

Comprehensive Treatment of Voice and Speech in Parkinson's Disease

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Over 200 years ago, James Parkinson first defined the medical phenomenon known as Parkinson's disease (PD). Originally described as the "shaking palsy," decades of scientific research have elucidated underlying etiologies, improved our diagnostic precision, and helped us understand a causative model for this life-threatening disease. PD is a progressive neurological disease with a mean onset of symptoms around 55 years old (Ascherio and Schwarzschild 2016) and affects 1-2 per 1,000 of the general pop-

ulation (Tysnes and Storstein, 2017). In 2015, however, the Movement Disorder Society Clinical Diagnostic Criteria for PD was revised to also recognize several non-motor manifestations. Clinical diagnostic features of non-motor manifestations range from constipation and psychiatric disorders to dementia and sleep disorders (Jankovic, 2008). It is important to note that based on the Neurology literature, there is a general lack of inclusion of voice, speech, and swallowing deficits in the diagnostic process of PD.

The underlying cause of the motor and non-motor impairments PD is still largely unknown. However, due to the known impact of PD on dopaminergic neurons in the basal ganglia, dopamine replacement therapy has been a gold standard treatment to manage PD motor symptoms. More recently, deep brain stimulation of the basal ganglia nuclei has been used to control motor deficits. However, neither dopamine replacement nor deep brain stimulation prevents disease



Baumann et al., 2018; Behrman et al., 2021; Behrman et al., 2020).

In addition to formal speech treatment, there is a growing body of evidence supporting singing as an adjunct therapeutic modality to address voice and speech deficits. Singing has been demonstrated to promote louder voice production than habitual speech production (Tamplin et al., 2019). Moreover, singing may help patients learn to develop and train their respiratory function, as increases in max-

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ulation (Tysnes and Storstein, 2017). It has been generally accepted that PD affects 1% of the population above the age of 60 (de Lau and Breteler, 2006). PD results from the death of dopaminergic neurons in a region of the basal ganglia called the substantia nigra pars compacta or the presence of proteinaceous aggregates in neurons called Lewy Bodies. Dopaminergic neuron death causes degeneration of dopamine release in the striatum, impacting the circuitry of the basal ganglia and reducing movement control.

Historically, the diagnosis of PD was based largely on the presentation of motor abnormalities. Hallmark motor features, including bradykinesia, resting tremor, and rigidity, are central to the clinical diagnosis (Postuma

progression.

Current evidence-based individual speech treatment options for voice and speech impairments associated with PD include Lee Silverman Voice Treatment® and Speak OUT!®. Both programs are relatively high intensity and based on motor-learning principles. The approaches are thought to help bypass the extrapyramidal tract in the brain and engage the pyramidal tract to promote improvement in voice and speech. These therapy programs utilize individual therapy followed by a maintenance group therapy (LOUD for Life® and The LOUD Crowd®, respectively) to focus on improved loudness, with additional effects also noted in articulation, intonation, and facial expressions (Levy et al., 2020;

imum expiratory pressure and maximum inspiratory pressure have been observed (Di Benedetto et al., 2009; Haneishi, 2001; Ferriero et al., 2013; Stegemöller et al., 2020). Intonation changes, phonation range changes, and improved speech intelligibility have also been demonstrated in the literature (Di Benedetto et al., 2009; Stegemöller et al., 2020). Additional study of larger sample sizes, appropriate dosage, and the use of randomized control trials would strengthen support for singing as a treatment modality.

The University of Utah Voice Disorders Center currently offers Speak OUT!® and The LOUD Crowd®, as well as a weekly half-hour choir online. These programs were initiated

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and are partially supported by grants from Parkinson Voice Project. In addition to providing evidence-based treatment to speakers with PD, the LOUD Crowd® provides a clinical experience to a graduate student in the Communication Sciences and Disorders program at the University of Utah, supervised by clinicians from the Voice Disorders Center. The choir started online and has remained online, despite the challenge that audio signal latency poses to choral timing. Attendance for the choir and The LOUD Crowd® has been excellent due to the comfort of participation from the patient's own home rather than traveling to our clinic. We find that the combination of programs offered by our clinical site provides a great chance for patients to socialize and practice their therapy skills, and allows clinicians to monitor patients for decline and offer additional treatment in a timely manner.



REFERENCES

1. Ascherio, A., & Schwarzschild, M. A. (2016). The epidemiology of Parkinson's disease: risk factors and prevention. *The Lancet Neurology*, 15(12), 1257-1272.
2. Ball, N., Teo, W. P., Chandra, S., & Chapman, J. (2019). Parkinson's disease and the environment. *Frontiers in neurology*, 10, 218.
3. Baumann, A., Nebel, A., Granert, O., Giehl, K., Wolff, S., Schmidt, W., Baasch, C., Schmidt, G., Witt, K., Deuschl, G., Hartwigsen, G., Zeuner, K. E., & van Eimeren, T. (2018). Neural correlates of hypokinetic dysarthria and mechanisms of effective voice treatment in Parkinson's disease. *Neurorehabilitation and Neural Repair*, 32(12), 1055-1066. <https://doi.org/10.1177/1545968318812726>
4. Behrman, A., Cody, J., Chitnis, S., Elandary, S., (2021). Dysarthria treatment for Parkinson's disease: one-year follow-up of SPEAK OUT! with the LOUD Crowd. *Logopedics Phoniatrics Vocology*, <https://doi.org/10.1080/14015439.2021.1958001>
5. Behrman, A., Cody, J., Elandary, S., Flom, P., & Chitnis, S. (2020). The Effect of SPEAK OUT! and The LOUD Crowd on Dysarthria Due to Parkinson's Disease. *American Journal of Speech-Language Pathology*, https://doi.org/10.1044/2020_AJSLP-19-00024.
6. De Lau, L. M., & Breteler, M. M. (2006). Epidemiology of Parkinson's disease. *The Lancet Neurology*, 5(6), 525-535.
7. Di Benedetto, P., Cavazzon, M., Mondolo, F., Rugiu, G., Peratoner, A., & Biasutti, E. (2009). Voice and choral singing treatment: a new approach for speech and voice disorders in Parkinson's disease. *European Journal of Physical and Rehabilitation Medicine*, 45(1), 13-19. <https://pubmed.ncbi.nlm.nih.gov/18987565/>
8. Ferriero, G., Bettoni, E., Picco, D., Massazza, G., & Franchignoni, F. (2013). Speech disorders from Parkinson's disease: Try to sing it! A case report. *Movement Disorders*, 28(5), 686-687. <https://doi.org/10.1002/mds.25440>
9. Haneishi, E. (2001). Effects of a Music Therapy Voice Protocol on Speech Intelligibility, Vocal Acoustic Measures, and Mood of Individuals with Parkinson's Disease. *Journal of Music Therapy*, 38(4), 273-290. <https://doi.org/10.1093/jmt/38.4.273>
10. Irons, J. Y., Hancox, G., Vella-Burrows, T., Han, E.-Y., Chong, H.-J., Sheffield, D., & Stewart, D. E. (2020). Group singing improves quality of life for people with Parkinson's: an international study. *Aging & Mental Health*, 25(4), 1-7. <https://doi.org/10.1080/13607863.2020.1720599>
11. Levy, E., Moya-Galé, G., Chang, Y., Freeman, K., Forrest, K., Brin, M. F., & Ramig, L.A. (2020). The effects of intensive speech treatment on intelligibility in Parkinson's disease: A randomised controlled trial. *The Lancet's EClinicalMedicine*, 24, 1-11. <https://doi.org/10.1016/j.eclinm.2020.100429>
12. Postuma, R. B., Berg, D., Stern, M., Poewe, W., Olanow, C. W., Oertel, W., ... & Deuschl, G. (2015). MDS clinical diagnostic criteria for Parkinson's disease. *Movement disorders*, 30(12), 1591-1601.
13. Ramig, L. O., Halpern, A., Spielman, J., Fox, C., & Freeman, K. (2018). Speech treatment in Parkinson's Disease: Randomized controlled trial (RCT). *Movement Disorders*, 33(11), 1777-1791. <https://doi.org/10.1002/mds.27460>
14. Shih, L. C., Piel, J., Warren, A., Kraich, L., Silver, A., Vanderhorst, V., Simon, D. K., & Tarsy, D. (2012). Singing in groups for Parkinson's disease (SING-PD): A pilot study of group singing therapy for PD-related voice/speech disorders. *Parkinsonism & Related Disorders*, 18(5), 548-552. <https://doi.org/10.1016/j.parkreldis.2012.02.009>
15. Stegemöller, E. L., Diaz, K., Craig, J., & Brown, D. (2020). The Feasibility of Group Therapeutic Singing Telehealth for Persons with Parkinson's Disease in Rural Iowa. *Telemedicine and E-Health*, 26(1), 64-68. <https://doi.org/10.1089/tmj.2018.0315>
16. Tamplin, J., Morris, M. E., Marigliani, C., Baker, F. A., & Vogel, A. P. (2019). ParkinSong: A Controlled Trial of Singing-Based Therapy for Parkinson's Disease. *Neurorehabilitation and Neural Repair*, 33(6), 453-463. <https://doi.org/10.1177/1545968319847948>
17. Tysnes, O. B., & Storstein, A. (2017). Epidemiology of Parkinson's disease. *Journal of neural transmission*, 124(8), 901-905.
18. Vázquez-Vélez, G. E., & Zoghbi, H. Y. (2021). Parkinson's disease genetics and pathophysiology. *Annual Review of Neuroscience*, 44, 87-108.

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