A Virtual Speech Therapist for Parkinson's Disease

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Objective

This study was designed as a pilot study to explore the use of virtual therapy in the delivery of LSVT LOUD® (Lee Silverman Voice Treatment).

Background

Nearly 90% of individuals with Parkinson's disease (PD) have a speech or voice disorder which historically has been resistant to medical or behavioral treatment. Today LSVT LOUD is the only speech treatment with published data from three randomized control trials (RCTs) documenting short and long term improvement in speech and voice in PD (1). The need for accessibility to efficacious speech treatment continues to grow and is being addressed in part through telepractice (2) and software-supported delivery systems (3). The work proposed here presents a novel idea for conducting LSVT LOUD using a fully automated computer program in which a perceptive, lifelike, animated 3D computer character (LSVT-VT) interacts with individuals with PD much like a human therapist. This pilot study blends an efficacious treatment (LSVT LOUD) with cutting edge human communication and animation technologies (4).
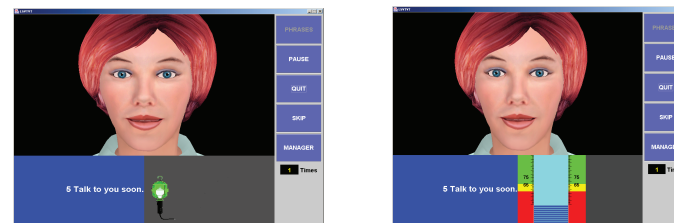
Methods

Fourteen individuals participated, 7 with mild to moderate PD (Ss) and 7 significant others (SOs).

Sustained Vocalization Visualizer
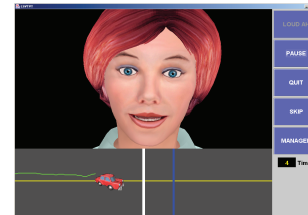
Pitch Range Visualizer

Functional Range Visualizer

Procedure

Treatment: The LSVT-VT was used for 9-12 of the standard 16 LSVT LOUD sessions.

Experimental data collection and analysis: Pre and post speech and voice data including sound pressure level (SPL) were collected while Ss performed a range of tasks. Ss with PD also completed perceptual rating scales and a questionnaire regarding their experience with the LSVT-VT. SOs completed rating scales to report their perception of the speech of the Ss pre to post treatment.

Results

Pre to post SPL increases ranged from 5.3-13.3dB at 30cm across a range of tasks. These changes are comparable to standard LSVT LOUD treatment outcomes (1). Perceptual ratings by both the Ss with PD and SO were consistent with these data. The majority of the individuals with PD rated the LSVT-VT easy to use, engaging, and helpful with speech.

Conclusions

This pilot study is a step in incorporating virtual therapy technology in voice treatment for PD. Clinical experience suggests individuals who have cognitive challenges, substantial sensory calibration issues or have more severely disordered voices, may need more direct clinician time. Future research will help determine which individuals will be most appropriate for the LSVT-VT.

References

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