

# Team 27 - TeleLSVT - Wearable Device for Remote LSVT-BIG Therapy

Anix Binu, Sam Kim, Timothy Luu

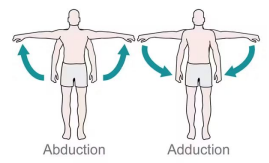
**LSVT BIG** (Lee Silverman Voice Treatment - BIG) is an intensive physical therapy for PD patients to help increase strength of the entire body and slow down PD progress.

**NEED:**  
Parkinson's patients struggle with accessing Therapy sites due to impaired movement

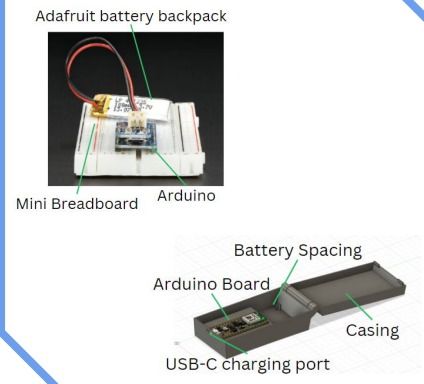
**OBJECTIVE:**  
*Create a remote therapeutic device for LSVT BIG therapy with real-time feedback*

**DESIGN INPUTS:**

- Device must be able to measure **range** and **velocity** of movement, and provide **real-time feedback** of shoulder **abduction/adduction**.
- Device must provide **clear** and **effective feedback** for both patient and therapists



**SOLUTION - DESIGN:**

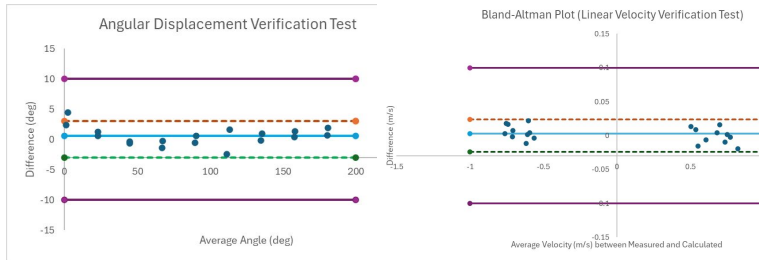


**TESTING RESULTS:**  
Device was able to measure range of motion and velocity, verified by Bland-altman plot, and provide feedback within the required 500ms

**SOLUTION - BUILD:**

- Adafruit Battery Backpack: Regulates voltage, recharging w USB
- Lithium-Ion Battery: Provides an external power source
- Arduino Nano 33 BLE: Provides necessary measurements
- 3D Printed Case: Ensures protection and user-friendly maintenance

**GRAPHS:** Bland-altman plot of displacement + velocity



Verification of real-time feedback

Accuracy of Feedback	Average Response (ms)	Within 500 ms
<u>100%</u>	<u>&lt;0.01</u>	<u>100%</u>

**FUTURE:**

- Accessing of Motion Capture Lab
- Inclusion of other movements for shoulder plane
- Smaller/comfortable design & fit
- Complete incorporation of Bluetooth functionality
- Measurement of other limbs