

Parkinson Disease

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PARKINSON DISEASE (PD) is a progressive neurological disorder that affects approximately two million Americans.¹ Typically, this disease presents in either sex after the age of 60; however, it can present in individuals as young as 30. It is the second most common neurodegenerative disorder facing the elderly.² In addition to affecting movement, 70–90% of patients also experience Parkinson-related voice and speech disturbance, and up to 1/3 of these patients identify the voice and speech symptoms as the most debilitating deficits related to the disease.³ Parkinson disease can be challenging in singers and it is imperative that singing teachers and professional voice users recognize the effects of PD on the voice and speech and be familiar with treatment options.

WHAT IS PARKINSON DISEASE?

Parkinson disease is a neurologic disease caused by death of neurons in the substantia nigra, a dopamine-producing region of the brain.⁴ Subsequently, there is a decrease in production of dopamine, an important neurotransmitter. The substantia nigra is part of the basal ganglia, a region of the brain crucial in movement; therefore, changes in the neurotransmitters in this region lead to motor impairment, including difficulty walking resting, speech and voice impairment, tremor, rigidity (stiffness), and bradykinesia (slow movements). In addition to motor symptoms, the disease can cause depression, sleep disturbance, voice changes, and possibly cognitive impairments. Voice changes can be the first sign of PD, and recognizing these changes is important in ensuring that the patient receives the necessary care.⁵ Parkinson disease should be distinguished from the Parkinson Plus Syndromes such as multisystem atrophy.⁶ This group of syndromes is defined by Parkinson symptoms, but with additional clinic features such as rapid progression, early dementia, vision changes, and frequent falls.

Vocal and speech disturbances in PD include hypokinetic dysarthrias marked by monopitch and slowed speech, reduced stress, imprecise consonants, breathiness, and reduced loudness.⁷ Patients with PD also have abnormal vocal processing and auditory feedback, which leads to the patient perceiving the voice as normal when it is not.⁸ Singers might note loss of range, decreased loudness, prolonged warm-up, and increased vocal instability. These speech and voice changes can limit patients' ability to convey emotions as well as decrease speech intelligibility.⁹ Decreased intelligibility can lead patients with Parkinson disease to limit social interaction, which may result in isolation and decreased quality of life.

EVALUATION

Patients diagnosed with Parkinson dysphonia and/or dysarthria require a multidisciplinary team approach including evaluations by a neurologist, otolaryngologist, speech language pathologist, and other professionals. A complete head and neck exam should be conducted, and additional neurologic signs such as resting tremor, “pill rolling” finger movements, and decreased facial expression should be noted.¹⁰ As part of the evaluation, the larynx is visualized typically using videostrobolar-yngoscopy. Vocal fold bowing and atrophy are seen commonly, and the vocal fold bowing is associated with glottal incompetence and compensatory muscle tension dysphonia.¹¹ Vocal tremor and vocal paresis and paralysis also have been reported in these patients. Objective voice testing can demonstrate increased shimmer and jitter and decreased harmonic-to-noise ratio. In addition to voice complaints, patients often have difficulty swallowing and reduced sense of smell, and these symptoms may require additional evaluation.¹²

TREATMENT

Typically, medical therapy to increase dopamine is the initial treatment for PD.¹³ This is done through a combination of medications that prevent degradation of dopamine and increase the supply of dopamine. The regimen requires adjustment as the disease progresses. These medications have been shown to improve motor symptoms of the disease like rigidity, bradykinesia, and resting tremor; however, there are mixed data about the vocal impact.¹⁴ Deep brain stimulation (DBS) is another treatment option that involves implanting electrodes into specific areas of the brain. These electrodes send electrical impulses that help regulate pathway activity in a more normal pattern. This treatment has been shown to dramatically improve overall motor function of the patient; however, the vocal results are variable, with some studies demonstrate a negative impact on vocal quality.¹⁵ As neither option specifically addresses Parkinson dysphonia, additional treatment typically is needed.

VOICE THERAPY

Several different forms of voice therapy have been studied in detail in the Parkinson disease patient population.

More traditional voice therapy approaches are of limited use due to patient inability to carry over improvements to environments outside the treatment room. While patients were participating in therapy and receiving direct feedback from therapist, vocal improvement was noted; however, these improvements were not maintained outside the treatment setting. One explanation for the inability of therapy to carry over was deficits of internal cuing.¹⁶ Patients with PD often are unaware of their decreased vocal loudness. When receiving external cues from the therapist to speak louder, loudness improved to normal conversational volume, but this improvement is not sustained during daily life. Multiple studies identified two features that were associated with consistent improvement of speech and voice quality: high dosage of therapy (increased number of sessions) and a focus on improving voice loudness.¹⁷ These concepts were incorporated into a treatment called the Lee Silverman Vocal Therapy (LSVT) Loud, now the mainstay of voice therapy for Parkinson patients.

LSVT Loud is a form of high intensity voice therapy that has been proven to improve voice production and communication in patients with Parkinson dysphonia. The therapy regimen consists of one hour sessions, four times a week, for four weeks. An extended version of the program also can be delivered with less frequent sessions over a longer period of time. The goal of the treatment is for the patient to focus on vocal loudness. It has been shown that by increasing vocal loudness, other speech parameters including articulation and intonation also improve.¹⁸ LSVT Loud involves having patient focus on maximal effort and multiple repetitions of vowel sounds. With time, the complexity of sounds and vocal movements is increased gradually, initially focusing on single words, then phrases, then sentences, followed by reading passages, and finally conversation. Patients are taught to “feel the effort” that is required to produce a voice loud enough for conversation.¹⁹ The phrases and sentences used in treatment are chosen specifically for individual and represent phrases the patient uses every day. LSVT Loud has been shown to improve voice quality for at least 6–12 months. Patients are encouraged to return after 6 months for re-evaluation and a few therapy sessions if deemed necessary after re-evaluation.²⁰ Though LSVT Loud has been proven to be effective and improve communication, as few as 3–4% of people

with Parkinson dysphonia participate in therapy. Low participation may be due to the time intensiveness of the therapy as well as limited access to LSVT Loud-trained speech-language pathologists, and efforts have been made to find alternative means of therapy that might increase the percentage of the patient population who receive therapy.²¹

Some research into music therapy has shown success as patients who participate regularly have demonstrated increased vocal intensity and improved speech intelligibility. In an effort to improve social support and sense of community, group therapy via choral therapy has been introduced and studied, as well. However, there yet have been no documented improvements of vocal quality utilizing this line of treatment.²²

SURGICAL INTERVENTIONS

LSVT Loud is typically the initial treatment for Parkinson dysphonia; however, in some patients, the therapy does not produce or sustain the desired results. In this population, surgical intervention can be considered, specifically vocal fold medialization procedures that reduce the gap between the vocal folds.²³ Injection medialization (injecting a bulking agent into the vocal fold) has been reported in the literature. In one study, 60–75% of patients who underwent injection medialization reported significant improvement in vocal quality. Some injections are temporary and require revision procedures, but other injected materials such as fat can be permanent.²⁴ Commonly, a medialization thyroplasty is considered. This procedure involves placing an implant in the larynx in order to medialize the membranous portion vocal folds. For Parkinson dysphonia, this procedure usually is performed bilaterally, but has also been reported to be successful with unilateral implantation.²⁵ The procedure is completed in the operating room under local anesthesia. These surgical options should be utilized as an adjunct to LSVT Loud or other voice therapy techniques.

CONCLUSION

Parkinson dysphonia and dysarthria can be debilitating for patients because of the functional decline, but also in regard to the quality of life effect. This emotional impact can be even more profound for singers. Although, LSVT

Loud is the most commonly recommended treatment option for Parkinson dysphonia, each patient requires an individualized treatment plan and a combined approach by the neurologist, otolaryngologist, speech language pathologist, singing teacher, and others.

Singing teachers should be familiar with the symptoms and signs of Parkinson disease as they may be the first people to recognize the voice dysfunction. Familiarity with PD allows singing teachers to recommend medical evaluation early when prompt diagnosis and treatment may minimize at least the early effects of the disease.

NOTES

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