



SLP Treatment for People with PD Improves Communication, Swallowing and Quality of Life (QoL).

(``@

J Improved Voice and Communication

For people with PD, intensive SLP voice treatment leads to...

Improved Speech and Communication

- Increased communicative effectiveness (25%).¹
- Improved turn-taking (143%), initiation of communication (125%), and participation in communication overall (12%).^{1,2}
- Increased speech intelligibility as reported by care partners (27%). and objective measures (5%-32%).³⁻⁶
- Reduced severity of dysarthria (13%-23%).7
- Reports of fewer repetitions and increased verbal communication in 60% of people with PD. $^{\rm 8}$

Improved Prosody and Loudness

- Increased loudness in 55%–87%^{5,6} of people with PD, with increased loudness in monologues (3–8 dB)^{2,7-9} and conversation (3–7 dB).^{1,10,11}
- Improved prosody in 50%¹² of people with PD, with increased vocal range (5-11 Hz).^{8, 10}
- Improved self-perception of prosody (25%-28%).^{12, 13}

Improved Voice Quality

- Improved dysphonia (21%-57%),¹⁸ hoarseness (50%),¹⁴ and breathiness (49%).¹⁴
- Improved voice-related QoL (27%-61%),^{1,5,10,15} with reduced impact of voice disorder on daily activities (30%-53%),^{2,16} vocal symptoms (32%)², and emotional well-being (53%).²

Improved Swallowing

Following intensive SLP treatment, people with PD experience a $23\%^{7}$ increase in pleasure of eating, with...

- Improved swallowing-related QoL (8%-16%)^{18, 19} and function (61%).²⁰
- Reduced severity (61%)^{20, 21} and frequency (14%-20%)^{17, 19} of dysphagia symptoms.
- Improved swallow initiation (45%),¹⁸ pharyngoesophageal segment opening duration (9%),²¹ and spontaneous cough (12%).²¹
- Reduced dysphagia severity (36%-52%).²²
- Reduced presence (36%–75%),¹⁷ severity (41%),²³ and volume (44%)²¹ of pharyngeal residue.
- Reduced swallowing-related fear (21%)²⁴ and emotional impact (59%).²⁰
- Higher likelihood (88%)²⁵ of maintaining or improving Penetration Aspiration Scale (PAS)²⁶ scores during the course of treatment, with 33%–70%^{25, 27} of therapy participants demonstrating improved PAS scores.

Following SLP-led compensatory strategy training and diet modification, aspiration is eliminated in 61% of patients with PD.^{\rm 28}

ဂိုဂိုဂို Multidisciplinary Treatment

Following multidisciplinary SLP care, individuals with PD demonstrate improvements in voice-related QoL (25%)²⁹ and health-related quality of life (16%-41%),^{30, 31, 32} with...

- Improved QoL for mental health (20%-43%), cognition (30%-34%), and communication (36%-49%).^{30, 31}
- Increased knowledge regarding PD for care partners (93%) and people with PD (95%).³³
- Reduced anxiety (10%)³⁴ and depression (8%).³⁵
- Reduced perceived burden and extent of disease (15%-31%).^{31, 36, 37}

Following inpatient multidisciplinary SLP treatment, patients with PD demonstrate...

- Reduced dependence for cognitive-based tasks (23%).³⁸
- Improved visuospatial reasoning (33%) and abstract reasoning (12%).³⁹



Treatment Hours and Progress



Patients with PD who improved by at least **30+%** in functional abilities only received **3-5 additional hours** of treatment compared to those who showed no improvement.⁴⁰

Patients with PD made an 8%--22% average gain in functionality following SLP treatment. 40

References

¹Bryans, L. A., Palmer, A. D., Anderson, S., Schindler, J., & Graville, D. J. (2021). The impact of Lee Silverman Voice Treatment (LSVT LOUD®) on voice, communication, and participation: Findings from a prospective, longitudinal study. *Journal of Communication Disorders, 89,* 106031. https://doi:10.1016/j.jcomdis.2020.106031

²Wight, S., & Miller, N. (2015). Lee Silverman Voice Treatment for people with Parkinson's: Audit of outcomes in a routine clinic. *International Journal of Language & Communication Disorders*, 50(2), 215-225. <u>https://doi:10.1111/1460-6984.12132</u>

³ Levy, E. S., Moya-Galé, G., Chang, Y. H. M., 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. *EClinicalMedicine*, 24, 100429. <u>https://doi:10.1016/j.eclinm.2020.100429</u>

⁴Ateras, B., & von Piekartz, H. (2018). Integration of a neurodynamic approach into the treatment of dysarthria for patients with idiopathic Parkinson's disease: A pilot study. *Journal of Bodywork & Movement Therapies, 22*(3), 648–656. <u>https://doi:10.1016/j.jbmt.2017.12.004</u>

⁵Searl, J., Wilson, K., Haring, K., Dietsch, A., Lyons, K., & Pahwa, R. (2011). Feasibility of group voice therapy for individuals with Parkinson's disease. *Journal of Communication Disorders*, 44(6), 719–732. <u>https://doi:10.1016/j.jcomdis.2011.05.001</u>

⁶Theodoros, D. G., Hill, A. J., & Russell, T. G. (2016). Clinical and quality of life outcomes of speech treatment for Parkinson's disease delivered to the home via telerehabilitation: A noninferiority randomized controlled trial. *American Journal of Speech-Language Pathology*, *25*(2), 214-232. https://doi:10.1044/2015_ajslp-15-0005

⁷ Richardson, K., Huber, J. E., Kiefer, B., Kane, C., & Snyder, S. (2022). Respiratory responses to two voice interventions for Parkinson's disease. *Journal of Speech, Language, and Hearing Research, 65*(10), 3730–3748. <u>https://doi.org/10.1044/2022_JSLHR-22-00262</u>

⁸Behrman, 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*, 29(3), 1448-1465. <u>https://doi:10.1044/2020_ajslp-19-00024</u>

⁹Ramig, L. O., Sapir, S., Countryman, S., Pawlas, A. A., O'Brien, C., Hoehn, M., & Thompson, L. L. (2001). Intensive voice treatment (LSVT) for patients with Parkinson's disease: A 2 year follow up. Journal of Neurology, Neurosurgery, and Psychiatry, 71(4), 493-498. <u>https://doi.org/10.1136/jnnp.71.4.493</u>

¹⁰Boutsen, F., Park, E., Dvorak, J., & Cid, C. (2018). Prosodic improvement in persons with Parkinson disease receiving SPEAK OUT!® voice therapy. *Folia Phoniatrica et Logopaedica, 70*(2), 51-58. <u>https://doi.org/10.1159/000488875</u>

¹¹Sale, P., Castiglioni, D., De Pandis, M. F., Torti, M., Dall'armi, V., Radicati, F. G., & Stocchi, F. (2015). The Lee Silverman Voice Treatment (LSVT®) speech therapy in progressive supranuclear palsy. *European Journal of Physical and Rehabilitation Medicine*, *51*(5), 569–574.

¹²Whitehill, T. L., Kwan, L., Lee, F. P., & Chow, M. M. (2011). Effect of LSVT on lexical tone in speakers with Parkinson's disease. Parkinsons Disease, 2011(2), 897494. <u>https://doi.org/10.4061/2011/897494</u>

¹³Halpern, A. E., Ramig, L. O., Matos, C. E., Petska-Cable, J. A., Spielman, J. L., Pogoda, J. M., Gilley, P. M., Sapir, S., Bennett, J. K., & McFarland, D. H. (2012). Innovative technology for the assisted delivery of intensive voice treatment (LSVT®LOUD) for Parkinson disease. *American Journal of Speech-Language Pathology*, 21(4), 354–367. <u>https://doi:10.1044/1058-0360(2012/11-0125)</u>

¹⁴Baumgartner, C. A., Sapir, S., & Ramig, T. O. (2001). Voice quality changes following phonatory-respiratory effort treatment (LSVT) versus respiratory effort treatment for individuals with Parkinson disease. *Journal of Voice*, *15*(1), 105-114. <u>https://doi.org/10.1016/s0892-1997(01)00010-8</u>

¹⁵Saffarian, A., Amiri Shavaki, Y., Shahidi, G. A., Hadavi, S., & Jafari, Z. (2019). Lee Silverman Voice Treatment (LSVT) mitigates voice difficulties in mild Parkinson's disease. *Medical Journal of the Islamic Republic of Iran, 33*, 5. <u>https://doi.org/10.34171/mjiri.33.5</u>

¹⁶ Moya-Galé, G., Goudarzi, A., Bayés, À., McAuliffe, M., Bulté, B., & Levy, E. S. (2018). The effects of intensive speech treatment on conversational intelligibility in Spanish speakers with Parkinson's disease. *American Journal of Speech-Language Pathology, 27*(1), 154-165. <u>https://doi.org/10.1044/2017_AJSLP-17-0032</u>

¹⁷ Manor, Y., Mootanah, R., Freud, D., Giladi, N., & Cohen, J. T. (2013). Video-assisted swallowing therapy for patients with Parkinson's disease. *Parkinsonism & Related Disorders*, 19(2), 207-211. <u>https://doi.10.1016/j.parkreldis.2012.10.004</u>

¹⁸ Athukorala, R. P., Jones, R. D., Sella, O., & Huckabee, M. L. (2014). Skill training for swallowing rehabilitation in patients with Parkinson's disease. Archives of Physical Medicine and Rehabilitation, 95(7), 1374–1382. <u>https://doi:10.1016/j.apmr.2014.03.001</u>

¹⁹Ayres, A., Jotz, G. P., Rieder, C. R., Schuh, A. F., & Olchik, M. R. (2016). The impact of dysphagia therapy on quality of life in patients with Parkinson's disease as measured by the Swallowing Quality of Life Questionnaire (SWALQOL). *International Archives of Otorhinolaryngology, 20*(3), 202–206. https://doi.org/10.1055/s-0036-1582450

²⁰Mohseni, Z., Saffarian, A., Mohamadi, R., Abolghasemi, J., & Habibi, S. A. H. (2023). Effect of conventional speech therapy combined with music therapy on swallowing in patients with Parkinson's disease (telerehabilitation): A randomized-controlled trial. *Middle East Journal of Rehabilitation and Health Studies*, 10(1). <u>https://doi:10.5812/mejrh-131572</u>

²¹Miles, A., Jardine, M., Johnston, F., de Lisle, M., Friary, P., & Allen, J. (2017). Effect of Lee Silverman Voice Treatment (LSVT LOUD®) on swallowing and cough in Parkinson's disease: A pilot study. *Journal of the Neurological Sciences, 383*, 180–187. <u>https://doi.org/10.1016/j.jns.2017.11.015</u>

²²Byeon, H. (2016). Effect of simultaneous application of postural techniques and expiratory muscle strength training on the enhancement of the swallowing function of patients with dysphagia caused by Parkinson's disease. *Journal of Physical Therapy Science, 28*(6), 1840–1843. https://doi.org/10.1589/jpts.28.1840

References

²³ Claus, I., Muhle, P., Czechowski, J., Ahring, S., Labeit, B., Suntrup-Krueger, S., Wiendl, H., Dziewas, R., & Warnecke, T. (2021). Expiratory muscle strength training for therapy of pharyngeal dysphagia in Parkinson's disease. *Movement Disorders*, *36*(8), 1815–1824. <u>https://doi.org/10.1002/mds.28552</u>

²⁴Argolo, N., Sampaio, M., Pinho, P., Melo, A., & Nóbrega, A. C. (2013). Do swallowing exercises improve swallowing dynamic and quality of life in Parkinson's disease? *NeuroRehabilitation*, 32(4), 949-955. <u>https://doi:10.3233/nre-130918</u>

²⁵Troche, M. S., Okun, M. S., Rosenbek, J. C., Musson, N., Fernandez, H. H., Rodriguez, R., Romrell, J., Pitts, T., Wheeler-Hegland, K. M., & Sapienza, C. M. (2010). Aspiration and swallowing in Parkinson disease and rehabilitation with EMST: A randomized trial. *Neurology*, 75(21), 1912–1919. <u>https://doi.org/10.1212/WNL.0b013e3181fef115</u>

²⁶Rosenbek, J. C., Robbins, J. A., Roecker, E. B., Coyle, J. L., & Wood, J. L. (1996). A penetration-aspiration scale. *Dysphagia*, 11(2), 93–98. https://doi.org/10.1007/BF00417897

²⁷Pitts, T., Bolser, D., Rosenbek, J., Troche, M., Okun, M. S., & Sapienza, C. (2009). Impact of expiratory muscle strength training on voluntary cough and swallow function in Parkinson disease. *Chest*, *135*(5), 1301-1308. <u>https://doi.org/10.1378/chest.08-1389</u>

²⁸Logemann, J. A., Gensler, G., Robbins, J., Lindblad, A. S., Brandt, D., Hind, J. A., Kosek, S., Dikeman, K., Kazandjian, M., Gramigna, G. D., Lundy, D., McGarvey-Toler, S., & Miller Gardner, P. J. (2008). A randomized study of three interventions for aspiration of thin liquids in patients with dementia or Parkinson's disease. Journal of Speech, Language, and Hearing Research, 51(1), 173-183. https://doi.org/10.1044/1092-4388(2008/013)

²⁹Tamplin, 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. <u>https://doi.org/10.1177/1545968319847948</u>

³⁰Ferrazzoli, D., Ortelli, P., Zivi, I., Cian, V., Urso, E., Ghilardi, M. F., Maestri, R., & Frazzitta, G. (2018). Efficacy of intensive multidisciplinary rehabilitation in Parkinson's disease: A randomised controlled study. *Journal of Neurology, Neurosurgery, & Psychiatry, 89*(8), 828–835. <u>https://doi.org/10.1136/jnnp-2017-316437</u>

³¹Marumoto, K., Yokoyama, K., Inoue, T., Yamamoto, H., Kawami, Y., Nakatani, A., Fukazawa, Y., Hosoe, Y., Yamasaki, A., & Domen, K. (2019). Inpatient enhanced multidisciplinary care effects on the quality of life for Parkinson disease: A quasi-randomized controlled trial. *Journal of Geriatric Psychiatry and Neurology*, 32(4), 186-194. <u>https://doi.org/10.1177/0891988719841721</u>

³²Tickle-Degnen, L., Ellis, T., Saint-Hilaire, M. H., Thomas, C. A., & Wagenaar, R. C. (2010). Self-management rehabilitation and healthrelated quality of life in Parkinson's disease: A randomized controlled trial. *Movement Disorders*, 25(2), 194-204. <u>https://doi.org/10.1002/mds.22940</u>

³³Trend, P., Kaye, J., Gage, H., Owen, C., & Wade, D. (2002). Short-term effectiveness of intensive multidisciplinary rehabilitation for people with Parkinson's disease and their carers. *Clinical Rehabilitation*, *16*(7), 717–725. <u>https://doi.org/10.1191/0269215502cr545oa</u>

³⁴ Gage, H., Grainger, L., Ting, S., Williams, P., Chorley, C., Carey, G., Borg, N., Bryan, K., Castleton, B., Trend, P., Kaye, J., Jordan, J., & Wade, D. (2014). Specialist rehabilitation for people with Parkinson's disease in the community: A randomised controlled trial. *Health Services and Delivery Research*, 2(51). <u>https://doi.org/10.3310/hsdr02510</u>

³⁵Gage, H., Kaye, J., Owen, C., Trend, P., & Wade, D. (2006). Evaluating rehabilitation using cost-consequences analysis: An example in Parkinson's disease. *Clinical Rehabilitation*, 20(3), 232-238. <u>https://doi.org/10.1191/0269215506cr9360a</u>

³⁶Ortelli, P., Ferrazzoli, D., Bera, R., Caremani, L., Giladi, N., Maestri, R., & Frazzitta, G. (2018). Effectiveness of a goal-based intensive rehabilitation in Parkinsonian patients in advanced stages of disease. *Journal of Parkinson's Disease, 8*(1), 113-119. <u>https://doi.org/10.3233/jpd-171247</u>

³⁷Stegemöller, E. L., Hibbing, P., Radig, H., & Wingate, J. (2017). Therapeutic singing as an early intervention for swallowing in persons with Parkinson's disease. *Complementary Therapies in Medicine, 31*, 127-133. <u>https://doi.org/10.1016/j.ctim.2017.03.002</u>

³⁸Ellis, T., Katz, D. I., White, D. K., DePiero, T. J., Hohler, A. D., & Saint-Hilaire, M. (2008). Effectiveness of an inpatient multidisciplinary rehabilitation program for people with Parkinson disease. *Physical Therapy*, 88(7), 812-819. <u>https://doi.org/10.2522/ptj.20070265</u>

³⁹Meloni, M., Saibene, F. L., Di Tella, S., Di Cesare, M., Borgnis, F., Nemni, R., & Baglio, F. (2021). Functional and cognitive improvement after an intensive inpatient multidisciplinary rehabilitation program in mild to severe Parkinson's disease: A retrospective and observational study. *Frontiers in Neurology*, *12*, 626041. <u>https://doi.org/10.3389/fneur.2021.626041</u>

⁴⁰American Speech-Language-Hearing Association (2022). National Outcomes Measurement System (NOMS): SLP healthcare registry. <u>www.asha.org/NOMS</u>