# LSVT Global® Virtual SLP Mini-Conference

Title: **LSVT LOUD® Applied to Adults with Cerebral Palsy: Two Single-Subject Studies**

Presenters: Gemma Moya-Galé, Ph.D., CCC-SLP
Jessica Galgano, Ph.D., CCC-SLP

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Contact Us:

Web: www.lsvtglobal.com Email: info@lsvtglobal.com

Phone: 1-888-438-5788 (toll free), 1-520-867-8838 (direct)

## LSVT Global's Virtual SLP Mini-Conference

LSVT LOUD® Applied to Adults with Cerebral Palsy:
Two Single-Subject Studies

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## Logistics

- ✓ Handouts are available in control bar
- ✓ Microphones are all muted
- ✓ You can type in questions at any time, we will answer at the end

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**Polling Question:**
**Who is joining us today?**

- LSVT LOUD certified professional or student
- SLP professional, not LSVT LOUD certified
- SLP student, not LSVT LOUD certified
- Other

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# LSVT LOUD® APPLIED TO ADULTS WITH CEREBRAL PALSY: TWO SINGLE-SUBJECT STUDIES

GEMMA MOYA-GALÉ, JESSICA GALGANO, CAROL FERRONE, YOUNGHWA MICHELLE CHANG, GRACE JI YAN TSANG, & LORRAINE RAMIG

NOVEMBER 19TH 2020

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## DISCLOSURES

- Dr. Gemma Moya-Galé reports no financial or non-financial relationship to this study
- Dr. Jessica Galgano is a paid consultant and receives lecture honorarium and travel reimbursement from LSVT Global, Inc.

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## LEARNING OBJECTIVES

1. Participants will be able to identify perceptual and acoustic characteristics of dysarthria associated with cerebral palsy
2. Participants will be able to hypothesize on the role of loudness to improve speech function in adults with cerebral palsy
3. Participants will be able to compare acoustic and perceptual changes post LSVT LOUD among different neurological populations

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## INTRODUCTION

- **Cerebral palsy** is a group of **developmental disorders** that affects movement and posture. In children, cerebral palsy (CP) constitutes the most common motor disability and it is estimated to occur at 1.5-4 per 1,000 live births worldwide (Centers for Disease Control and Prevention, 2018).
- **Dysarthria** is the motor speech disorder most frequently associated with CP (Schölderle et al., 2016), with variable prevalence data (Nordberg et al., 2013; Mei et al., 2014).
- Despite the increased life expectancy observed in CP, and the early onset of dysarthria in this population, **sparse attention** has been paid in the literature to the speech of adults with this neurological condition or to the effect of speech treatment on their vocal function and overall communication (Haak et al., 2009).

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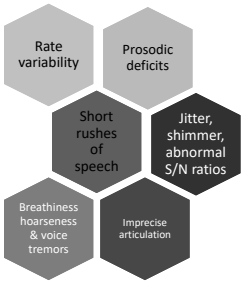
## SPEECH AND VOICE MANIFESTATIONS OF DYSARTHRIA

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## SPEECH TREATMENT FOR CP: A BRIEF OVERVIEW

1. Speech systems approach (Pennington et al., 2006; Pennington et al., 2010; Pennington et al., 2013; Pennington et al., 2018)
2. Speech Intelligibility Treatment (Levy, 2014, 2018; Levy et al., 2020)
3. Lee Silverman Voice Treatment (LSVT LOUD; Ramig et al., 2001; Ramig et al., 2018)

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## SPEECH SYSTEMS APPROACH

(PENNINGTON ET AL., 2006; PENNINGTON ET AL., 2010; PENNINGTON ET AL., 2013; PENNINGTON ET AL., 2018)

- Dysarthria affects different speech subsystems underlying articulatory configurations (Strand, 1995), hence the importance of targeting respiration and phonation in treatment
- Primary treatment targets: increased breath support and phonation and decreased speech rate

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## SPEECH INTELLIGIBILITY TREATMENT

(LEVY, 2014, 2018; LEVY ET AL., 2020)

- Dual-focus treatment approach that aims to increase intelligibility by targeting increased articulatory working space and vocal intensity
- Child-friendly cues of "big mouth" and "strong voice"
- Camp format, 6.5 hours of treatment daily, five days a week for three weeks, plus 15 minutes of homework daily

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## LEE SILVERMAN VOICE TREATMENT

(RAMIG ET AL., 2001; RAMIG ET AL, 2018)

- Several published randomized control trials (Levy et al., 2020; Ramig et al, 2001a; Ramig et al 2001b; Ramig et al 2018).
- Level I evidence for increasing vocal intensity in individuals with hypokinetic dysarthria secondary to idiopathic Parkinson's disease
- Successfully implemented with adults with multiple sclerosis (Baldanzi et al., 2020; Sapir et al., 2001), ataxia due to cerebellar dysfunction (Lowit et al., 2020; Sapir et al., 2003), Down Syndrome (Mahler & Jones, 2012) and stroke (Mahler & Ramig, 2012).
- Positive evidence with children with CP (Boliek & Fox, 2017; Boliek & Fox, 2014; Fox & Boliek, 2012).

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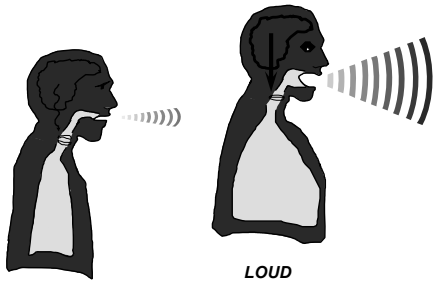


Ramig et al., 1995

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## AIM OF OUR STUDY

1. To examine the effects of LSVT LOUD on selected acoustic and perceptual measures of vocal function in two adults with severe spastic dysarthria secondary to CP

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## GET TO KNOW OUR SPEAKERS

| | Medical dx | Deviant speech characteristics | Received former speech therapy? |
|---|---|---|---|
| **Female** | Spastic quadriplegia s/t CP | Strained-strangled voice quality, hoarseness, imprecise articulation, poor intelligibility | YES |
| **Male** | Athetoid CP | Strained-strangled voice quality, hoarseness, imprecise articulation, slow speech rate, uneven stress, dysfluencies, fair intelligibility | YES |

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## METHODOLOGY DETAILS

- 10 year span between two speakers!
- Baseline data were collected three times within the week prior to the onset of treatment. Post-treatment data collected immediately after treatment.
- Vocal function tasks analyzed:
  - Maximum phonation time (MPT)
  - Maximum phonation frequency range (MPFR)
  - Variables of interest: SPL, mean F0, MPT, MPFR, jitter, shimmer, NHR
- Perceptual measures analyzed:
  - Voice Handicap Index (VHI)
  - Communicative Participation Item Bank (CPIB)

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## LSVT LOUD TREATMENT PROTOCOL

| Daily Exercises (minutes 1-30) | |
|---|---|
| Maximum sustained movements | |
| Directional movements | |
| Functional movements (i.e., self-generated phrases) | |
| **Hierarchy Exercises (minutes 31-55)** | |
| Purpose | Generalize vocal exercises into context-specific and functional speaking activities |
| Method | Multiple repetitions of reading & conversation tasks |
| Tasks | Increase in complexity across weeks & tailored to speakers' interests |

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## LET'S NOW WATCH SOME TREATMENT VIDEOS!

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## PRELIMINARY ACOUSTIC RESULTS: FEMALE SPEAKER

| Acoustic variables | Baseline 1 Mean (SD) | Baseline 2 Mean (SD) | Baseline 3 Mean (SD) | Post-treatment Mean (SD) |
|---|---|---|---|---|
| SPL (dB) | 75.90 (3.57) | 79.01 (1.73) | 79.68 (2.04) | 74.48 (1.61) |
| Mean F0 (Hz) | 178 (17) | 169 (21) | 176 (15) | 246 (13) |
| MPT (s) | 9.53 (4.48) | 4.60 (0.81) | 4.45 (0.74) | 20.17 (6.51) |
| Jitter (%) | 0.71 (0.52) | 1.12 (0.5) | 0.89 (0.46) | 0.23 (0.08) |
| Shimmer (%) | 3.82 (1.87) | 4.35 (1.9) | 2.56 (0.9) | 2.53 (0.49) |
| NHR | 0.07 (0.09) | 0.11 (0.08) | 0.07 (0.05) | 0.01 (0.01) |
| Mean MPFR (Hz) | 226 (10) | 208 (12) | 222 (6) | 264 (11) |

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## PRELIMINARY ACOUSTIC RESULTS: MALE SPEAKER

| Acoustic variables | Baseline 1 Mean (SD) | Baseline 2 Mean (SD) | Baseline 3 Mean (SD) | Post-treatment Mean (SD) |
|---|---|---|---|---|
| SPL (dB) | 61.66 (2.20) | 59.67 (2.31) | 63.1 (1.46) | 65.5 (1.03) |
| Mean F0 (Hz) | 142.36 (2.85) | 129.56 (5.16) | 129.72 (2.84) | 141.45 (3.56) |
| MPT (s) | 3.11 (2.23) | 2 (0.94) | 1.89 (0.77) | 4.02 (2.45) |
| Jitter (%) | .69 (0.11) | 1.03 (0.36) | .96 (0.3) | .71 (0.06) |
| Shimmer (%) | 3.28 (0.47) | 4.25 (0.6) | 4.05 (1) | 4.44 (0.56) |
| NHR | 0.04 (0.01) | 0.07 (0.04) | 0.06 (0.03) | 0.05 (0.03) |

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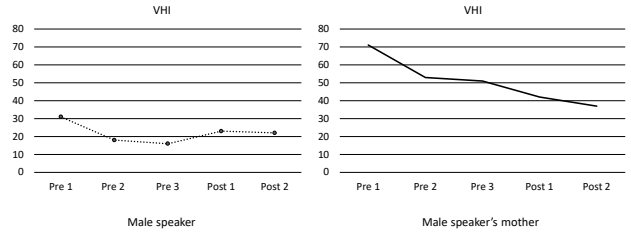
## PRELIMINARY PERCEPTUAL RESULTS: MALE SPEAKER

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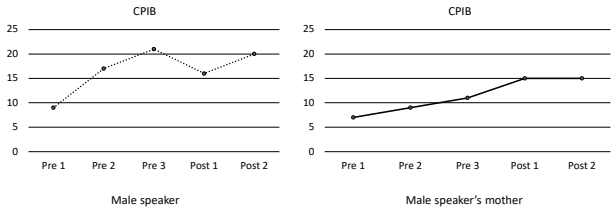
## PRELIMINARY PERCEPTUAL RESULTS: MALE SPEAKER

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## DISCUSSION: WHAT CAN WE INFER FROM THIS SO FAR?

- Adults with CP have been traditionally neglected in the literature (Schölderle et al., 2016).
- Positive physiological adjustments and stability resulting from this voice-focused treatment (Boliek & Fox, 2017) but heterogenous population!
- Both speakers evidenced a severe and chronic voice disorder pre-treatment, which may be more resistant to change or may require more exposure to treatment for observable changes to be recorded in some occasions …. **BUT!**

Individuals with more severe speech impairments constitute the most relevant clinical population for whom rehabilitation services should be directed (Schölderle et al., 2016)

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## FUTURE DIRECTIONS

- Larger studies are needed!
- Focus on study of speech production tasks as well as perceptual analysis of intensive voice-focused treatment in this population
- Emphasis on **functional abilities, confidence in communication, and life participation**

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## THANK YOU!

Gemma Moya-Galé, Ph.D., CCC-SLP: gemma.moya-gale@liu.edu
Jessica Galgano, Ph.D., CCC-SLP: jgphd@openlinesny.com

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