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Feasibility and preliminary outcomes of a standardized exercise program in adults with Down syndrome: A pilot study

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PURPOSE AND HYPOTHESIS

- Youth with Down Syndrome (DS) have limited participation in physical activity. When compared to their typically developing peers, adults with DS display decreased functional mobility and strength.
- Exercise has shown to improve the physical fitness, overall health, and quality of life in people with DS.
- The Lee Silverman Voice Treatment (LSVT® BIG) is an effective treatment approach designed for patients with Parkinson's disease.
- The core components of LSVT® BIG include large amplitude movements, sensory calibration, high intensity, and maximum effort while performing the daily exercises.
- Due to hypotonicity associated with DS, these individuals typically display kyphotic posture, shortened step length and overall lower amplitude movements.
- The LSVT® BIG protocol has the potential to improve muscle tone and overall fitness in adults with DS similar to the improvements seen in the Parkinson's disease population, but the effects have yet to be studied.

The purpose of this pilot study was to test the feasibility of implementing a 4 week standardized group exercise program in adults with DS, and assess whether subjects improved after this protocol.

PARTICIPANTS

A convenience sample of 8 adults with DS were recruited from a residential facility.

Subject	Gender	Age (y)	Height (in)	Weight (lb)	BMI	Number of participation days
1	M	38	66	246.4	39.8	16
2	M	38	66	189.2	30.53	14
3	M	31	63	134	23.73	16
4	F	33	55	142.4	33.09	14
5	F	50	57	142.4	30.81	13
6	F	47	52	151.6	39.41	10
7	M	29	67	200	31.32	16
8	M	33	59	162	32.72	11
Mean	---	37.38	60.63	171	32.67	13.75
SD	---	7.58	5.68	38.4	5.15	2.17

METHODS

- This exploratory, feasibility pilot study employed a pretest-posttest design.
- Outcome measures were assessed at baseline and at one week post intervention.
- The independent variable for this study was the LSVT® BIG standardized exercise protocol.
- Outcome measures included: the Modified Clinical Test of Sensory Interaction on Balance (mCTSIB) and timed single leg stance (SLS) for balance, the 10 meter walk test (10MWT) for gait speed, the 30 second sit-to-stand test for lower extremity functional strength, and the timed-up-and-go (TUG) for overall functional mobility.
- Each participant completed the established LSVT® BIG protocol in a group exercise format, totaling 16 sessions.



LSVT® BIG EXERCISE PROTOCOL

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https://www.lsvtglobal.com/images/uploads/digital_files/26065/lsvt_big_home_ex_program_2015.pdf

RESULTS

Table: Results of outcome measures at initial and post intervention

	Outcome Measure	Pretest	Posttest
Balance	CTSIB 1	5.95	7.40
	CTSIB 2	6.85	6.30
	CTSIB 4	3.60	6.45
	CTSIB 5	5.00	6.50
	SLS Right	0	0
	SLS Left	0	0
Gait Speed (m/sec)	10MWT (self-selected)	0.78	1.01*
	10MWT (fast)	1.17	1.19
Lower Extremity Functional Strength	30 Second Sit-to-Stand	9.50	8
Functional Mobility	TUG	12.42	10.46

*Statistically significant increase at p < 0.05

RESULTS

- LSVT® BIG certified instructors were able to lead the group exercises for all 8 adults with DS with no adverse effects.
- Attendance varied between 10 to 16 sessions, with an average participation rate of 13.75 days (SD = 2.17).
- Standard LSVT® BIG modifications were easy to implement when needed.
- While not statistically significant, the median scores improved for all dependent variables except for one of the mCTSIB scores and 30 second sit-to-stand test.

CONCLUSION

A 4 week high-amplitude standardized exercise program can be easily implemented and may improve self-selected gait speed in adults with DS, but may not have a statistically significant effect on their balance or functional strength.

CLINICAL RELEVANCE

The findings from this pilot study support the incorporation of an LSVT BIG program into the exercise routine of adults with DS.

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