The Effects of Intensive Voice Treatment on Dysarthria in Multiple Sclerosis (MS)

Anna Farrell, PhD

The National Hospital for Neurology and Neurosurgery, Queen Square, London, UK

Abstract

The aim of this poster is to describe the effects of an intensive voice treatment programme on dysarthria in two individuals with MS.

Perceptual and acoustic measures of speech production recorded before and after intensive voice treatment revealed improvements in acoustic speech measures, speech intelligibility and overall communication ratings.

Background

•Dysarthria is the most common communication disorder in individuals with MS with previous studies documenting prevalence rates varying from 42% to 51% (Hartelius & Svensson, 1994).

•The presenting dysarthria is typically mild, with the severity of dysarthria symptoms related to neurological involvement. Features of dysarthria in MS include impaired loudness, breathy or harsh voice, vocal instability, and imprecise articulation (Darley et al., 1975; FitzGerald, Murdoch & Chenery, 1987; Hartelius, Buder & Strand, 1997).

•Whilst there is a strong evidence base supporting the use of intensive voice treatment (i.e., Lee Silverman Voice Treatment) for individuals with dysarthria and Parkinson's disease (Ramig et al., 1996) there is a relative paucity of published research into the treatment of dysarthria in MS

•Only a few studies have assessed the effects of speech treatment for individuals with MS (Hartelius, Wising & Nord, 1997; Sapir et al., 2001).

•Hartelius et al. (1997) treated 7 individuals with dysarthria and MS and found 5 individuals improved with therapy, as measured acoustically and perceptually. The other 2 individuals did not improve significantly.

•Sapir et al. (2001) found improvement in acoustic and perceptual measures of speech function (sound pressure level, duration of vowel phonation and voice loudness) for 2 individuals with MS 6 months after administration of Lee Silverman Voice Treatment (LSVT).

•The current study was designed to evaluate whether an intensive voice treatment programme based on the LSVT might improve voice function in individuals with MS

Method

Participants

2 females with MS presented with mild spastic-ataxic dysarthria undergoing a period of rehabilitation at a specialist neurological hospital

Participant A

•45 year old female with 14 year history of primary progressive MS.

•Participant A lived with her husband and two young children. Previously employed as a professional musician and worked part-time teaching music to children.

•Symptoms of MS included upper and lower limb weakness and mild spastic-ataxic dysarthria.

•Pre-treatment, speech was characterised by reduced volume, reduced pitch range, articulatory imprecision, and slow rate.

•Participant A reported that dysarthria impacted her confidence particularly in relation to her work and family roles.

Participant B

•57 year old female with 43 year history of secondary progressive MS.

•Symptoms of MS included mild cognitive impairment (executive dysfunction), mild spastic-ataxic dysarthria, upper and lower limb weakness, bowel and bladder dysfunction,

•Participant B lived with husband and her main activities were reading, cooking and listening to music.

•Pre-treatment, speech was characterised by reduced volume, reduced pitch range and articulatory imprecision.

•Participant B reported dysarthria impacted her confidence and she avoided talking in social situations and avoided using the telephone.

Speech Assessment

Perceptual rating of Speech Intelligibility

❑**Assessment of Intelligibility of Dysarthric Speech** (Yorkston & Beukleman, 1981)

❑**Visual Analogue Scale of Speech Difficulties**: 0 = no speech difficulties, 10 = severe speech difficulties

❑**Review of SLT records** before and after treatment to obtain information about possible qualititative changes experienced by participants

Acoustic Measures

❑**Sound pressure level (SPL)** calculated during sustained phonation /a/, reading and monologue using sound level meter 30cm from each participant's lips and recorded with Visipitch.

❑**Duration of sustained /a/ in seconds**

Treatment

❑**16 individual speech therapy sessions across 4 week period**

•Modelled on the LSVT programme with focus on training the variable 'loud'.

•Techniques were designed to maximize phonatory efficiency and loudness, improve vocal fold adduction and respiratory support

•Repetition of maximum duration of sustained /a/ phonation, generation of highest and lowest fundamental frequency levels during vowel phonation, and speech production tasks using high effort healthy loud phonation

•No direct attention was focused on altering participant's speaking rate or articulation during treatment.

Perceptual and acoustic speech measures were collected before treatment and immediately post-treatment.

Perceptual and acoustic speech measures were collected by the same SLT

Speech intelligibility was rated by an independent SLT blinded to each participant's identity

Results

Table 1.

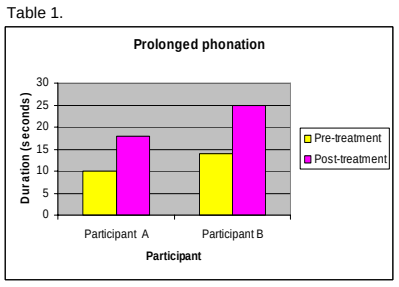


Table 2.

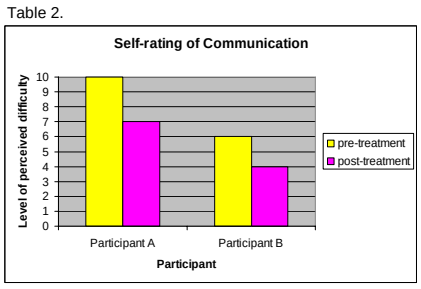


Table 3.

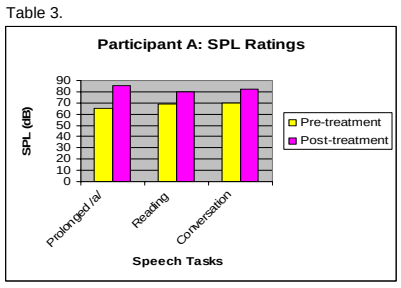


Table 4.

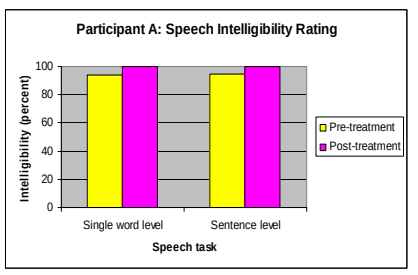


Table 5.

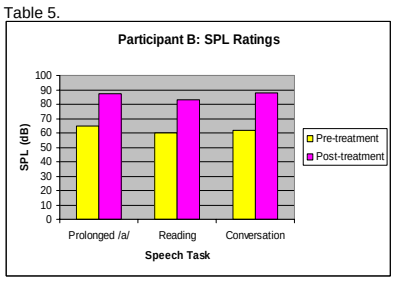
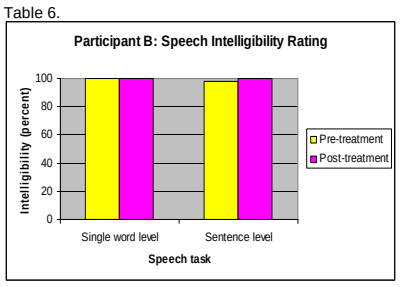


Table 6.



Discussion

•Two individuals with MS who were treated with an intensive voice treatment programme exhibited improvements in SPL, sustained phonation duration, and speech intelligibility ratings. Current results were preliminary and should be evaluated as single cases.

•The improvement in SPL, duration of sustained phonation and communication ratings were consistent with findings of Sapir et al. (2001).

•Based on the current findings, it was hypothesised that the post-treatment improvement in vocal function was associated with improved vocal fold adduction. However, post-treatment changes in the physiology of the motor speech mechanism were not evaluated in the current cases.

•Current results were consistent with findings of Petajan et al. (1996) that intensive training may improve function in those parts of the body that are prone to fatigue in MS.

•Further evidence is required to establish the effectiveness of this treatment approach with particular examination of treatment parameters (e.g., frequency and duration of treatment).

•Clear need for further evaluation of the profile of individuals most likely to benefit from this speech treatment.

•The current results suggest a potential role for intensive voice treatment in individuals with dysarthria and MS.

Conclusion

•The current findings identified a need for additional studies to assess the impact of intensive voice treatment programme on a larger number of individuals with MS in order to compare the efficacy of the programmes (e.g., LSVT) with that of other treatment methods and to explore the neurophysiologic mechanisms underlying vocal improvement.

References

Darley, F., Aronson, A., & Brown, J. (1975). *Motor Speech Disorders*. Philadelphia, Saunders.

FitzGerald, F., Murdoch, B., & Chenery, H. (1987). Multiple sclerosis: Associated speech and language disorders. *Australian Journal of Human Communication Disorders, 15,* 15-33.

Hartelius, L., Buder, E., & Strand, E. (1997). Long-term phonatory instability in patients with multiple sclerosis. *Journal of Speech, Language, and Hearing Research, 40*, 1056-1072.

Hartelius, L. & Svensson, P. (1994). Speech and swallowing symptoms associated with multiple sclerosis. *Clinical Linguistics and Phonetics, 9,* 95-120.

Hartelius, L., Wising, C., & Nord, L., (1997). Speech modification in dysarthria associated with multiple sclerosis: An intervention based on vocal efficiency, contrastive stress, and verbal repair. *Journal of Medical Speech-Language Pathology, 5*, 113-140.

Petajan, J., Gappmaier, E., White, A., Spencer, M, Mino, L., & Hicks, R. (1996). Impact of aerobic training on fitness and quality of life in multiple sclerosis. *Annals of Neurology, 39*, 432-441.

Ramig, L., Countryman, S., O'Brien, C., Hoehn, M., & Thompson, L. (1996). Intensive speech treatment for patients with Parkinson's disease: Short- and long-term comparison of two techniques. American Academy of Neurology, 47, 1496-1504.

Sapir, S., Pawlas, A., Ramig, L., Seeley, E., Fox, C. et al. (2001). Effects of intensive phonatory-respiratory treatment (LSVT) on voice in two individuals with MS. *Journal of Medical Speech-Language Pathology, 9(2*), 141-151.

Yorkston, K. & Beukleman, D. (1981). *Assessment of Intelligibility of Dysarthric Speech*. Austin: Pro-Ed.

Acknowledgements

Lucy Rodriguez, Clinical Specialist SLT and Nikki Wilson, Senior SLT at NHNN

Colleagues at Neurorehabilitation Unit, NHNN

Email Contact: anna.farrell@uclh.nhs.uk