Dysarthria: A Study of Effects on Communication

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INTRODUCTION

Dysarthria is an impairment classified by slow, weak, and imprecise muscle movements that affect speech and communication. It can be caused by neurologic disorders such as stroke, Down syndrome, cerebral palsy, or Parkinson’s disease. The largest problem associated with dysarthria is its negative impact on communication, and therefore its negative impact on a patient’s quality of life. The ability to speak intelligibly is essential to fulfill social and emotional needs. In many interactions, people with dysarthria cannot be fully understood, which makes it difficult and frustrating to engage in daily tasks and can lead to feelings of isolation and loneliness (Mahler & Ramig, 2012). The purpose of this project was to look at the effects of treatment on dysarthria of an adult with Down syndrome and the impact of dysarthria on speech and communication in people with Parkinson’s disease. Qualitative and quantitative measures were used, such as listener studies, surveys, acoustic analyses, and careful observation of therapy sessions.

METHODS

A variety of techniques were used to collect information regarding the effects of treatment on dysarthria.

Multi-Dimensional Voice Program

A computer program called the Multi-Dimensional Voice Program (MDVP) measured quantitative acoustic variables of voice quality, calculating more than 22 parameters for a single vocalization. Recordings from a patient with Down Syndrome were recorded and analyzed using this software. MDVP is valuable in its ability to work accurately over a wide range of pathological voices. Its normative references are based on an extensive database of normal and disordered voices, and results are graphically and numerically compared to these normative threshold values. A key feature of MDVP is the visual “snapshot” that it provides that summarizes the speech. An example can be seen below. (http://kayelemetrics.com/)

DISCUSSION OF RESULTS

Multi-Dimensional Voice Program

As this project is still ongoing, we have only collected pre-treatment data from the observed participant DS03, a person with Down Syndrome who received speech therapy to improve their intelligibility. The chart included shows her Average Fundamental Frequency, Relative Average Perturbation, and Pitch Perturbation Quotient which was taken from MDVP snapshot. These numbers show us that the mean value for each of these measures are above the norm. The goal of the treatment was to lower these values closer to that of the norm, therefore making her speech clear and intelligible. To date, the participant whose voice was analyzed using MDVP had improved speech in therapy, but not outside of the treatment room.

Listener Studies

Intelligibility ratings data are still being collected for this project and have not yet been analyzed.

Surveys

Surveys were administered asking patients with Parkinson’s disease to rate their communication and swallowing characteristics on a scale, to gain knowledge of their perceptions of the impact of PD. The EAT-10 Swallowing Screening tool consists of ten questions about different aspects of the swallowing process, and each answer is rated on a scale of 0 (no problem) to 4 (severe problem). These numbers were added to obtain a total EAT-10 score. A score of 3 or higher indicates that swallowing is a safety issue and should be discussed with a physician.

Surveys included several trends in the data after analyzing the visual analog scales for communication and swallowing as well as the results of the EAT-10 questionnaire. People with Parkinson’s disease (PD) seem to underestimate the severity of their symptoms. This was supported by differences in results when a spouse took the same survey and rated the person with PD. Spouses consistently rated the symptoms as being more impaired than the patient on almost all communication and swallowing parameters. These results highlight in people with PD that makes it difficult for them to accurately monitor their own behaviors. It would be a health risk for swallowing since people with PD did not appear to recognize signs and symptoms of swallowing impairment. Another conclusion I drew from the data was that people with PD identified more deficits with their speech than their swallowing. A partial explanation may be that Loud Crowd, a weekly therapy group that these participants belong to, is meant to address voice and speech changes resulting from PD, and not their swallowing deficits.

REFERENCES