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A Practice-Based Approach to Developing One-on-One Singing Instruction
for Individuals with Parkinson's Disease

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Project Portfolio

Introduction

This paper considers the structure and potential benefit of one-on-one voice lessons specifically for Individuals with Parkinson's Disease (IPD). Parkinson's Disease (PD) is a complex neurological condition that can impact the entire body and its functions. IPD experience vocal tremor and weakening of muscles within the vocal mechanism, affecting the pitch and loudness of the voice (Xavier and Simonyan, 2022). Tremors may be observed in laryngeal and oral structures such as the throat, velum, tongue, and jaw, as well as the respiratory cavity (de Lima Xavier and Simonyan, 2020; Xavier and Simonyan, 2022). Vocal tremor can negatively disrupt daily life, causing communication difficulties, social isolation, and depression (Alam, Munjal and Panda, 2017; Hemmerich, Finnegan and Hoffman, 2017). The tremulous voice associated with PD is often interpreted to be weak, fearful, over-emotional or anxiety-ridden (Xavier and Simonyan, 2022). Studies show that singing interventions positively impact speech outcomes such as phonation, intelligibility and vocal intensity (Barnish and Barran, 2020). In addition, singing and music therapy have had a positive impact on gait, mood and quality of life (McIntosh *et al.*, 1997; Harrison, McNeely and Earhart, 2017; Stegemöller *et al.*, 2017). While several speech protocols exist for IPD, they are not singing focused per se. Existing singing activities implemented for IPD tend to focus on group singing and the positive social and well-being implications of these programs (Irons *et al.*, 2021). While successful, these programs do not sufficiently satisfy the need for lesson plans to guide one-on-one singing work with IPD.

The Artefact presented as an Appendix to this paper is a developed lesson plan for one-on-one voice lessons for IPD. This paper and appendices were developed based upon my prior teaching experience, existing vocal pedagogy practices and relevant theoretical discussion in the literature. Responsibly preparing to teach voice lessons to IPD is time consuming and requires sensitivity to individual needs, patience with compromised abilities, and an understanding of the disease and its symptoms. While I anticipate methods in the lesson plan to be effective and enjoyable for IPD, they remain untested due to ethical restrictions. However, based on my prior experience working with IPD and others with health impairments, I predict the lesson plans, if tested, would have a positive emotional and physical outcome for students. This is supported by a review of research presented below.

As a vocalist, I have long believed in and experienced the physical and mental health benefits of singing. Singing is an essential component of my own personal health regimen. I credit singing for its influence on my own breath control, vocal endurance, postural awareness and emotional health. The opportunity to immerse myself in the research-based pedagogy and the physical mechanisms that become activated during the singing process motivated my entry into the Voice Study Centre MA program at the University of Wales Trinity St David.

As a voice teacher, I have worked with hundreds of singers, including health compromised clients who struggle with aging, swallowing issues, respiratory concerns, vocal tremor and PD. I have seen a developing trend for students to seek out singing lessons with the dual goals of having an enjoyable experience while addressing vocal issues that present due to health concerns. To be most effective, voice teachers must not only understand vocal pedagogy, but also the health challenges caused by medical conditions affecting each student.

I am particularly interested in issues that affect the more mature singer. Having worked in public health with individuals recovering from respiratory illnesses, I have long been drawn to topics that explore the relationship between health and singing. In the past, I have worked with a few IPD. These students might be novice singers, individuals who sang in choirs in their youth, or experienced singers. Due to their PD diagnosis, they experience muscular degeneration and speech difficulties typical of the disease (Herd *et al.*, 2012; Gillivan-Murphy, Carding and Miller, 2016; Irons *et al.*, 2021; Natl Inst on Aging, 2022).

Building on the knowledge gained from completing a literature review on singing protocols for vocal tremor in a prior assignment (Harris, 2024), I set out to develop my Artefact: lesson plans for one-on-one voice lessons for IPD and an intake form for new students with PD (see, Appendices 1 and 2, respectively). My goal for developing my Artefact is to provide fun and engaging sessions that are designed to stimulate the muscles used in vocal production and impacted by PD. I am guided by relevant publications, my personal best practices, and exemplar group sessions found online. These lessons are developed to be respectful of a student's present health condition and conveyed in safe and supportive manner.

Developing this Artefact will enable me to reflect on my present teaching practices, and then re-evaluate them based on existing research on PD and protocols for working with IPD. My future goals for developing this resource are to guide new work with IPD, to provide a resource for others who wish to engage in this work, and to propose a lesson plan that may be the subject of

future observational or experimental research studies. This process will prepare me more effectively to teach voice to IPD in the future and to understand the special vocal circumstances experienced by IPD.

Planned Programme of Study

Theoretical Influences

Parkinson's disease (PD) is a neurological condition that degrades movement throughout the body including the musculature of the speech mechanism (Herd *et al.*, 2012; Irons *et al.*, 2019). PD is characterized by a decrease in dopaminergic neurons in the substantia nigra in the basal ganglia region of the brain (Schulz, 2002; de Laat *et al.*, 2024). The resulting impairment to dopamine production leads to motor-symptom and muscle control challenges such as slowness of movement, rigidity, tremor, compromised speech and postural instability (Meder *et al.*, 2019). Dopamine replacement therapies are often prescribed to slow these symptoms in IPD (Meder *et al.*, 2019). Parkinson's symptoms worsen over time and can also include depression and anxiety (Sutherland *et al.*, 2009; Herd *et al.*, 2012; Irons *et al.*, 2019).

The global burden of PD is 11.8 million people worldwide as of 2021. Rates have risen steadily over the past 35 years and by 2050 over 25 million people are expected to have the disease globally with highest rates of prevalence expected in the 60–79 year-old age group (Luo *et al.*, 2025; Su *et al.*, 2025). More men experience the disease than women (Luo *et al.*, 2025). While environmental contaminants are considered a risk factor for developing PD, aging is considered the greatest risk factor (Coleman and Martin, 2022; Su *et al.*, 2025). Depending on the study, people under 50 years of age account for 5-20% of Parkinson's cases (Riboldi *et al.*, 2022; *Early Onset Parkinson's Disease*, 2025).

Approximately 75% of IPD experience speech impairment (Schulz, 2002). Dysarthria refers to a group of speech disorders that result from muscular control disturbances in the vocal mechanism due to central nervous system damage (Herd *et al.*, 2012). Parkinson's dysarthria includes speech classified as reduced in volume, weak, breathy, hoarse, nasal, monotonous, and poorly articulated, with speakers exhibiting difficulty starting speech, pronouncing consonants, impaired rhythm and pitch, stuttering or tremor (Herd *et al.*, 2012). IPD may use limited facial expressions or be unaware of low volume levels which can lead to impaired

communication and social isolation (Schulz, 2002; Herd *et al.*, 2012; E. Stegemöller *et al.*, 2017).

PD is treated with multiple protocols including medications, surgery and a variety of therapies (Irons *et al.*, 2019). Considering the large numbers of individuals who have or may contract the disease, and the accessibility of singing, developing guided singing-care strategies could effectively help many individuals. While significant research exists on IPD and speech or motor control issues, much of the literature specifically on singing protocols has been spearheaded by Elizabeth Stegemöller. Her published papers and publicly available presentations lay out persuasive arguments for developing singing protocols for working with IPD who are interested in one-on-one lessons. Stegemöller highlights the difference between motor and voice symptoms in IPD, noting that motor impairment treatments do not always effectively address voice impairment (E. Stegemöller *et al.*, 2017). Because singing is an enjoyable and engaging activity, Stegemöller suggests it could improve quality of life (QOL), aid in patient adherence to therapeutic protocols, and address vocal and respiratory challenges in IPD (E. Stegemöller *et al.*, 2017).

The enjoyment of music promotes the release of dopamine itself, suggesting that music therapy may be a powerful tool in the management of PD progression (Boso *et al.*, 2006). Music has been shown to influence the release of dopamine in the brain (Salimpoor *et al.*, 2011). In a study of song-learning observed in zebra finch birds, researchers found that the level of dopamine produced in the basal ganglia increased when the effort to sing was made (Qi *et al.*, 2025). Studies linking music making to activation of dopamine release further indicate that singing could be a valuable therapy in the overall care protocols for IPD.

Basal ganglia degeneration apparent in PD also impairs beat and rhythm processing (Harrison, McNeely and Earhart, 2017). Music is a recognized cueing technique used to influence a rhythmic gait (Harrison, McNeely and Earhart, 2017). Harrison and colleagues looked at whether singing could provide a self-generated musical cue to IPD to stabilize gait and found that singing at a tempo similar to the subject's normal walking pace had the potential to improve gait variability (Harrison, McNeely and Earhart, 2017). While further research is needed, singing while walking could prove to be an easily accessible cueing technique for IPD to employ to improve gait and stability (Harrison, McNeely and Earhart, 2017).

Freezing of gait (FOG) is a common symptom experienced by IPD (Li *et al.*, 2022). It has been described by study participants as feeling like “their feet were stuck to the ground when initiating gait, turning, or negotiating obstacles” (Li *et al.*, 2022 at 2). FOG increases the risk of falls and reduces mobility in IPD (Mazzetta *et al.*, 2019). Gait variability signifies a lack of steadiness and control and is related to fall risk in IPD (Harrison, McNeely and Earhart, 2017). Movement with singing has been shown to help with gait rehabilitation in IPD (McIntosh *et al.*, 1997). Music-based movement therapy (MMT) consists of exercising while listening to music and incorporates processing external cues and auditory stimuli while exercising (Zhou *et al.*, 2021; Li *et al.*, 2022). A systematic review of music-based movement therapy protocols for IPD showed that this type of therapy significantly improved motor function, balance, gait consistency, and walking speed (Zhou *et al.*, 2021). Li *et al.* put IPD through an intervention consisting of five 1-hour MMT sessions per week for 4 weeks and found that MMT resulted in an improvement in gait disorders and motor function (Li *et al.*, 2022).

Singing is referred to as a sport by vocal practitioners due to the muscular demands of the activity (LeBorgne and Rosenberg, 2014). As exercise, singing programs could benefit those suffering from a disease that weakens the very musculature needed to speak and sing (E. Stegemöller *et al.*, 2017). In a study that compared the results of a 10-week singing program to conventional physical exercise for patients with COPD, the singing program resulted in similar improvements implying muscle recruitment, activation and strengthening (Vaes *et al.*, 2022). Exercise has been shown to improve physical conditioning in IPD, (Lamotte *et al.*, 2015) and to be effective for improving motor symptoms and slowing symptom progression including degeneration of motor skills in IPD (Wu, Lee and Huang, 2017; Ramaswamy, Jones and Carroll, 2018). Exercise programs have been shown to slow motor symptom deterioration depending on the type, intensity, and duration of the exercise, with higher intensity exercise done multiple times a week for prolonged periods being particularly effective (Lamotte *et al.*, 2015). Regular physical activity and habits have been associated with a better progressive path of the disease (Tsukita, Sakamaki-Tsukita and Takahashi, 2022). In addition, a small study working with newly diagnosed IPD found dopaminergic neurons retained an unexpected amount of functionality after exercise, implying potential neuroprotective effects of exercise in IPD (Lamotte *et al.*, 2015; de Laat *et al.*, 2024).

To decouple the effects of music protocols from the effects of exercise protocols in IPD, Stegemoller looked at the change in motor symptoms after one hour of group singing in a group

of 18 individuals (Stegemoller *et al.*, 2022). Based on results seen in past studies (E. Stegemöller *et al.*, 2017), researchers hypothesized that due to the stationary nature of group singing, the primary benefits would be seen as improvements in facial expression and speech. However significant improvements were observed in gait, posture and tremor, while changes in bradykinesia (slower than expected movement), facial expression, and speech remained minimal. Novice singers showed the largest improvement in gait and posture. Researchers hypothesize that the immediate results of group singing may be an engagement of neural networks that influence gait, posture and tremor while changes in vocal, swallowing and respiratory systems may require multiple singing experiences over time. Fatigue after an hour of singing may also play a role in the lack of reported changes to these systems (Stegemoller *et al.*, 2022).

IPD experience respiratory complications due to stiff or weak respiratory, abdominal and chest-wall related muscles (Reyes *et al.*, 2020). Resulting reduced pulmonary capacity and airflow can compromise vocal intensity and glottal pressure needed to vibrate vocal cords (Reyes *et al.*, 2020). Breathing and vocal exercises are valuable tools to promote respiratory coordination (Kang, Scholp and Jiang, 2018). Studies have shown that singing exercises muscles required for air inhalation and exhalation thereby strengthening respiratory muscles (Tanday, 2016; Kang, Scholp and Jiang, 2018; Reyes *et al.*, 2020). Studies have also shown respiratory and pulmonary improvements after subjects participate in singing programs (Bonilha *et al.*, 2009; Gick and Nicol, 2016; Lewis *et al.*, 2016; Goldenberg, 2018; Kang, Scholp and Jiang, 2018; Desjardins and Bonilha, 2020)

In a series of publications, Stegemöller and her team documented the benefits of singing for IPD (E. Stegemöller *et al.*, 2017; Stegemöller *et al.*, 2017; Stegemoller *et al.*, 2022). Her team assessed changes in voice, respiratory and quality of life (QOL) measures before and after 8 weeks of singing interventions including vocal and articulation exercises and group singing. Significant improvements were seen in maximum inspiratory and expiratory pressure (measures indicative of muscle strength (Buckley and Gillham, 2007; Berry, 2012)), phonation time, and voice QOL and whole health QOL measures (E. Stegemöller *et al.*, 2017). While not reaching statistical significance, additional voice measures improvements also occurred (E. Stegemöller *et al.*, 2017).

Individuals with neurological impairments such as PD often experience difficulty swallowing, a condition known as dysphagia (Yeo *et al.*, 2021). Dysphagia can present with poor tongue control, reduced pharyngeal motility, and decreased laryngeal mobility (Kim, 2010). Improper swallowing can cause liquid or food to aspirate into the lungs resulting in aspiration pneumonia, which is a leading cause of death in IPD (Won *et al.*, 2021). Singing and related exercises can improve swallowing function (Yeo *et al.*, 2021). One study looked at the rate of involuntary swallowing in the elderly during music therapy (MT) and found that involuntary swallowing significantly increased during the sessions (Jomori and Hoshiyama, 2010). Involuntary swallowing was defined as swallowing without eating and MT consisted entirely of singing songs and rhythm movements. Swallowing rates increased even when the participants did not sing during the sessions. Engaging in MT and singing (or exposure to singing) included positive activation of the pharyngeal muscles used when swallowing and implied activation of parts of the brain responsible for triggering this movement (Jomori and Hoshiyama, 2010). Studies have also shown singing protocols to increase laryngeal elevation, important in swallowing (Jo *et al.*, 2021; Kim, Yeo and Kim, 2023).

PD can negatively affect mood, increasing anxiety and depression. Studies have shown producing and listening to music can enhance mood, increasing blood flow in areas of the brain involved with emotion, pleasure and reward (Blood and Zatorre, 2001). Exercise generally has been shown to increase the release of endorphins which also help to elevate mood. Singing is a physical activity that requires exertion and deep breathing, leading to a similar release of endorphins and enhanced mood (Blood and Zatorre, 2001; Keating, 2020). Studies have also shown that singing in groups results in measurable benefits to mental, emotional, and social well-being (Clift *et al.*, 2009; Gick and Nicol, 2016; Kang, Scholp and Jiang, 2018; Clift and Gilbert, 2019).

The wide body of research presented above supports developing singing lesson protocols for IPD as part of their on-going physical and mental healthcare, and particularly to improve and maintain their vocal and respiratory function (E. Stegemöller *et al.*, 2017).

Best Practice Influences

This section provides a discussion of singing and speech programs in the literature and appearing in research studies that have been suggested for IPD. While singing programs that facilitate group singing sessions or choirs are considered and are thought to be beneficial, they do not generally allow for adjustment to accommodate individual abilities or comfort levels (Han *et al.*, 2018). As my practice is comprised primarily of private singing lessons, my Artefact focuses on private one-on-one singing lessons for IPD. Many exercises described in the literature seeks to activate laryngeal, pharyngeal and respiratory musculature. My Artefact draws from these best practices, however the specific exercises I have included and in many cases designed or modified take into account the need to keep students engaged, enthused and interested.

Stegemoller's studies generally include the following in therapeutic singing programs: warm-up songs, songs with movement, vocal exercises, breathing exercises, familiar songs, and songs chosen to target breath control, vocal range, and articulation (Brown and Stegemöller, 2024). Specifically, vocal exercises were incorporated into group sessions including lip trills, sustained vowels, ascending and descending slides in intervals from a 3rd to an octave, messa de voce, and articulation exercises using multiple consonants (m, t, d, s and k) paired with each vowel (E. L. Stegemöller et al., 2017; E. Stegemöller et al., 2017; Stegemöller et al., 2017; Stegemoller et al., 2022).

Parkinson's UK has produced several video singing classes for IPD. They are upbeat and song focused. Sessions incorporate postural, breathing, and vocal exercises, and singing (Moore, 2022b, 2022a; Parkinson's UK, 2024). Many of these practices are standard parts of my voice lessons however the versions included in my Artefact to into consideration the individual abilities of IPD and are adjustable depending on their disease progression and related physical impairments. As in all one-on-one teaching, the ability to adjust goals and activities to accommodate for the student's ability level and personal musical tastes is likely to result in a more enjoyable voice lesson.

The respiratory system is highly responsive to vocal training (Mendes *et al.*, 2006) and most singing lessons include a discussion of and exercises in breath control and development (Anderson, 1979; Miller, 1986; Gates, Forrest and Obert, 2013; LeBorgne and Rosenberg,

2014; Ragan, 2020). Reduced pulmonary strength and capacity experienced by IPD negatively impacts the airflow need to vibrate vocal folds, resulting in reduced vocal intensity (Reyes *et al.*, 2020). Vocal training develops muscles and motion of the chest wall, influences airway pressure and can assist in airway clearance (Mendes *et al.*, 2006; Goldenberg, 2018; Desjardins and Bonilha, 2020). Some singing interventions have been specifically designed to improve respiratory efficiency (Cahalan, Meade and Mockler, 2022). Singing for Lung Health (SLH), is one such program and includes physical, vocal, breathing exercises, rhythm and pitch games, song singing, and relaxation exercises (Tanday, 2016; Lewis, Cave and Hopkinson, 2017, 2018; ALUK, 2020; Lewis *et al.*, 2021; Ly *et al.*, 2022). This broad range of items is evident my Artefact design as well.

Brown and Stegemoller compared traditional inspiratory and expiratory training protocols using mechanical instruments and therapeutic singing protocols for their effect on anxiety, depression and quality of life measure in IPD to potentially influence the acceptability of singing interventions (Brown and Stegemöller, 2024). Their results showed no significant difference in outcomes the interventions, and stated preferences of study subjects were equally divided between therapy methods (Brown and Stegemöller, 2024). Of particular interest however was the reported commentary of subjects on singing protocols. Comments included a preference for knowing lyrics or having access to written lyrics, an increased awareness of the muscular benefits gained from singing and a resulting inclination to sing more often during daily life, the importance of influencing song choice during sessions, a discomfort for singing in front of others, and a higher comfort for making random noises within the context of singing rather than other therapeutic programs (Brown and Stegemöller, 2024). Such considerations were incorporated into my lesson plan in Appendix 1.

One study considered the effectiveness of a proposed neurological singing program on vocal quality and depression in IPD (Han *et al.*, 2018). The program showed positive results, however because the entire study only lasted 2 weeks and included a small number of participants, there is need for further testing of the program. The structure of the singing program is worth noting as a greater level of detail was provided by the authors than in other research publications. Lessons included: 1. vocal exploration, where patients were encouraged to make sounds and explore the quality of their voice, 2. singing songs of the patient's choosing that have positive associations, 3. vocal exercises that include dynamics and interval patterns, 4. song and vocalization creation by the patient (Han *et al.*, 2018). Activities that allowed the patient to play a

role in exercise design and song choice were of particular interest, as that is a practice I have long incorporated into my vocal lessons with all students.

The Lee Silverman Voice Treatment program (LSVT) is a popular speech therapy protocol for IPD. LSVT targets improvements in speech and respiratory functions focusing on volume consistency. Participants produce a loud voice, sustain effort during phonation, and are reminded of the volume and effort of their voice throughout the program (Baumgartner, Sapir and Ramig, 2001; Behrman and Haskell, 2020). Studies have shown lasting improvement in glottic closure, vocal fold vibration, sound pressure level, voice frequency range, voice quality, and speech intelligibility (Wang and Song, 2022). To capture the benefits, singing exercises were included in my Artefact that employ similar techniques.

Voice Function Exercises (VFE) designed by Joseph Stemple are also popular voice therapy exercises. VFEs aim to strengthen and coordinate laryngeal muscles, exercise vocal folds, and coordinate respiratory and vocal production muscles and the systems involved in vocal production (Behrman and Haskell, 2020). Exercises include sustaining the “ee” vowel sound for as long as possible on one pitch, vocal glides from lowest to highest pitch and from highest to lowest pitch on the word “knoll,” and sustaining an “oo” vowel sound with a consistent stream of air through rounded lips (Behrman and Haskell, 2020). These exercises encourage laryngeal movement, a raised velum, forward placement, pharyngeal muscle activation, and cricothyroid and thyroarytenoid muscle activation, all of which are important for vocal quality (Stemple *et al.*, 1994; Behrman and Haskell, 2020). Muscular engagement recruited through VFE underlies several exercises developed in the Artefact including variations of vocal slides and the meow exercises.

Aims & Objectives

Aims

- To identify symptoms experienced by IPD.
- To identify singing protocols used with groups of persons with PD.
- To identify speech therapy interventions that may be applicable in private singing lessons for IPD.
- To explore the vocal and speech symptoms experienced by IPD and their etiologies.

Objectives

- Use the Kolb experiential learning theory (ELT) to guide my reflective process.
- Gain an understanding of Nelson's Practice as Research definition.
- Identify potential health benefits of singing for IPD.
- Identify the challenges and potential for developing vocal training programs for IPD.

Learning Outcomes

- Understand new lesson strategies for working with IPD and the pedagogy and medical science behind each exercise.
- Understand symptoms of PD and be able to adjust lessons based of the individual abilities of each student.
- Understand the individual health condition of each student and be able to communicate the purpose and goals of exercises to students and caregivers

Timeline for Module 5

	Jan	Feb	Mar	Apr	May
Reflect on rationale for Artefact, usefulness to my practice, and strategy needed to complete report	x				
Finalize topic and scope of project		x			
Research literature in medical field related to Parkinson's Disease, symptoms and treatment studies		x			
Research vocal pedagogy and relevant exercises considering PD specific knowledge gained		x	x		
Write draft				x	
Develop Artefact				x	
Rewrite and final draft submission					x

Methodological Influences

Highlighting the process of learning (my experience) rather than the outcome of learning (the student's experience) is a major tenant of experiential learning (Kolb, 2015). As a vocalist and voice teacher, I hold many beliefs about singing and what it does for the heart (emotional self), mind (rational self) and body (physical self). My reality, or ontological vision, is that singing is beneficial to health. While this statement implies a positivist paradigm (Gray, 2004), it is made with the recognition that the mechanics of singing and instructions given for voice exercises are not always interpreted by the singer in the same way. This recognition is supported both by my personal experience and the experiences of researchers and pedagogues in the field of voice science, teaching and performance (McCoy, 2004; LeBorgne and Rosenberg, 2014; Ragan, 2020). The knowledge underlying this positivist belief is fluid, however, constantly growing and changing as my own experience develops and the body of knowledge produced by performers, voice scientists, physicists and medical professionals grows. As Phillips states in his discussions on the foundations of knowledge, "all knowledge is tentative" (Phillips, 1993 at 12).

There is an intuitive and kinesthetic component to singing that can vary depending on the singer's experience, abilities, and understanding of their body, therefore all singing exercises may not manifest into a health outcome, or the same health outcome, in all subjects (Miller, 1986; Ragan, 2020). Outcomes may further be influenced by a singer's physical abilities or health conditions and may change over time. The teacher, singer or researcher must assume that more than one outcome or experience is possible and remain flexible with their process. What works for one voice student may not reflect the perceived reality, or experience of another student (Allison and Pomeroy, 2000). The subject's responses and experiences are valuable in and of themselves regardless of outcome (Allison and Pomeroy, 2000).

Due to the influence of my own experience and learning process as I teach singing or sing myself, the development of my Artefact was also guided by elements of a constructivist paradigm (Mackensie and Knipe, 2006; Creswell and Creswell, 2018).

I have used my prior experience and knowledge as an educator as a foundation to develop new, targeted exercises in my Artefact based on the theoretical and best practices research explored in this paper. My assumption is that each student, in this case an IPD, will experience some benefit from singing lessons. The outcome of each exercise must be considered based on the individual student and not on the average singer. For example, the goal of a singer traditionally would be to sing well, with full supported tones. The goal of a singer with PD might, on the other hand, be to form and sustain a vowel sung on pitch and sustained for a period of seconds to strengthen the vocal musculature. They may also find success in the emotional reward of singing a song, however unsteadily, which will continue to exercise the vocal mechanism and inspire them to sing more. An understanding of the benefit of singing lessons for each individual will continue to develop. The pursuit of that knowledge is a worthwhile endeavor because of the underlying assumption that a benefit, at some level will be achieved.

This Artefact was developed through a process of my own experiential learning. Developing a lesson plan aimed to benefit IPD without a clear definition of what that benefit will be may seem like a flawed endeavor, however in experiential learning it is the process itself that is valued over the product (Warner, 1984; Allison and Pomeroy, 2000). The development of my knowledge base is experiential, and my role as a voice teacher is that of facilitating access of my students to experiences that will support their own exploration and growth (Allison and Pomeroy, 2000).

To find relevant research, I began my literature search with the online library system at University of Wales Trinity St David (UWTSD). My initial searches included the terms: singing and Parkinson's. Additional searches added broader terms such as: voice, speech, behavioral therapy, tremor, respiratory, breathing and gait. I also ran these searches on PUBMED, Science Direct and Research Gate. I used the strategies of forward and backward chaining to increase my collection of relevant articles, relying heavily on citations from the few relevant articles that I had found. This strategy brought up additional articles that had not appeared in my original searches. A Google search with the terms "singing and Parkinson's" brought-up a number of video classes designed for IPD to access remotely by Parkinson's support organizations such as Power for Parkinson's (Moore, 2022b, 2022a). I also used Medbridge, an online education website for healthcare professionals, as a source for lectures about speech pathology intake protocols and Parkinson's related treatment information (Schneider, 2025). These resources guided the development of the intake form appearing in Appendix 2.

Ethical Considerations

Due to my professional activities in the vocal field, I am an insider researcher. My experience creates bias through which I analyze my own reality and interpret my own knowledge. I regularly journal and reflect on past lessons delivered to students, building on my process and practice over time. This allows me to develop and improve exercises and advice given to students. Reflection has been shown to help those in the healthcare field remain engaged, patient-centered and aware of their own bias (Murphy, Franz and Schlaerth, 2018). The same should hold true for those in the voice field working with students with medical concerns.

As a voice teacher, I have had taught all levels of singers. Many students often come out of curiosity or for the sheer enjoyment of it. Sometimes however, students come to address a health concern after being referred by health professionals or hearing about the potential health benefits of singing. I am not a licensed health care provider, therefore it is essential that I remain aware ethical considerations inherent the teacher-student relationship, including the of the limitations of my advice, the potential weight of my opinions, the special implications of working with at-risk clients, and the need to refer clients to the care of a medical provider at the sign of any new or unexplained health issue (Tanday, 2016; Lewis, Cave and Hopkinson, 2017). At the request of a student, I am always willing to confer with any healthcare providers. Confering with

medical providers may broaden an understanding of singing programs, leading to their integration into broader treatment strategies (Lewis *et al.*, 2016; Ly *et al.*, 2022).

Some individuals may not be aware of the potential impact health issues, diet or medications can have on the voice. In addition, PD can negatively influence memory, putting a student's ability to self-advocate at risk. Understanding an IPD's complete health history is essential for safe and ethical lesson planning. Therefore, I have broadened my intake questions for IPD (see Appendix 2). This form also includes health history-related questions and follow-up for caregivers, with the permission of the student.

Critical Review & Reflection

This paper details the process of creating an Artefact consisting of a lesson plan for one-on-one voice lessons with individuals with Parkinson's Disease (PD) (see Appendix 1 & 2).

Singing has begun to play a role in therapeutic protocols for people with respiratory issues, vocal tremor and Parkinson's. For prior MA assignments, I reviewed recorded lessons and researched speech interventions by PD researchers and support groups. As I learn more about PD and the variability of symptoms experienced by IPD, I realize that my traditional voice lesson framework requires additional development to better accommodate the needs and special circumstances of IPD.

Those who continue to study and teach are always in the position of incorporating new knowledge into their lesson plans. The Artefact developed for this assignment is a product of my reflective process in which I reviewed my own general lesson plans from the past, vocal exercises in my repertoire, best practices for working with IPD published in literature or presented in videos online, and the latest medical knowledge about PD and its symptoms. The Artefact in Appendix 1 and the supporting intake form in Appendix 2 are for my own future use as a teacher and the use of others who may find themselves working with IPD. While untested, they contain what I believe will be roadmaps for engaging and beneficial sessions for IPD.

Many protocols for singing with IPD focus on the benefits of singing in groups (Elefant *et al.*, 2012; Barnish and Barran, 2020; Irons *et al.*, 2021; Campbell, Bodkin-Allen and Swain, 2022; Stegemoller *et al.*, 2022). IPD experience different physical and emotional symptoms as the

disease progresses, and symptoms may impact muscular control, speech, gait, memory and emotional well-being (Solomon and Hixon, 1993; Herd *et al.*, 2012; Irons *et al.*, 2021; Natl Inst on Aging, 2022). Much of my past professional work with singers has also been with groups or large casts. As I transitioned to private practice and coaching performers one-on-one, I recognized that strategies that are often successful in groups do not translate well to private sessions. I intuited the same to be true for IPD, therefore I developed exercises in my Artefact with this professional experience in mind to best allow for the individual needs and abilities of students and their individual symptom progression.

I used Kolb's experiential learning theory (ELT) to guide my reflective process (Kolb, 1984, 2015). In Kolb's model, knowledge is gained through experience (Kolb, 2015). This process allows the learner to be guided by intuition in the future (Kolb, 1984). Reflection allows the learner to make sense of experiences thereby increasing their effectiveness and relevance (Akella, 2010). Experiential learning is described by many academics to be a conflict-filled process. What that conflict is and how it is defined can vary, but most include some aspects of knowledge acquisition and synthesis followed by reflection and further action (McCarthy, 2010; Kolb, 2015). Education gained through experiential learning must both instill new ideas and allow the learner to modify old ones (Kolb, 2015). Kolb describes a four-part learning cycle with segments entitled: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE) (Kolb, 1984, 2015). These segments are referred to in the chart below as *act*, *review*, *conclude*, *plan*. Examples of how I used Kolb's model in my Artefact development process and research are detailed below.

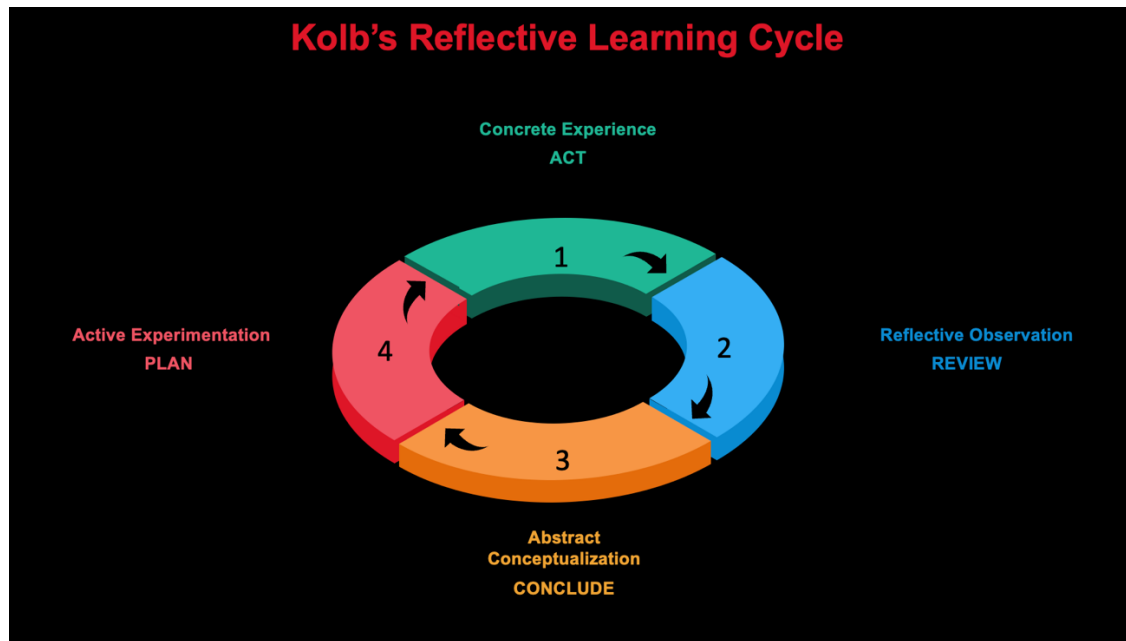


Figure 1: Kolb's four-part reflective learning cycle

While the circle can be entered into at any point, the process follows from the point of entry through the other segments of the circle, often for many cycles (Akella, 2010). The cycle might begin with (1) an experience, upon which the learner then (2) reflects considering what they know in order to evaluate their experience. (3) This reflection results in the learner making modifications to their experience thereby developing new ideas and transforming actions. (4) During the last step in the circle, the modified ideas are applied to the learner's real-world circumstance to guide and plan the next action. The cycle then repeats (Kolb, 1984, 2015; Akella, 2010).

Concrete experiences:

I have been a vocal director for 15 years and a performer for most of my life. As a teacher, I have developed my own structure for lessons. My lessons include listening to the student, assessing their goals for studying voice, selecting or designing exercises to help them reach those goals, working primarily with material selected by the student, showing them different ways to use, manipulate and access their voice, and teaching them vocal health practices. As a singer I have studied in both group and private settings. I have personally found comfort and security in the private lesson format that I do not feel in a group setting. While group singing is fun and community driven, it also must move at the pace of the group rather than the individual. There is not as much time to work on individual issues presented by each singer, answer questions, and address a student's needs. My experience has also made me aware that singers may feel more judged in a group setting, particularly those who struggle with confidence or physical issues that affect their vocal abilities.

I have had a parallel career in public health for many years as well and I am particularly interested in the intersection between the worlds of speech and swallowing therapy and singing. Many exercises employed in speech therapy are identical to exercises singers use to train their voice and strengthen their vocal apparatus. The belief that singing can play an important role in therapeutic protocols for individuals experiencing physical or emotional issues has driven my graduate studies.

In the past, I have taught students with health challenges including the elderly, those with vocal tremor, those in respiratory distress and those with Parkinson's Disease. Once I am informed of a condition, I spend some time learning about potential vocal challenges faced by a student due to their health status. Doing so allows me to be prepared to make changes when I observe difficulty during a lesson or places where more challenge is needed. My approach to date has been reactive, sticking to my general lesson plan and adjusting as needed during a lesson based on the singer, rather than proactive and anticipatory. The opportunity to work on an Artefact representing a targeted lesson plan designed for singers with a specific health condition will afford me the opportunity to look deeper at individual and unique needs of a IPD and redesign my lessons to accommodate their needs and health goals.

Reflective Observation:

Completing the *Theoretical Influences* and *Best Practices* sections of Component 1 of this paper has alerted me to the vast amount of Parkinson's Disease research that may be relevant to voice work. My interest in PD was heavily influenced by my prior graduate school research on vocal tremor, a common symptom of PD. With that in mind, adjustments made to vocal exercises in past lessons focused primarily on strategies to address vocal tremor or unsteady vibration in the voice.

What I have learned from my preliminary research is that IPD can experience a great number of symptoms that may impact voice quality and communication. In addition, singing has the potential to not only affect these symptoms, but also to impact non-vocal symptoms such as gait, mood, respiration and swallowing. The potential to influence the overall quality of life of a IPD elevates the need to understand how singing exercises can best be designed as an effective therapeutic strategy for IPD.

Disease progression and physical ability also varies greatly between individuals. Best practices in the literature are primarily focused on group singing, which does not easily allow for modification based on individual needs, whereas my focus on individual lessons may be more accommodating.

Abstract Conceptualization:

Based on the literature reviewed in Component 1, I anticipate that in Component 2 of this paper I will develop a lesson plan consisting of proposed exercises conscious of the particular needs and circumstances of IPD. I will use Nelson's trio paradigm to reflect on the creation of the lesson plan. The basis for this lesson plan will be insight gained from my professional practice and a literature review. These lesson plans will be dynamic and reflexive, so that they can be altered by the instructor to address the needs of specific students as they navigate their PD symptoms.

An example of such a situation follows. Observations of student abilities prior to the start of this module made me aware that students with impaired dexterity, for example those who cannot control facial expression, control their finger movement or physically hold their tongues – all symptoms experienced by IPD, may have difficulty with tongue stretch exercises I generally

include in my lessons. These exercises will be modified to allow for varied levels of physical ability, resulting in flexible learning tools.

Parkinson's can manifest differently in different people, with some experiencing symptoms that others will never develop. There are also multiple treatment pathways including medication and surgical implants and these treatments can impact the voice. In order to help a teacher prepare for lessons with an IPD, I will develop an intake form specifically designed for students with PD enrolling in singing lessons. The development of this intake form will be informed by relevant workshops presented on MedBridge, an online learning platform for medical professionals and modeled after intake forms used by speech and language therapists. The more information the teacher has on the student's physical condition and PD related symptoms, the more tailored the lesson can be.

Active Experimentation:

With the goal of considering on how different IPD might receive and process the information presented in lessons and how adaptive, safe exercises might be designed (Akella, 2010; Yardley, Teunissen and Dornan, 2012), I will adjust and refine vocal exercises to be included in the Artefact. Exercises will be included that are most supportive of people with PD symptoms. This determination will be made based on the information I discover in the literature, or by extrapolating new iterations of exercises based on my experience as a teacher or intuition that the exercises may prove engaging to IPD.

While outside the scope of this paper, future experimentation could assess self-reported enjoyment and mood measures, and physical measures such as lung capacity, volume projection, frequency or range. I hypothesize that flexible exercises will result in a high level of student satisfaction and enjoyment. In the future this hypothesis could be tested using self-reporting scales and surveys.

Project Report

Introduction

This paper discusses the design of an Artefact: a lesson plan specifically designed for one-on-one singing lessons for individuals with Parkinson's Disease (IPD). My experience has taught me that people with health challenges may become overwhelmed with the number of medical appointments and formal therapies prescribed and may seek out more fun and relaxed activities that are able to take into consideration their physical condition. Support organizations, such as the Parkinson's Foundation, advise that stress can exacerbate Parkinson's Disease (PD) symptoms and remind members to seek out enjoyable and calming activities (Parkinson's Foundation, 2025). Singing lessons fit this definition.

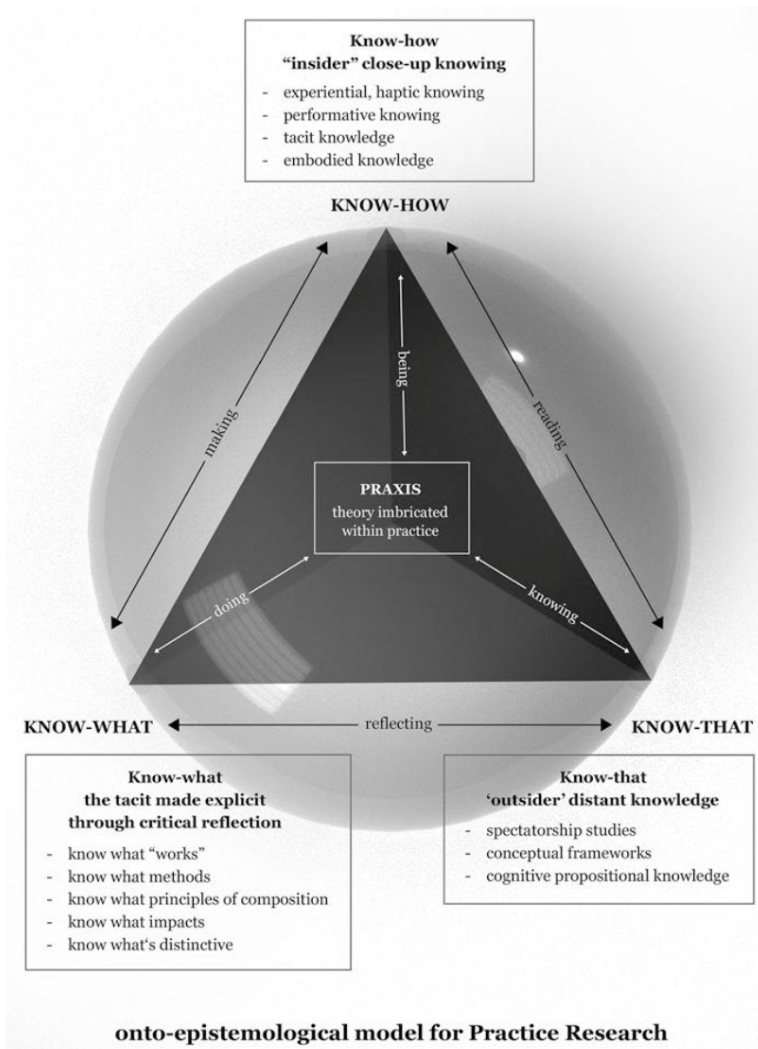
Working with clients who have health conditions is a challenging task, requiring patience, flexibility and a great deal of preparation to ensure lessons are safe and engaging. In searching for lesson plans to guide my singing work with IPD, I noticed a gap in science-based guides in the existing literature. My Artefact was developed to help fill this gap. It is based on my many years of experience working with students of all ages and abilities, including the elderly and health compromised individuals, and my studies of related literature. Consideration of the impact of PD symptoms on singers is essential when designing a positive singing experience.

PD is a neurological condition that often affects the vocal mechanism and one's communication ability, as well as gait and emotional well-being (Alam, Munjal and Panda, 2017; E. Stegemöller *et al.*, 2017; Hemmerich, Finnegan and Hoffman, 2017; Xavier and Simonyan, 2022; Brown and Stegemöller, 2024). Pharyngeal, laryngeal and respiratory muscles and mechanisms may be affected (de Lima Xavier and Simonyan, 2020; Xavier and Simonyan, 2022). The unsteady voice associated with PD may present as fearful, unsure or emotional (Xavier and Simonyan, 2022). Singing positively affects phonation, intelligibility vocal intensity, gait, stability and mood (McIntosh *et al.*, 1997; Harrison, McNeely and Earhart, 2017; Stegemöller *et al.*, 2017; Barnish and Barran, 2020).

The Artefact in Appendix 1 has been developed to guide singing lessons for IPD. Reflection on the development of my Artefact is discussed below using Nelson's three-part approach: *know-that*, *know-how*, *know-what* (Nelson, 2022). *Know-that* highlights the practical knowledge and theoretical thought that supports the Artefact; *know-how* looks at how the Artefact was

developed, based on the knowledge presented; and know-what assesses how and if the objectives of the development of the Artefact were achieved and what will follow.

Figure 2:



(Nelson, 2022) at 46.

Know That

PD is a progressive neurological disorder that appears with symptoms that affect movement, such as gait or tremor, and cause vocal and respiratory impairment (E. Stegemöller *et al.*, 2017). IPD also experience symptoms such as anxiety, depression, stigma, isolation, facial

masking and impaired gait (Irons *et al.*, 2019, 2021). Voice disfunction and speech impediments are common with PD (Logemann JA, Fisher HB and Boshes B, 1978; Schulz, 2002). Related diminished motor activity appears in respiration, phonation, articulation, resonance, and prosody (Schulz, 2002). These subsystems are all involved in speech production and stimulated during singing (Sundberg, 1987; Schulz, 2002).

Studies suggest that singing is beneficial for improving respiration, vocal function, speech, and quality of life in IPD. (E. Stegemöller *et al.*, 2017) Singing serves as a strategy to engage the respiratory system, stimulate vocal fold vibration, develop vocal control, and improve speech intelligibility (E. Stegemöller *et al.*, 2017). Studies have noted that IPD struggle with producing speech patterns with similar prosody (pitch, loudness and timing) as those without the disease (Solomon and Hixon, 1993; Schulz, 2002). Multiple studies have explored the benefits of speech therapy for IPD. Speech therapy has been shown to positively impact prosody for up to 3 months after conclusion of therapy routines (Robertson and Thomson, 1984).

Singing is a fun activity that can be done alone or in groups at any location. It activates physical, neurological and psychological systems, stimulating facial muscles, the larynx, vocal cords, nasal cavity, mouth, lungs, diaphragm, and intercostal muscles (Irons *et al.*, 2019, 2021). The Sing to Beat Parkinson's (STBP) program is a typical program found in the literature. The sessions include a hello song; a time to share; breathing exercises; vocal warm-ups, simple songs such as rounds (30 minutes); and singing (30 minutes) (Irons *et al.*, 2021).

The underlying premise for singing as a therapeutic strategy for IPD is that the musculature required to sing will stimulate, strengthen and potentially retrain the muscles impacted by PD (E. L. Stegemöller *et al.*, 2017; E. Stegemöller *et al.*, 2017; Stegemöller *et al.*, 2017; Stegemöller *et al.*, 2022) Singing encourages respiratory control, pitch and volume variability, tone production, facial movement, speech articulation and intelligibility, and postural awareness (Haneishi, 2001). Impact on vocal tremor, volume control, sound consistency, verbal recall and gait are potential goals of singing lessons (Stegemöller *et al.*, 2022).

The benefits of singing specifically for IPD are less studied. Singing however has been shown to engage the entire laryngeal and respiratory systems, improve mood and QOL measures, and stimulate neurological processes in the brain, thereby improving speech and communication in IPD (Irons *et al.*, 2019, 2021) Additional research is needed to clarify outcomes measured in

singing studies, the specifics of singing and therapy exercises used, which exercises are most effective for different speech variables in IPD, and the repetition and length of singing sessions undertaken to be most beneficial (Robertson and Thomson, 1984; 'Speech therapy in Parkinson's disease', 2002).

Depending on the program, singing is accompanied by movement which can have physical benefits such as improving gait (Irons *et al.*, 2021; Zhou *et al.*, 2021; Li *et al.*, 2022). Singing helps to stimulate and convey emotion (Scherer *et al.*, 2017) and promote the release of neurochemicals such as dopamine, cortisol, serotonin, and oxytocin (Chanda and Levitin, 2013). In multiple studies, Clift and colleagues have linked singing with improved mental health, wellbeing and quality of life measures, particularly in groups (Clift and Hancox, 2001; Clift *et al.*, 2009, 2010a, 2010b; Clift, Manship and Stephens, 2017).

Know How

My professional teaching experience provided me with a starting point for designing my Artefact. The literature presented in this paper introduced me to several strategies employed by therapists and researchers working with IPD on vocal challenges (Baumgartner, Sapir and Ramig, 2001; E. Stegemöller *et al.*, 2017; Stegemöller *et al.*, 2017; Moore, 2022b, 2022a; Stegemoller *et al.*, 2022).

Understanding PD and its effect on the brain and muscle movement has allowed me to take a deeper look at vocal exercises and their potential impact on the voice of IPD. In doing so, the exercises in my Artefact activate muscles most compromised by PD and allow for variability based on the student's symptoms and abilities. I have also endeavored to design exercises focused on singing songs and presenting oral poems that incorporate aspects of these vocal exercises in an engaging and unobvious way, with the hope that students will enjoy singing, rather than become concerned with its therapeutic potential. While an exhaustive discussion of the rationale behind all exercises included in my Artefact is outside the word limitations of this paper, I have included some selections below. What follows is an example of some of the variables that went into the design of exercises included in the Artefact based my prior teaching experience and discussion in the published literature on PD.

Pitch Glides

I have long incorporated pitch glides as a vocal warm up in my lessons. From my memory, one of the first vocal exercises I learned as a child was gliding up and down in pitch on a vowel sound. Instructions often include making a ghost sound or mimicking an ambulance siren. These images made the exercises fun and accessible. Pitch glides are extremely common exercises and are used in both voice training and speech therapy (LeBorgne and Rosenberg, 2014; Behrman and Haskell, 2020; Ragan, 2020; Lee, Dvorak and Manternach, 2024). As a regular exercise in a vocal warm-up routine, pitch glides help to stretch the vocal cords and activate laryngeal musculature (Callaghan, 2014). Higher pitches stretch the vocal cords, activate related musculature and raise the larynx (LeBorgne and Rosenberg, 2014; Ragan, 2020; Jo *et al.*, 2021). They are especially relevant for IPD because they encourage laryngeal elevation, which is important for effective swallowing (Jo *et al.*, 2021). Researchers have found pitch glides to be accurate identifier of patient aspiration in individuals with impaired swallowing (Mavrea and Regan, 2020).

I often instruct my experienced singers to pick their lowest and highest notes in a pitch glides based on vocal comfort. Pitch glides allow me to hear the student's voice, range and ability to move through their vocal breaks or registers. When the student controls the pitch choice and sings unaccompanied, I also receive insight into the part of their range with which they are most comfortable. However, my experience working with novice singers and singers with poor vocal control has shown me that the exercise is best received by these students when they receive more guidance. Pitch and volume control are symptoms of PD (Schulz, 2002). To help the student with PD, exercises in the Artefact have them begin and start on the same note. To maximize the vocal cord stretch, the pitch glide included in the Artefact instructs the teacher to provide the lowest and highest notes and play them on a keyboard as the singer sings. Range is limited to one octave, and the instructor may go up or down in pitch to fully warm-up the voice and stretch range.

The popular LSVT program incorporates vocal glides, instructing an IPD to sing on one vowel sound up and down (Ramig *et al.*, 1995; Behrman and Haskell, 2020). Facial muscle and articulation challenges are symptoms of PD, therefore I suggest in my Artefact to incorporate more than one vowel sound in each glide. The vocal glide exercise in the Artefact is designed to begin on /i/, going to /o/ on the highest pitch and ending back on /a/. To help with mouth shaping, students might be offered a visual cue of going from a smile, to a rounded "fish

shaped” mouth, to a more relaxed open mouth (Haneishi, 2001; Schulz, 2002; E. Stegemöller *et al.*, 2017; Stegemöller *et al.*, 2017) In addition, the LSVT Loud program encourages maximizing volume during vocal exercises (Behrman and Haskell, 2020). Therefore, I have included variations in the pitch glide and other exercises in the Artefact to go from softer, quieter tones, to maximum volume at different ends of the glide. Volume variation direction is included while singing songs as well.

Voiced and voiceless sounds

The sound a voice makes can be indicative of muscular difficulties within the vocal mechanism. Monotonal pitch or phonatory breaks, for example, may be due to a weakness in vocal cord adduction (Ramaswamy, Jones and Carroll, 2018; Carroll, 2023), while a breathy sound may be a sign of incomplete abduction (de Lima Xavier and Simonyan, 2020; Xavier and Simonyan, 2022; Esper, 2023). Strengthening the thyroarytenoid and cricoarytenoid are beneficial for improving adduction or abduction issues (Xavier and Simonyan, 2022; Esper, 2023). Exercises that focus on producing voiceless consonants (/p/, /t/, /l/, /h/, /f/, /s/) are recommended (Carroll, 2023). Moving between voiceless and voiced consonant pairs helps to coordinate airflow, air pressure and phonation and improve vocal fold closure (Ragan, 2020) These sounds can be purposefully added into sung phrases such as “Pearls please pretty Penelope” or “Say do you want to go to the zoo?” (see Appendix 1, 7A & 7B).

Community

Close to half of all IPD also suffer from depression (Poewe and Luginger, 1999) which is considered to be a confounding factor affecting speech production (Schulz, 2002) Studies have shown that singing with others elevates mood (Elefant *et al.*, 2012; Stegemöller *et al.*, 2017; Barnish and Barran, 2020; Irons *et al.*, 2021; Campbell, Bodkin-Allen and Swain, 2022). A study of the STBP program showed that group singing had a positive impact on mental-wellbeing and QOL self-assessments including anxiety and stress measures (Irons *et al.*, 2021). Singing in a private lesson allows for more focus on the individual student and catering to their music preferences. However, because of the positive mental health impact of singing with others, I incorporate many instances in my Artefact where the voice teacher might sing along with the student during lessons, serving teaching, exemplar and comradery functions.

Songs and lyrics

While vocal exercises are essential to train and strengthen the voice and related musculature, (LeBorgne and Rosenberg, 2014; Ragan, 2020) my experience has taught me that students are most engaged when singing songs or interpreting lyrics. Therefore, many of the exercises in my Artefact incorporate songs and poems, often taking advantage of opportunities to use sections of these materials as exercises themselves, varying emotion behind a reading, or volume or emphasis on a word or phrase. I have long used such methods for my musical theater students to teach acting through song. These exercises also allow the IPD to practice using their voice with varied intent. For example, a line said with anger, versus pleading, versus love may require different volume control, intonation and facial expressions, further exercising the vocal and facial musculature impacted by PD. (see Appendix 1, at 11).

One study determined that singing and speech were not always equally affected by PD (Harris, Leenders and de Jong, 2016). While speech in IPD often exhibits levels of dysprosody (speech lacking fluid rhythm, intonation, melody, or pattern), singing does not exhibit the same variability (Harris, Leenders and de Jong, 2016). A potential dissociation of speech and singing in IPD further suggest that singing may be helpful in improving prosody in PD patients. This study helped to inform the decision to include poems, tongue twisters and songs into my Artefact.

Breathwork

Semi-occluded vocal tract (SOVT) exercises have been shown to improve voice quality measures in IPD (Lee, Dvorak and Manternach, 2024). They require partial closure of the mouth, thereby impacting pressure and vibration within the vocal mechanism (Ragan, 2020). This is often achieved by voicing through a straw, an exercise known as straw phonation (Ragan, 2020). Due to their positive impact on vocal efficiency, breath control and vocal cord movement, SOVT exercises are standard practice in the study of voice (Ragan, 2020). My experience working with children, the elderly and IPD has taught me that conscious awareness of one's breath is not always intuitive. Putting one's hand in front of a straw used for an SOVT exercise and feeling no wind coming out is a strong cue that breath is not being engaged in a strong ideal manner. Cues such as "blow out a candle" may also help. To help facilitate breath awareness and respiratory function, breathing exercises and SOVT exercises are incorporated into the Artefact.

Vocal registers

Insufficient muscle contraction to support the vocal mechanism can cause a “wobble” (a vibration that is slower than normal) or instability in the voice (Obert and Henny, 2024).

Obert designed several exercises to strengthen vocal fold muscles by potentially adding muscle mass to the vocal folds or compensating for their weakness by strengthening the tongue, velum, and other muscles in the pharynx and larynx (Obert and Henny, 2024). I have found one of Obert’s exercises to be extremely popular with all of my students in the past: the Kitten Meow exercise. I have students relax on a supportive yet soft chair so that they can be most aware of their voice, its break and its volume, without focusing on posture or other muscular effort engaged while singing. While not tested for IPD and tremor-related therapy, I have incorporated this relaxed variation of the exercise into my lesson plan to assist with self-awareness of the voice as well as muscular activation (Obert, 2023).

Songs and poems

In my past work with children in a classroom setting, I have worked with groups to develop their own melodies and singing patterns. My impression, while untested, is that these exercises are fun and engaging. Having students improvise melodies to poems or tongue twisters is incorporated in the Artefact. I have also witnessed the emotional stimulation that can result from vocalizing and singing. I have experienced this personally as a singer and performer, and it is a phenomenon supported in the literature (Blood and Zatorre, 2001; Han *et al.*, 2018; Perkins, Yorke and Fancourt, 2018; Snow *et al.*, 2018). I was therefore intrigued to see a discussion of both activities included in the protocol proposed Han et al for individual lessons for IPD (Han *et al.*, 2018). Allowing the student to choose songs is also informed by the literature. The STBP had close to a one third attrition rate, in part due to a reported distaste for the music selected (Irons *et al.*, 2021). One’s musical experience is deeply personal, therefore one-on-one lessons that use the student’s selected music may produce a more positive and rewarding experience (Sihvonen *et al.*, 2017).

Respiratory impairment can impact speech, and studies have shown that inadequate breath support negatively impacts the amount of air reaching the vocal cords in IPD (Solomon and Hixon, 1993; Schulz, 2002). Holding vowel duration can help with breath control (Schulz, 2002). Holding vowel sounds is incorporated as an exercise into song-singing in the Artefact.

IPD suffer from an impaired ability to produce vocal loudness (Schulz, 2002). This may be due to impairment of laryngeal, respiratory or neurological systems or physical abnormalities (Schulz, 2002). Reduced loudness may be due to weakness in the thyroarytenoid (Baker *et al.*, 1998; Schulz, 2002). One study suggested that volume regulation in IPD was only minimally impaired when speaking to individuals further away than with people close by, suggesting that the muscular ability to control volume was intact but the brain's ability to fire those muscles was hampered by the disease (Ho, Iansek and Bradshaw, 1999). With this study in mind, exercises aimed at inflection and volume adjustment were included (see Appendix 1 exercises 8 & 11). Speaking rates were shown to vary based on whether the individual with PD was reading a text or speaking in conversation (Schulz, 2002), therefore both songs with written lyrics and songs known from memory are incorporated.

Exclusions

Stegemoller et al incorporated vocal exercises into their group sessions including lip trills, sustained vowels, ascending and descending slides in intervals from a 3rd to an octave, messa de voce, and articulation exercises using multiple consonants (m, t, d, s and k) paired with each vowel (E. L. Stegemöller et al., 2017; E. Stegemöller et al., 2017; Stegemöller et al., 2017; Stegemoller et al., 2022) Many of these practices are standard parts of my voice lessons and are incorporated in the Artefact. However, inability to move the lips and other facial mobility limitations can be a symptom of PD. Therefore, I have chosen to not include lip trills in my Artefact. For an individual with compromised respiration and poor mouth control, lip trills may prove difficult, to the point of frustrated embarrassment. I feel there are sufficient alternative exercises included that target similar muscular outcomes.

Know What

Developing this Artefact has allowed me to redefine my standard teaching practices considering the special needs and abilities of IPD. Medicine, vocology and pedagogy are all relevant and developing fields and writing this paper has impressed upon me how much information will continue to develop.

The development of this Artefact has enabled me to gain an in-depth understanding of PD progression, treatments and symptoms. The process of seeking out the latest protocols for speech therapy for PD patients has introduced me to accessible professional development websites such as Medbridge where I can find lectures by health care professionals not only

regarding IPD, but also focused on many health conditions that may arise in my student population in the future. Understanding the unique symptoms of many health issues that can impact the voice has inspired me to take a more proactive, rather than reactive, approach to my lesson planning. This will include a more detailed intake form and interview for new students, similar to the form presented in Appendix 2. Understanding any health concerns of students will enable me to communicate the purpose and goals of exercises to students, thereby hopefully motivating engaged participation in lessons and future singing practices.

Having the opportunity to research the rationale behind exercises and pedagogical practices, and compare these descriptions to the descriptions appearing in published research has made me aware of the level of focus that each exercise I use with students can have. For example, volume and breathwork is a variable that can be incorporated into exercises as well as song singing, without becoming repetitive or obvious. Incorporation of these strategies has allowed me to better understand how to keep my lessons flexible, interesting and scientifically sound, focused on the needs and abilities of each student.

Communication has always been a priority in all my work. Being more attuned to the varied symptoms of PD has shown me how important it is to speak not only with the student, but to their spouse or care-giver, with the student's permission, to make sure every effort is made to keep the client safe and healthy.

Conclusion

A review of the literature of singing and voice work with IPD supports that idea that singing lessons could be a beneficial addition to existing therapies for IPD. Training of the vocal and respiratory musculature can result in symptom improvement or stabilization in IPD (Russell *et al.*, 2010). Additional research is required to determine the lasting impact of targeted vocal therapies on muscular and sensory motor deficits caused by PD, however singing activities have the potential to strengthen muscles impaired by PD while providing an enjoyable and mood enhancing activity to participants (Russell *et al.*, 2010; E. Stegemöller *et al.*, 2017).

Focused singing specific protocols have not been studied for their long-term effectiveness on symptom progression or management in IPD. While additional research is warranted, it is this

author's opinion that the lack of such research should not negate the suggested incorporation of singing lessons into Parkinson's care strategies.

A common trait among studies of voice or respiratory therapies is that sessions occur multiple times a week for a period of weeks or months (Russell *et al.*, 2010). Studies have suggested that longer protocols lasting more than 4 months may be preferable for positive results (Baumgartner, Sapir and Ramig, 2001; Elefant *et al.*, 2012; Obert and Henny, 2024). Such a schedule would be difficult to maintain in the context of private voice lessons due to cost and scheduling considerations. Offering homework, supplying videos to guide singing exercises when lessons are not scheduled, or partnering with singing group programs might be strategies to increase weekly participation in singing exercises.

The interventions in studies looking at the efficacy of speech therapy on IPD often include multiple sessions per week resulting in multiple hours spent with IPD per month (Herd *et al.*, 2012). This is more intense than the standard one voice lesson per week or weekly community sings. Future studies might look at the benefit of singing protocols where session occurred one time a week, compared to multiple sessions, where students were instructed to work on their own on singing between sessions, and the length of each session in comparison. Singing can be an exhausting exercise and therefore shorter sessions might be advisable or necessary.

Understanding the etiology of voice disorders is important when designing singing protocols (Kodama *et al.*, 2021). Some individuals may experience more than one medical condition that manifest with similar symptoms and it can be difficult to determine which condition is causing each symptom (Duke Health, 2025; Mount Sinai, 2025; Weill Cornell Medicine, 2025). Studies suggest vocal impediments resulting from conditions that affect the physical structures of the larynx or the central nervous system controlling the vocal cords, such as head and neck cancers or spasmodic dysphonia respectively, may not significantly respond to speech therapy and singing protocols alone (Kodama *et al.*, 2021). In these cases a combination of voice therapy and other treatments may be effective (Kodama *et al.*, 2021). However, vocal impediments that appear as symptoms of neurological conditions such as PD or essential tremor, and affect the broader musculature involved in speech, show improvement with speech therapy protocols (Kodama *et al.*, 2021). It is therefore important to have a broad and complete understanding of a health-compromised student's medical condition. With this knowledge exercises as well as expectations and goals can be best managed.

Irons et al reviews singing studies done specifically with IPD and highlights that additional studies, with larger participant groups, longer timeframes, standardized outcome measures, and Parkinson's specific measures, would be beneficial in understanding the impact singing protocols have on IPD (Irons *et al.*, 2021). Outcome measures may include speech impairment and intelligibility measures, acoustic measures, laryngeal activity measures, Parkinson's specific QOL measures, depression rating scales, and participant self-assessment questionnaires (Herd *et al.*, 2012).

While growing, published research on singing programs remains limited (Lewis *et al.*, 2016; Clift and Gilbert, 2019). Such deficits in research further the opinion that singing is an artistic endeavor to be valued as an art rather than a potential therapy (Clift and Gilbert, 2019). Research linking the physical attributes of singing with specific outcomes is needed to change this view (Clift and Gilbert, 2019).

Finally, because many existing studies that do test singing and health outcomes do not include specific details of their singing protocols, learning from these studies can be difficult. Researchers should be encouraged to record singing sessions and provide them as part of the methods or data collection sections publications to assist voice teachers and therapists in best treating their students and patients with the most relevant methods.

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Appendix 1

ARTEFACT

Voice Lesson Plan

One-on-One singing instruction for Individuals with Parkinson's Disease

1. Have a note pad to take notes during lesson. Student should have the following props for voice lessons: straw, napkin, lyric sheets, chair, pillows for posture assistance as necessary. Have water available and remind student to take sips regularly between exercises.
2. Greet student and ask about the week. Listen to the voice, note energy, pitch, tremor, and any new variables or symptoms.
3. Physical work & posture
 - Ask student to be seated and to straighten their body in chair, put feet flat on floor, roll shoulders back, level chin, and focus eyes straight ahead.
 - Teacher can gently influence student's body into a neutral position and hold, release and hold again. Ask for feedback on pressure. This should feel good, not hurt, a light stretch. Tell student what is or when they are straight. Re-correct during lesson as needed.
 - Depending on experience level of teacher and student, light massage of upper back (around ribcage) shoulders, back of neck and jaw. Receive permission before touching at every lesson. Before massaging be aware of any implants, dental work or on-going physical conditions.
 - If student does not consent to being massaged you can model massage of side of neck and jaw bone on yourself and suggest they try it on themselves, if appropriate.
4. Triangle breath
 - a. Breathe-in for 6 seconds.
 - b. Hold with puffed cheeks for 6 seconds.
 - c. Blow-out like you are aiming at a candle flame for 6 seconds.
 - d. Repeat 3 times

5. Tongue stretches

Student should use clean cloth to hold tongue with fingers out of mouth in the up, down, left and right positions for 8 seconds, 3 times in each direction. Hold tongue with both hands, pinching lightly on either side of mouth.

Some students will not have this dexterity to hold the tongue with their fingers, in which case you can try having them move the tongue out of the mouth and hold in place at will in those positions without holding it with the fingers.

6. SOVTs (semi-occluded vocal tract exercises) through a soft straw (I provide each student with their own .5 inch diameter silicone boba straw). Test for breath pressure at the far end of the straw when they vocalize. If it is not there have them feel for it themselves and try to produce wind through the straw.

Exercises :

- Sing through straw on hee-ee-ee up and down $\frac{1}{2}$ steps (C-C#-C, C#-D-C#, etc)
- Sirens that go up and down an octave or more

7. Vocalization Exercises

A. Tongue twisters used as vocal exercises

For example:

“Pearls please pretty Penelope” (go up in scale)

B. Unvoiced/voiced consonants

“ssss” to “zzzz”

“sssay” to “zzzay”

“zzzzzoo” to “zzzebra”

“Say do you want to go to the zoo?”

C. Pitch glides

Student picks starting note and vocalizes from that note up an octave or higher (to their comfort-level). Starting and ending note is sung on “e”, highest note is on “o”. Switch is made where student is comfortable. Mouth should move from a wide narrow smile shape to a rounded fish

shape and back. Pitches should not sound staccato or identifiable as if the student is going up a scale note by note, but rather a smooth glide. Once the starting low and high notes are set, play these notes on a piano as the student starts and finishes the glide. Go up a half step for additional glides as ability allows to stretch range.

- D. Y-buzz to Mahvelous Exercise (activates TA and CT muscles, assists with pitch control)
“Ye-ye-ye to Maahvelous” on one pitch, then up-scale to repeat

To access Y-buzz:

- Emphasize perceived vibration in front of mouth and in face
- Have student touch forehead to feel the vibration of the Y-buzz
- Vocalize “yee-yee-yee-yee”
- Vocalize “yes it’s yellow and its easy”

To access Mahvelous: (Student may feel a stretch in back of mouth at velum)

- Yawn
- Speak like Julia Child
- Speak like Billy Crystal “you are maah-velous”
- Exaggerate British accent (for non-British speakers)
- Speak like Elmo or other cartoon characters

- E. Alternating between the sounds hung-sing 3 times on the same pitch, then going up in pitch up the scale

- F. Held notes

Go up scale 1-3-5 (hold for 3-10 seconds)-3-1 (example C-E-G-E-C)

Use various vowels (o, a, e) or sounds (Wee-oo-wee-oo-wee)

Depending on student ability hold middle note longer

- G. Other Vocalizations

May Me Mah Mo Mu (same pitch, going up scale each time)

Nay Ne Nah No Nu (variations include switching consonant or emphasizing first pitch)

Yay Ye Yah Yo Yu (going down major scale eg. GFEDC) Note: Some students may experience more difficulty moving down the scale than up, so it is important to do both.

Complex pattern (Ne Nay Nah No Nu)

n-e nay-e nah-ah no-o nu (ne nu)

A-F#, G-E, F#-D, E#-C#, D

Hold a vowel sound on one pitch. Start quietly, get progressively louder and then go back to a quiet sound. This may be difficult for students with poor breath control or extreme tremor. Do not incorporate this exercise if it is too hard for the singer.

H. Meows

Meow like a kitten down the scale from the highest comfortable note in the scale achievable by the student. Note where the break in voice naturally occurs and instruct the student to retain the muscle control and sound of the higher register rather than switching into the lower and often more gruff sound of the lower register. If available, have student sit in a comfortable lounge chair with head rested against the back and body relaxed. Eyes may be closed.

8. Poems: Ask student for any favorite poems that they may know from memory. Student may provide their own rhythm and cadence.

Exercises:

- Read at normal cadence and pace
- Speed up or slow down
- Read with heightened enthusiasm
- Read as if talking to a small child
- Read emphasizing the first word of each line with increased volume and higher pitch (emphasized the Capitalized words below, or the first or last word of a line).

Toucan Poem

(from How to Tell the Birds from the Flowers by Robert Williams Woods)

<https://www.gutenberg.org/ebooks/33346>

Very few can

Tell the toucan

*From the pecan
Here's a new plan
to Take the toucan from the tree
requires Immense agillitee,
while Anyone can pick with ease
the Pecans from the pecan trees
its Such an easy thing to do
that Even
the Toucan
he can Too!*

Whether the Weather

Whether the weather is cold or
Whether the weather is hot
We'll be together whatever the weather
Whether we like it or not

- Teach poem line by line. Say one line and let them repeat it, and continue through the entirety of the poem. Student will commit it to memory eventually.
- Say the poem above with increasing and decreasing tempos.
- Do the above tapping legs to the tempo.
- Sing lines above. You can ask the student to make up the melody or provide one.
- Go up scale for a vocal exercise.

Animal Can-Can

(lyrics below are sung to Galop infernal from Orpheus in the Underworld)

- Add seated step-kicks to the beat, or tap claps (tap legs with hands then clap hands to beat)

My dog, he can do the can-can
Better than my cat can
But my goldfish finds it very dif-fi-cult.
Oh my dog, he can do the can-can better than my cat can
But my goldfish finds it very hard.

Favorites

Some students enjoy tongue twisters or poems from favorite movies. This may come up in conversations or when prompted as relationship between students and teacher develops. For example, see the one below from the movie *The Court Jester* with Danny Kaye, Mildred Natwick and Glynis Johns).

The pellet with the poison's in the
Vessel with the pestle
But the chalice from the palace has the
Brew that is true

9. Songs

To match the range of the student, songs are primarily sung a cappella, or with a simple recorded track. For quick transposition of recorded backing tracks, I used the app Anytune.

Rounds

Difficulties students may encounter when remembering lyrics are keeping control of their own tempo next to competing verses, leading a round, and following. Students may do better if they cannot see the teacher's lips moving during a round. Try covering your mouth so they can hear, but not see, the teacher sing.

Frère Jacques
French lyrics
Frère Jacques, Frère Jacques,
Dormez-vous? Dormez-vous?
Sonnez les matines! Sonnez les matines!
Din, dan, don. Din, dan, dong

English lyrics
Are you sleeping? Are you sleeping?
Brother John, Brother John,
Morning bells are ringing! Morning bells are ringing!
Ding, dang, dong. Ding, dang, dong.

Cannons

Cannons may be a challenge, if needed. The student learns both parts. Then the student sings the first part, while the teacher sings the second.

Example: Hey Doombah (available at: <https://carpediemarts.org/track/984144/hey-doombah>)

1. Hey Doombah

E-A Doombah

Hey Dabadoom

Hey Dabadoom

2. Ah ma ne a, E-A

Doombah

E-A Oh

Ah ma ne a, E-A

Doombah

E-A Oh

10. Songs adding walking

Mobility will vary. For example, while some students may have difficulty moving while seated and singing, they may be able to walk while singing. Moving together may add a level of camaraderie, intimacy and fun to the lessons. Holding hands while moving is possible as well. Leading the student (teacher walks backwards) while walking to the beat provides stability and eye contact. Songs with simple lyrics and a strong beat may work best. Take note of steadiness in gait after lessons including this type of exercise. Example song is All of Me.

11. Songs for fun – choose songs the student knows. Provide written lyrics. Ask at end of each lesson for song ideas for the next lesson. Repeating songs or adding new ones that the student chooses are both options.

Exercise

To work on breath control, sustaining pitch, and increase volume (messa de voce) add held note exercises to songs. Draw arrows to indicate held notes or dashes to indicate cut offs.

(Below these directions are typed out, but I suggest doing this in writing in front of the student on printed lyric sheets and singing to show what is expected.)

Example:

Good Thing Going

(from Merrily We Roll Along by Stephen Sondheim)

It started out like a song >>>>>>>>

We started quiet and slow with no surprise /

And then one morning I woke to realize /

We had a good thing going >>>>>>>>

It's not that nothing went wrong >>>>>>>>

Some angry moments, of course but just a few /

And only moments, no more because we knew /

We had this good thing going >>>>>>>>

And if I wanted too much /

Was that such /

A mistake >>>>>>>>

At the time? >>>>>>>>

You never wanted enough /

All right, tough /

I don't make >>>>>>>>

That a crime >>>>>>>>

And while it's going along >>>>>>>>

You take for granted some love will wear away /

We took for granted and still I say /

It could have kept on growing >>>>>>>>

Instead of just kept on >>>>>>>>

We had a good thing going /

Going /

Gone >>>>>>>>

Songs with dense lyrics

Singing songs with many lyrics is possible and fun, particularly if the song was familiar to the student in the past. For example, Tom Lehrer's Lobachevsky, Cole Porter's Brush Up Your Shakespeare, Frank Loesser's Adelaide's Lament, Young MC's Bust A Move, or Sugarhill Gang's Rapper's Delight. The important part here is that they knew the lyrics well at one point, not to teach new songs. The age of the student, preferred genre and musical history will play an important part in song choice and memory recall.

Exercises are also influenced by the following voice teachers:

Kerrie Obert (see Appendix 3)

Kari Ragan (Ragan, 2020)

Melody Moore (Moore, 2022a)

Appendix 2

Intake Form for voice student with Parkinson's Disease

- Name
- Age
- Gender
- Age of Diagnosis
- Symptoms and Health Issues

Ask for details on the following subjects and the student's rating of the success of procedures or other commentary.

- Medications
- Treatments
- Past or Current Therapy or Exercise Programs
- Physical issues, concerns or challenges
- Implants
- Breath work
- Movement issues

Additional questions

- Goal of voice lessons?
- Ability and commitment to practice between sessions?
- Ask about history of singing (including public speaking or performing)

Spouse or care-giver intake

- Name
- Relationship
- How long they have been with student (in comparison to onset of disease)
- Ask for medical details to confirm or add to what the student has conveyed
- Any other insights
- Check in with same person at the 4-6 week mark.

Teacher's observations (to be filled out after each session by teacher)

- Date
- Exercises done
- Songs sung
- Preferences
- Teacher follow-up
- Student assignments

Appendix 3

Sample exercises from Kerrie Obert's proposed therapeutic program for Essential Voice Tremor (Obert, 2023).

Exercise Name	Exercise Description	Targeted Area	Description
Kitten voice	Using a soft, quiet, and unforced head voice make a "meow" sound going down the scale for five pitches. Begin solidly in M2 working through the passagio into M1, but maintaining the soft, almost baby-like character of the voice.	Pharyngeal musculature	Head voice requires: 1. Stretched vocal folds 2. Pharyngeal narrowing 3. Cricothyroid engagement 4. stabilization of muscles used in lower range
APN (anterior to posterior narrowing) exercises	Vary between sounds that emphasize a "Y-buzz" such as "ye" and sounds that emphasize a raised velum such as imitating Billy Crystal's "Mahvelous" from Saturday night Live sketches, or Julia Child's affected speech. Start from a lower pitch and progress to higher pitches,	Larynx, Velum, Pharyngeal musculature	APN stabilizes tongue and laryngeal muscles and requires: 1. Tongue stabilizes the larynx and connects the hyoid to the larynx 2. Tongue tip should touch the back of the lower front teeth while the back blade lowers and flattens 3. Velum stretch as

Widening false vocal folds (FVF)	On /i/, vary between a whine/cry and a constricted sound.	FVF, lower pharynx	Widening FVF lessens their constriction
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