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# Introducing Telepractice for Parkinson's Disease - Deciphering the Ease and Hurdle – A Single Case Report

**Elanthendral C, MASLP**
**Assistant Professor, Department of Audiology and Speech-Language Pathology**
**elanthendralslp@gmail.com**

**Sivamani J¸ MSc. SLP**
**Post-graduate Student, Department of Audiology and Speech-Language Pathology**
**jsivamani2000@gmail.com**

**Vishnavi S, BASLP., Intern**
**Department of Audiology and Speech-Language Pathology**
**svs3501@gmail.com**

**SRM Medical College Hospital and Research Centre, Kattankulathur 603203, Tamil Nadu, India**

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**Abstract**

Parkinson's disease (PD) is a neurodegenerative disorder predominantly affecting dopamine-producing, "dopaminergic" neurons in a specific area of the brain called substantia nigra. It is a slow and progressive idiopathic disease that affects about 1 to 2% of the population over the 5th decade of life (Jang H et al., 2009). About 90% of people with Parkinson's disease have communicative disorders (Logemann, J. A et al., 1978). Owing to the existing pandemic worldwide, telepractice has become more common in treating the patients. The present study highlights the outcomes of telerehabilitation of a 79-year-old individual who is a known case of Parkinsonism, diagnosed to have hypokinetic dysarthria. The study also shows us a clear view on the importance of tele practice for speech therapy amidst the current pandemic situation, its effect on quality of life and challenges that are faced with telepractice as mode of rehabilitation for speech-language therapy service delivery option.

**Keywords:** Parkinson's disease, Speech-Language therapy, Telepractice.

## Introduction

Parkinson's disease (PD) is a neurodegenerative disorder predominantly affecting dopamine-producing, "dopaminergic" neurons in a specific area of the brain called substantia nigra. It is a slow and progressive idiopathic disease that affects about 1 to 2% of the population over the 5th decade of life (Jang H et al., 2009)[1]. Parkinson symptoms usually begin gradually and get worse over time. As the disease progresses, people may have difficulty walking, talking, behavioural changes, sleep problems, depression, memory difficulties, and fatigue.

Although Parkinson's disease can't be cured, medications and therapy might significantly improve your symptoms. Speech difficulties (dysarthria) and voice problems are very common in people with PD. About 90% of people with PD have communicative disorders. (Logemann, J. A et al., 1978)[2]. Assessment and intervention options depend on many factors like age, literacy, socio-economic status etc. Research has shown that minorities and individuals with lower annual income live with more severe Parkinson's disease than individuals with higher annual income. Literature evidence gauging the effects of Socio-economic status (SES) on Parkinson disease is imperfectly aligned with miscellaneous results (Morgan, R., 2018)[3]. So, it is essential to carry research studies in developing countries like India which has society with varied socio-economic statuses.

The role of a speech language pathologist is paramount in the assessment, management and rehabilitation of individuals analysing the dependency on these factors for overall communication abetting better quality of life. Owing to the existing pandemic worldwide, telepractice has become more common in treating patients. Telepractice for Parkinsonism is an imperative arena. Due to issue in kinesis and curfews of lockdown, the feasibility of transporting the patient from home to therapy, is questionable for which telepractice may be an appropriate option for these patients. Advances in techniques to teletherapy with available resources targeting to meet realistic expectations of the client and challenges that are met alongside are to be documented to benefit the community of Parkinsonism.

The present study holds a single case report of a 79-year-old man, a known case of Parkinsonism who has been enrolled in telerehabilitation for 4 months (as of December, 2021) highlighting the evaluation and intervention plan tailor-made for the individual deciphering the ease and the hurdle.

## Case Report

### Brief History

On formal interview, a 79-year-old male, K/C/O Parkinsonism had reported complaints of slurred speech with reduced loudness and compromised intelligibility of speech. Onset of the illness is observed to be gradual and progressive for the past 8 years.

### Investigations

**Table 1. Details of procedure including a detailed case history, assessment of speech, language and swallowing assessment**

| S.no | Domain | Test / Investigation | Findings / Impression |
|---|---|---|---|
| **I.** | **Sensory status** | Pure tone audiometry | *Hearing:* Bilateral minimal to mild high frequency sloping hearing loss<br>*Vision:* Usage of bifocal lens for 30 years for corrected vision (as reported) |
| **II.** | **Motor speech Examination** | | |

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|---|---|---|---|
| **Assessment of Articulation** | | | |
| **a.** | **Diadochokinesis (Time constant)** | Alternate Motion Rate (Diadochokinetic measure - average syllables/20s) | /pʌ/ 29.3 syllables/20s<br>/tʌ/ 30.6 syllables/20s<br>/kʌ/ 33 syllables/20s |
| | | Sequential Motion Rate /pʌtʌkʌ/ | Average of 17.3 syllables/20s |
| **b.** | **Rate of speech** | Narration and Conversation | 185-190 WPM & 7-8 SPS |
| **c.** | **SODA analysis** | Test of Articulation in Tamil (Usha D, 1986) | Predominantly Distortions seen in Initial and medial level of the word. |
| **d.** | **Speech intelligibility** | Ali Yavur Jung National Institute of Hearing Handicapped (AYJNIHH) intelligibility rating scale | Score of 3 indicating "can understand with concentration and effort especially by a sympathetic listener" |
| **Assessment of Respiration & Resonance** | | | |
| **e.** | **Breathing pattern** | Informal Observation | Clavicular |
| **f.** | **Overall posture** | | Posture affects respiration |
| **g.** | **Nasality** | | Adequate nasal resonance |
| **h.** | **Oral peripheral examination** | Subjective | Normal structures but the functions were compromised with reduced Range of movement |
| **Aerodynamic assessment of voice** | | | |
| **i.** | **Maximum phonation duration** | Informal observation | /a/ - 7s, /i/ - 7s and /u/ - 7s; indicating reduced phonatory support for speech production. |
| **j.** | **s/z ratio** | | Score of 0.91 indicating no indication respiratory and laryngeal pathology |
| **k.** | **Voice analysis** | GRBAS scale (Hirano, 1981) | $G_2R_1B_2A_1S_2$ - Perceptually the patient's voice had a mild degree of breathiness, asthenia and roughness with minimal strain. Reduced loudness with monopitch evident from conversation |
| | | Multi-Dimensional Voice program (MDVP) analysis<br>CSL4500 module | Acoustic analysis revealed noise to harmonic ratio deviant from the norm. Overall intensity/shimmer components compromised. |
| **Assessment of Fluency and Prosody** | | | |
| **l.** | **Fluency & Prosody** | Informal assessment | Fluent speech observed with conversational task. However, word rush seen throughout the communication with festinating speech. |
| **Assessment of feeding and Swallowing** | | | |

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|---|---|---|---|
| **m.** | **Feeding/ Swallowing** | Informal assessment & Manipal Manual of Swallowing assessment (Balasubramanium, R. K., & Bhat, J. S. 2012) | The feeding and swallowing assessment showed notable signs of aspiration markedly during intake of liquids. He preferred to have a smaller bite size and pureed food over large and hard/tough food and discerned to have lost weight since then. Oral feed taking regular foods in room temperature. Intermittent swallowing problems noticed since the onset of illness with signs of aspiration in thin liquids. |
| **III.** | **Dysarthria** | Frenchay Dysarthria Assessment - Second Edition (FDA 2) (Enderby, P. M., & Palmer, R. 2008) | Outcome with the laryngeal and phonatory subsystem significantly impaired when compared to the ailment of articulators and reflex. The unintelligible speech apparently ensued from the soft loudness and accelerated speech (short rushes in speech) |
| | | Nijmegen dysarthria scale (NDS) (Enderby, P. M., & John, A., 1997) | The severity of dysarthria was mild degree (score 3) with limited functional communication (Score 2) |
| **IV.** | **Quality of life questionnaire** | Parkinson's Disease Questionnaire-8 (PDQ-8) (Jenkinson, C., Fitzpatrick, R., et al., 1997) | Score of 28% - "Moderate" impairment |
| **V.** | **Cognition** | Folstein Test (Cockrell, J. R., & Folstein, M (2002) | Score of 25 - mild cognitive impairment with alert state of consciousness observed |
| **VI.** | **Language Domain** | Informal assessment | Pre-morbid: Language comprehension and expression intact. Reading and writing intact |

**Treatment**

The client was enrolled in Tele-speech-language therapy using Zoom platform (with a 40-minute duration for each session) after a comprehensive assessment. Management was divided into three phases, Phase I, II and III. The client was given home training programs. Each phase was divided into 10 individual sessions with a unique management plan targeting on baseline of the client.

**Phase I**

- To facilitate adequate functioning of Oro-motor structures with proper breath support targeting pre-requisites for speech tasks like Maximum phonation duration.
- To improve loudness in simple sentence complexity appropriate articulation.
- To decrease aspiration risk with manoeuvres; Chin tuck with head positioning.

**Phase II**

- To reduce rate of speech and word rush with tailor-made custom rehabilitation materials triggering cognitive speech aspects.
- The goals taken in Phase I, will be monitored.

**Phase III**

- To improve overall cognition with self-monitoring skills in conversational and narration.
- Telephonic and stranger-conversation will also be targeted to check on transfer and maintenance of excelled skills.

After each phase, the targeted goal was re-assessed to scale the prognosis in each goal. The outcome measures are tabulated in Table 2.

**Table 2. Tabulation of Prognosis**

| **Goals** | **Base line** | **Prognostic indicators** |
|---|---|---|
| **Phase I** | | |
| **Maximum Phonation Duration** | /a/, /i/, /u/ - 7s | /a/ & /u/ 11s; /i/ - 10s |
| **Loudness (Sentence level)** | $G_2R_1B_2A_1S_2$ | $G_1R_0B_1A_0S_1$ |
| **Safe swallow** | Aspiration in thin liquids | No signs of aspiration reported. |
| **Phase II** | | |
| **Maximum Phonation Duration** | /a/, /i/, /u/ - 7s | /a/, /i/, /u/ - 13s |
| **Rate of Speech** | 185-190 WPM<br>7-8 SPS | 165 WPM<br>5-6 SPS |
| **Articulation, Pitch, Loudness (Sentence level)** | $G_2R_1B_2A_1S_2$<br>Test of articulation in Tamil revealed distortions seen in Initial/medial level of the word. | $G_0R_0B_0A_0S_0$<br>Distortions markedly absent. |
| **Speech intelligibility (AYJNIHH Intelligibility rating scale)** | Score of 3, indicating can understand with concentration and effort especially by a sympathetic listener | Score of 1 indicating, can understand without difficulty, however, the speech is not normal. |
| **Phase III** | | |

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|---|---|---|
| **Maximum Phonation Duration (MPD)** | /a/, /i/, /u/ - 7s | /a/ 15s, /i/ 18s, /u/ 18s |
| **Rate of Speech** | 185-190 WPM<br>7-8 SPS | 160 WPM<br>5-6 SPS |
| **Self-monitoring, Transfer & Maintenance** | Partially achieved | Self-monitoring of phonation duration is achieved, however, monitoring of rate of speech needed multiple reminders which again had an impact in articulation and intelligibility specially when it is with family members and different contexts. |

After Phase III, over all re-assessment was done. Measures of Maximum Phonation Duration (MPD) showed marked improvement in phonatory support for speech production (phonation duration improved from average of 7 seconds to an average of 16 seconds). Scores of FDA2 revealed laryngeal and Phonatory subsystem outcomes had shown significant improvement. NDS revealed mild dysarthria with level of communicative effectiveness, cues and prompting.

Comparison of pre and post speech articulation skills revealed that over all precise articulation had been achieved post management with negligible distortions seen in any word position during conversational discourse. The technique employed were exaggerated articulations and pacing using hand tapping and metronome. Speech intelligibility scores revealed near normal intelligible speech according to AYJNIHH Speech intelligibility rating scale. A significant reduction in word rush and Rate of Speech (RoS) noticed with RoS reduced from 190 WPM to 165 WPM in all environmental settings. Weak/asthenic voice was targeted with therapy techniques including vocal relaxation exercises, breath support warm-ups, frequent modelling of loud voice with visual feedback along with postural modifications to facilitate loud voice. This had led to adequate loudness in speech in conversational level. Prosody and Pitch were found appropriate. Acoustic analysis using MDVP CSL 4500 module revealed, all parameters within the normal range. Comparing the pre and post language skills revealed no impairment in language comprehension and expression. Safe swallow skills were found to be achieved. Comparing the pre and post Quality of life (QoL) skills revealed that Parkinson's disease resulting in a score of 46% indicating only mild handicap in quality of life.

## Discussion

### The Ease and the Hurdle

Being a virtual speech-therapist for a 79-year-old client who exhibited communication deficits consequent to Parkinson's disease needs careful planning, detailed methods for assessment and intervention. In spite of meticulous work that goes for plan through telepractice, there are notable factors of "ease" and "hurdles" that are seen through the SLPs' session. The patient in this study had good improvement in overall communication, speech and swallowing

parameters. However, the Quality-of-Life measures had shown minimal pace of improvement owing to reasons we are to discuss below.

In an attempt to decipher the ease in adopting telepractice in a Parkinson's client, the chance of rehabilitation in the pandemic era by itself was considered an "ease" factor. The major ease observed in this patient was getting the acceptance of the client.

Another major ease factor was availability of plentiful resources online for therapy which helped us have an animated rehabilitation process with fun element depending on the client's interest, immediate access to tools was available, paving better involvement and improvement in the management. Similar results were obtained in a study that employed computer-based LSVT. The online options offer an accessible and affordable alternative. The greatest of all ease is that individuals avail therapy in comfort of their homes (Cole, 2007)[4]. Patients from different age groups with different health conditions benefit from remote health services (Almathami et al., 2020)[5].

The interest and motivation for telepractice was another ease factor with respect to this client. This could be associated with the individual's personality and cognitive status. But the sustenance of the interest throughout the whole management plan has a high inclination on care giver distress. The improvement achieved after each phase was significantly related with the inputs of the caregivers to the client in day-to-day basis. A slight distress shown by the caregivers usually affected the performance in all phases. As mental and motor decline tend to occur together as the disease progresses, caregiver distress impacted day-to-day speech skills. This particular concern directly corelates with the QoL measure. Having done a detailed counselling about being around and living with a person with parkinsonism, it at times gets burdening to the caregivers to abide by the rules of how to be a careful listener and speak to a person living with parkinsonism. Psychological health of caregivers of persons with Parkinson's is bleak. As the disease progresses, they further succumb to debilitating stress and depression (Kumar & Kumar, 2019)[6].

## Conclusion

Owing to the existing pandemic worldwide, telepractice has become more common than usual in treating the patients. Telepractice is the application of telecommunications technology to the delivery of speech language pathology at a distance by linking clinician to client or clinician to clinician for assessment, intervention, and/or consultation. Telepractice can be a boon for SLPs' to treat their clients exclusively in an era of pandemic where 'going-out' is severely compromised. Even though, telepractice can be a boon, there are nuances of ease and hurdles that one should carefully view for a better experience of diagnosis and intervention which is highlighted in the current study.

## Declaration of Conflicting Interests

We have no conflict of interests to declare.

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## References


1. Jang, H., Boltz, D. A., Webster, R. G., & Smeyne, R. J. (2009). Viral parkinsonism. *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease*, *1792*(7), 714-721.
2. Logemann, J. A., Fisher, H. B., Boshes, B., & Blonsky, E. R. (1978). Frequency and cooccurrence of vocal tract dysfunctions in the speech of a large sample of Parkinson patients. Journal of Speech and hearing Disorders, 43(1), 47-57.
3. Morgan, R. (2018). *The Effects of Socioeconomic Status on the Progression of Parkinson's Disease* (Doctoral dissertation, Wake Forest University).
4. Cole R, van Vuuren S, Ngampatipatpong N, Halpern A, Ramig L, Yan J. A virtual speech therapist for individuals with Parkinson's disease. Educational Technology. 2007 Jan 1:51-6.
5. Almathami, H. K. Y., Win, K. T., & Vlahu-Gjorgievska, E. (2020). Barriers and facilitators that influence telemedicine-based, real-time, online consultation at patients' homes: systematic literature review. *Journal of medical Internet research*, *22*(2), e16407.
6. Kumar H, Ansari S, Kumar V, Barry HD, Tahir A. Severity of caregiver stress in relation to severity of disease in persons with Parkinson's. Cureus. 2019 Apr.



**Elanthendral C, MASLP**
**Assistant Professor, Department of Audiology and Speech-Language Pathology**
**elanthendralslp@gmail.com**
**SRM Medical College Hospital and Research Centre, Kattankulathur 603203, Tamil Nadu, India**

**Sivamani J¸ MSc. SLP**
**Post-graduate Student, Department of Audiology and Speech-Language Pathology**
**jsivamani2000@gmail.com**

**Vishnavi S, BASLP., Intern**
**Department of Audiology and Speech-Language Pathology**
**svs3501@gmail.com**