts** of LSVT LOUD are relevant for a variety of neurological disorders and a variety of dysarthria types

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TARGET OF TREATMENT: VOICE

Voice as a source

- Targets healthy vocal loudness
- Voice as "point of entry" - Carol Boliek

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VOICE AS A TRIGGER

- Enhance effort and coordination across motor speech system
- "Loudness is a global variable"

Schulman, 1989; Dromey, Ramig & Johnson, 1995; Sapir et al., 2008; Watson & Hughes, 2006

- Spread of effects!

Mahler et al., 2015; Huber et al., 2003; Spielman et al, 2003; El Sharkawi et al., 2002, Sapir et al., 2003; Sapir et al., 2007



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SPEECH-LANGUAGE PATHOLOGIST SHAPES AND MODELS NORMAL LOUDNESS WITH HEALTHY QUALITY, WHICH CAN ALSO IMPACT...

- Deep breath
- Open mouth
- Improved articulation
- Reduced rate
- Naturalness
- And more!

Mahler et al., 2015; Huber et al., 2003; Spielman et al, 2003; El Sharkawi et al., 2002, Sapir et al., 2003; Sapir et al., 2007

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MODE OF TREATMENT: INTENSIVE AND HIGH EFFORT

- LSVT LOUD incorporates many key principles of neuroplasticity: repetition, specificity, complexity, saliency
- Important for both healthy and disordered motor systems
- Key to effecting behavioral changes that last over time
- Applicable for adults and children

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CALIBRATION IN TREATMENT

<p>Parkinson's Disease</p> <ul style="list-style-type: none"> • Sensory mismatch • Problem with internal cueing • Subtle neuropsychological changes <ul style="list-style-type: none"> • Slower thinking • Slower learning • Problems shifting cognitive set 	<p>Other Neural Conditions</p> <ul style="list-style-type: none"> • Sensory disorders • Vocal effort required for improved speech • Social stigma • Cognitive challenges <ul style="list-style-type: none"> • Language deficits • Abstract reasoning • Delayed expressive/receptive language
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**HOW DOES A
SPEECH-
LANGUAGE
PATHOLOGIST
DETERMINE IF
LSVT LOUD IS
APPROPRIATE?**

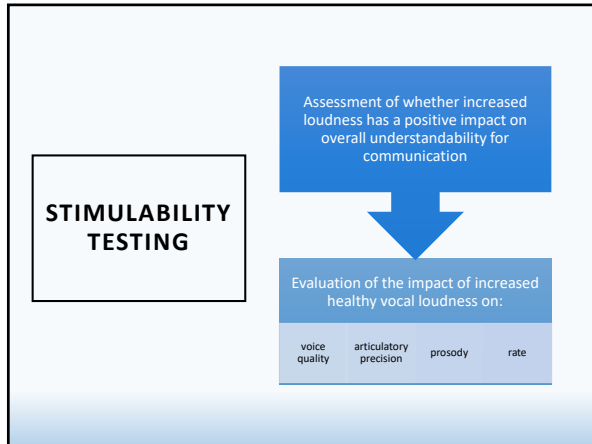
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EVALUATION

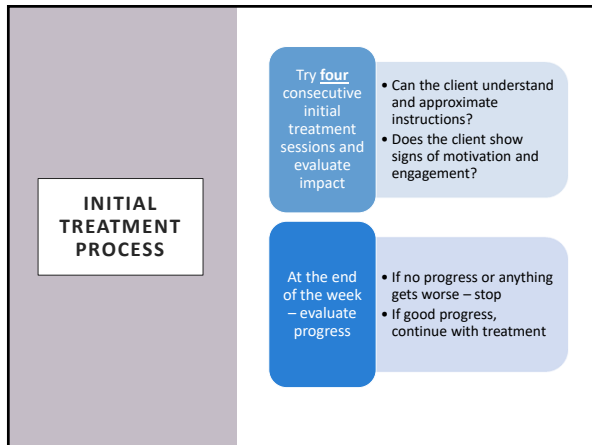
- Evaluate the clinical diagnosis and rationale for focusing on improving voice.
- Determine if there are medical contraindications (e.g. ALS, myasthenia gravis) by consulting with the patient's medical team.*
- If there is a good clinical rationale, based on the physiology of the communication disorder, then try stimulability testing.

*Handout: Physician Clearance Letter Template

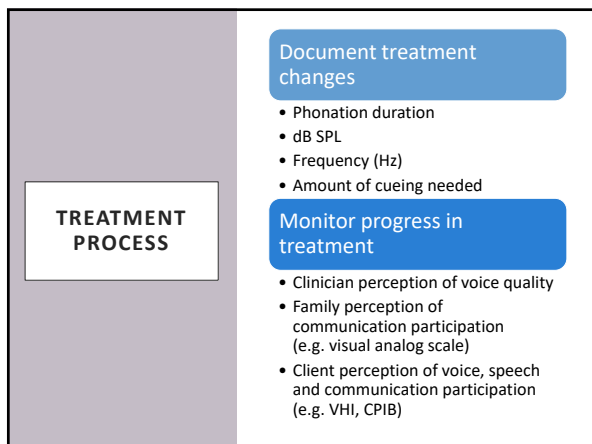
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EXAMPLES OF APPLICATION OF LSVT LOUD TO NEUROLOGICAL DISORDERS OTHER THAN PD

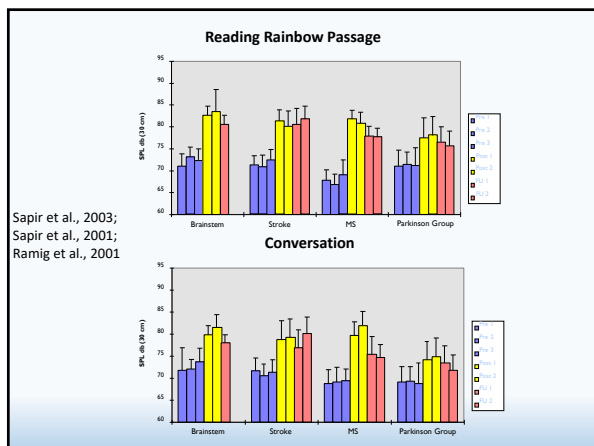
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LSVT LOUD APPLICATIONS

Single-subject, case study and small group designs

- Parkinson Plus Countryman et al., 1994
- Post Surgery, Fetal cell Countryman, et al., 1993
- Stroke Fox et al., 2002; Mahler et al., 2009; Mahler et al., 2012
- Multiple Sclerosis Sapir et al., 2001
- Ataxia Sapir et al., 2003
- Cerebral palsy Fox et al., 2012; Boliek et al., 2014, 2016
- Down Syndrome Boliek et al., 2016; Petska et al., 2006; Mahler et al., 2012
- Deep Brain Stimulation Spielman et al., 2011; Tripoliti et al., 2011
- Aging Ramig et al., 2001

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STROKE

- A leading cause of disability in the US (AHA, 2003; Page, Gater, & Bach-y-Rita) and dysarthria can interfere with communication following a stroke
- 54% of acquired communication disorders (Duffy, 2005; Walshe, 2010)

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CASE STUDY

BACKGROUND INFORMATION

Age:	37 year old male
Diagnosis:	Arteriovenous malformation in brain (condition since birth) Left hemisphere hemorrhagic stroke--Broca's aphasia
Cause of trauma:	Artery was punctured during embolectomy
Years since trauma:	3 years
Language:	Broca's aphasia
Status of Condition:	Stable since 1992

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STROKE:
PRE/POST AUDIO
SAMPLE

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**LESSONS
WITH STROKE**

- Shaping good quality loudness can be challenging
- Change may occur more slowly than in people with PD
- Considerations if aphasia is present
- Outcomes expectations

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CEREBRAL PALSY

- Dysarthria is common in people with CP and is typically characterized by:
 - Hypernasality
 - Breathy voice quality
 - Reduced loudness
 - Rate abnormalities

Workinger, M.S. & Kent, R.D. (1991)
Perceptual analysis of the dysarthrias in children with athetoid and spastic cerebral palsy.

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SMALL GROUP DESIGN

**5 kids with predominately spastic CP
(all 4 limbs) 5-7 years of age**

Pre-post samples

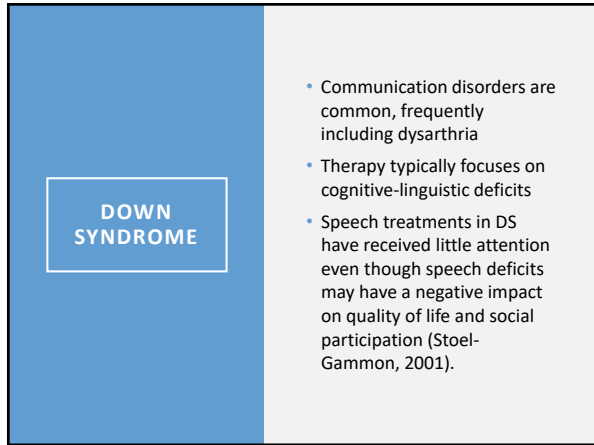
1	2	3	4	5
Male 7 yrs, 10 mos	Female 5 yrs, 10 mos	Male 6 yrs, 1 mos	Male 7 yrs, 7 mos	Female 6 yrs, 7 mos (No Treatment)

Fox & Boliek (2012), JSLHR

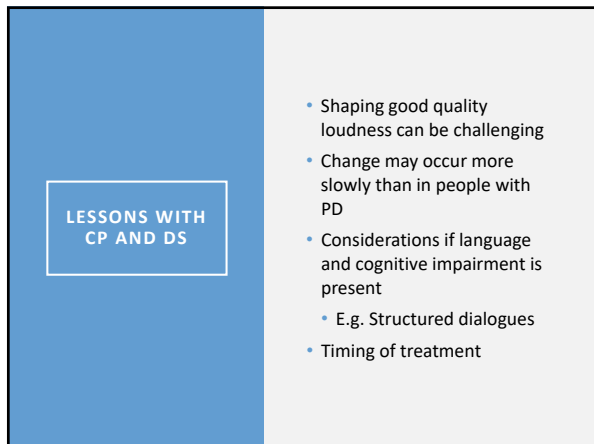
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MULTIPLE SCLEROSIS

- About 40-45% of individuals with MS suffer from dysarthria (Darley et al., 1972)
- Most commonly spastic-ataxic dysarthria (Darley et al., 1975)
- Prominent features: impaired loudness, breathy or harsh voice quality, vocal instability, imprecise articulation (Darley et al., 1975; Fitzgerald et al., 1987; Hartelius et al., 1997, 1995)
- More treatment research needed!

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CASE STUDY

BACKGROUND INFORMATION

Age: 46 year old female

Diagnosis: Progressive MS with superimposed exacerbations

Time since diagnosis: 12 years since initial diagnosis

Physical involvement: Motorized cart

Cognition: Within normal limits

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PRE-TREATMENT VOICE AND SPEECH SIGNS

Weak voice

Intermittent breathy voice

Observed deterioration of vocal loudness with extended use

"No laryngeal anomalies, good speech production, no lesions"

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MULTIPLE SCLEROSIS: PRE/POST AUDIO SAMPLE

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POST-TREATMENT VOICE AND SPEECH CHANGES

- Increased loudness
- Decreased fatigue
- Improved singing strength
- Confidence
- "Marked improvement in both the strength of voice and the adductor tone"

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CONSIDERATIONS WITH MS

- Treat with LSVT LOUD during periods of remission, not relapse
- Timing of treatment
- Case by case basis

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DEEP BRAIN STIMULATION

Speech Characteristics Post-DBS

- Neurosurgical interventions do not consistently or effectively improve speech in PD.
Freed et al., 1992; Goberman, 2005; Pinto et al., 2004; Rousseaux et al., 2004
- While some individual components of speech may improve, (e.g., loudness of sustained phonation, oral force control of tongue) overall speech intelligibility is not improved.
Kostermann et al., 2008; Pinto et al., 2003
- Speech problems (dysarthria) reported after STN-DBS ranges: 5% - 61%
Krack et al., 2003; Guehl et al., 2006

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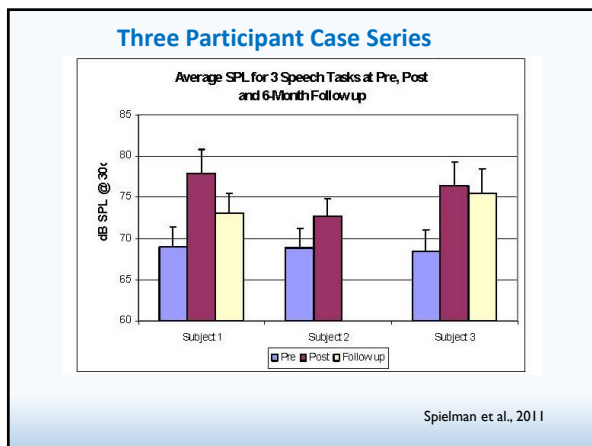
DEEP BRAIN STIMULATION

Speech Characteristics Post-DBS from the patient perspective

- Significant differences in severity of perceived speech disturbance between DBS and non-DBS group
- 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

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DEEP BRAIN STIMULATION: PRE/POST AUDIO SAMPLE

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CONSIDERATIONS WITH DBS

Feedback from treating clinicians

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

One possible explanation for this is the high stimulator settings for these three participants, which has shown to negatively affect speech intelligibility.

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

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CONSIDERATIONS WITH DBS

Optimize Stimulator Settings for Speech

- Work in a team with the neurologist/neurosurgeon and speech therapist to adjust stimulation and find the best contact and voltage settings

Behavioral Speech Treatment

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

Severe Speech Impairments from Stimulation

- Trials of behavioral speech treatment
- May need addition of augmentative communication devices

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ATYPICAL
PARKINSONISMS

- Comprise about 12% of Parkinsonian disorders (Stacy & Jancovic, 1992)
- Typically speech/voice deficits are more severe and deteriorate faster than idiopathic Parkinson’s disease (IPD) (Quinn, 1989)

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CONSIDERATIONS
WITH ATYPICAL
PARKINSONISMS

- Don’t discount potential based on initial impressions! (e.g. cognitive involvement, lack of interest, physical condition)
- Long-term goals may be less than IPD (e.g. phrase/sentence level; cued loudness)
- May need more frequent follow-up (e.g. 2 months post-treatment)

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CASE REPORT:
YOUNG ADULT WITH
AUTISM

- 18-year-old male
- Severe cognitive, language, and sensorimotor disorders; CAS
- Significantly limited use of functional, intelligible vocabulary (Severe mixed receptive-expressive language disorder)
- Parent-reported speech and voice concerns:
 - weak breath control
 - reduced loudness
 - very limited clarity when attempting to speak
 - not having enough breath
 - soft speech
 - monotone
 - no confidence with speaking

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**CASE REPORT:
YOUNG ADULT WITH
AUTISM**

Observed speech and voice signs by three speech-language pathologists:

- reduced breath support and control
- reduced intelligibility of attempted utterances
- reduced loudness
- monotone
- fast rate
- output limited to word or short phrase approximations, imprecise articulation, prosodic abnormalities

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**CASE REPORT:
YOUNG ADULT WITH
AUTISM**

Negative prognostic variables:

- Not initially stimuable for LSVT LOUD
- Unable to inhale volitionally or in response to models or cues
- Unable to respond to cues to increase loudness
- Child's age (Age at time of initial assessment: 16 years)
- Severity of speech and language disorders

Positive prognostic variables:

- Client and parent level of motivation to attempt to acquire functional, verbal communication
- Open to trial week of treatment to determine candidacy; feasibility

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**CASE REPORT: YOUNG
ADULT WITH AUTISM
RESULTS**

Significant gains in acoustic measures during performance tasks, (e.g. maximum phonation time, vocal loudness)

Parent rated great improvement across several perceptual variables:

- Breathing associated with speech
- Speech intelligibility
- Initiates conversation
- Participates in a conversation

Client noted improvements:

- Ease of speech production
- Ability to breathe and control speech
- Confidence speaking with people

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**CASE REPORT:
YOUNG ADULT WITH
AUTISM**

DISCUSSION

Several adaptations to accommodate difficulties with behavior and cognitive-linguistic delays were necessary to administer LSVT LOUD while maintaining treatment fidelity:

- breaks in motor practice
- longer sessions
- additional week(s) of treatment
- behavior management
- modifications for language and reading level
- additional feedback, reinforcement, and counseling to increase confidence as a speaker

Findings provide exciting, preliminary support for intensive voice treatment to improve select aspects of voice and speech functioning in this population

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**CASE REPORT:
YOUNG ADULT WITH
AUTISM**

DISCUSSION

When asked about his progress since starting the intensive LSVT LOUD program, Joey used his letter board to express,

“For years, to tell people my needs was almost impossible. Now make no mistake; now I’m virtually making verbal chatting with my loved ones.”

http://www.huffingtonpost.com/jim-luce/voice-of-hope-the-joey-10_b_7667976.html

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GENERAL CONSIDERATIONS

- LSVT LOUD is not for everyone – another tool in the toolbox
- Stimulability testing results, clinical judgment and client/family discussions should guide the decision on whether or not to progress with treatment
- Diagnoses that are contraindicated
 - Myasthenia Gravis
 - ALS
 - Multiple Sclerosis in exacerbation

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HOW TO ASK QUESTIONS LIVE:

1. Type in the QUESTION BOX on your control panel
2. Raise your hand! (*Click on the hand icon.*)
 - Your name will be called out
 - Your mic will be unmuted (make sure your mic is unmuted as well)
 - Then ask your question out loud
3. Email info@lsvtglobal.com if you think of questions later

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Webinar

UPCOMING PUBLIC WEBINAR

Application of LSVT LOUD® to neurological conditions beyond PD
 Wednesday, July 22nd
 2:00 – 3:00 EDT

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THANK YOU!

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