

The Use of Rhythmic Speech Cueing® and Vocal Intonation Therapy® for Speech Intelligibility in Parkinson's Disease: A Case Study

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Background

- **Parkinson's Disease (PD)** is a neurodegenerative disease in which the brain's basal ganglia experiences neuronal loss.
- The basal ganglia is responsible for the coordination of body movement, including those used for speech (Sveinbjornsdottir, 2016).
- **Hypokinetic dysarthria** is a motor speech disorder characterized by a quiet, harsh, weak voice with strain, breathiness, and reduced intelligibility (Ma et al., 2020). About 89% of people diagnosed with PD will develop speech problems over the course of the disease (Ramig et al., 2008).
- **Rhythmic Speech Cueing® (RSC)** is used to rehabilitate the voice by relying on rhythmic entrainment. This method emphasizes speech timing while also incorporating various other elements of vocal production, including sufficient breath support, phonation, articulation, and resonance (Mainka & Mallien, 2014).
- **Vocal Intonation Therapy® (VIT)** is the use of vocal exercises to train, maintain, develop, and rehabilitate aspects of voice control due to voice disorder. This includes aspects of vocal control such as inflection, pitch, breath control, timbre, and dynamics.

Research Question:

What is the effect of the use of RSC® and VIT® for speech intelligibility in PD?

Methods

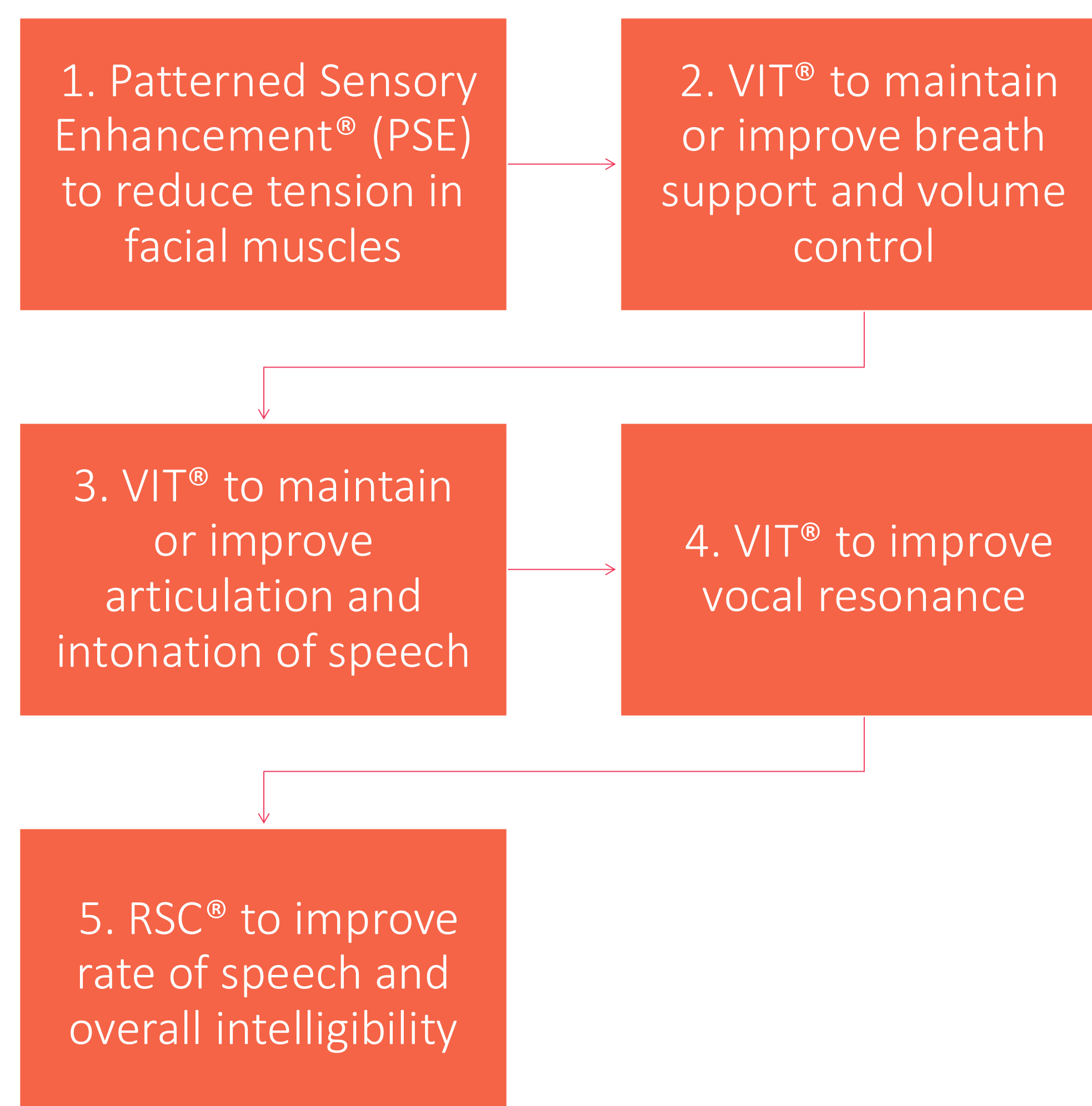
PARTICIPANT: older adult male diagnosed with PD, living at home with his spouse

PROCEDURE:

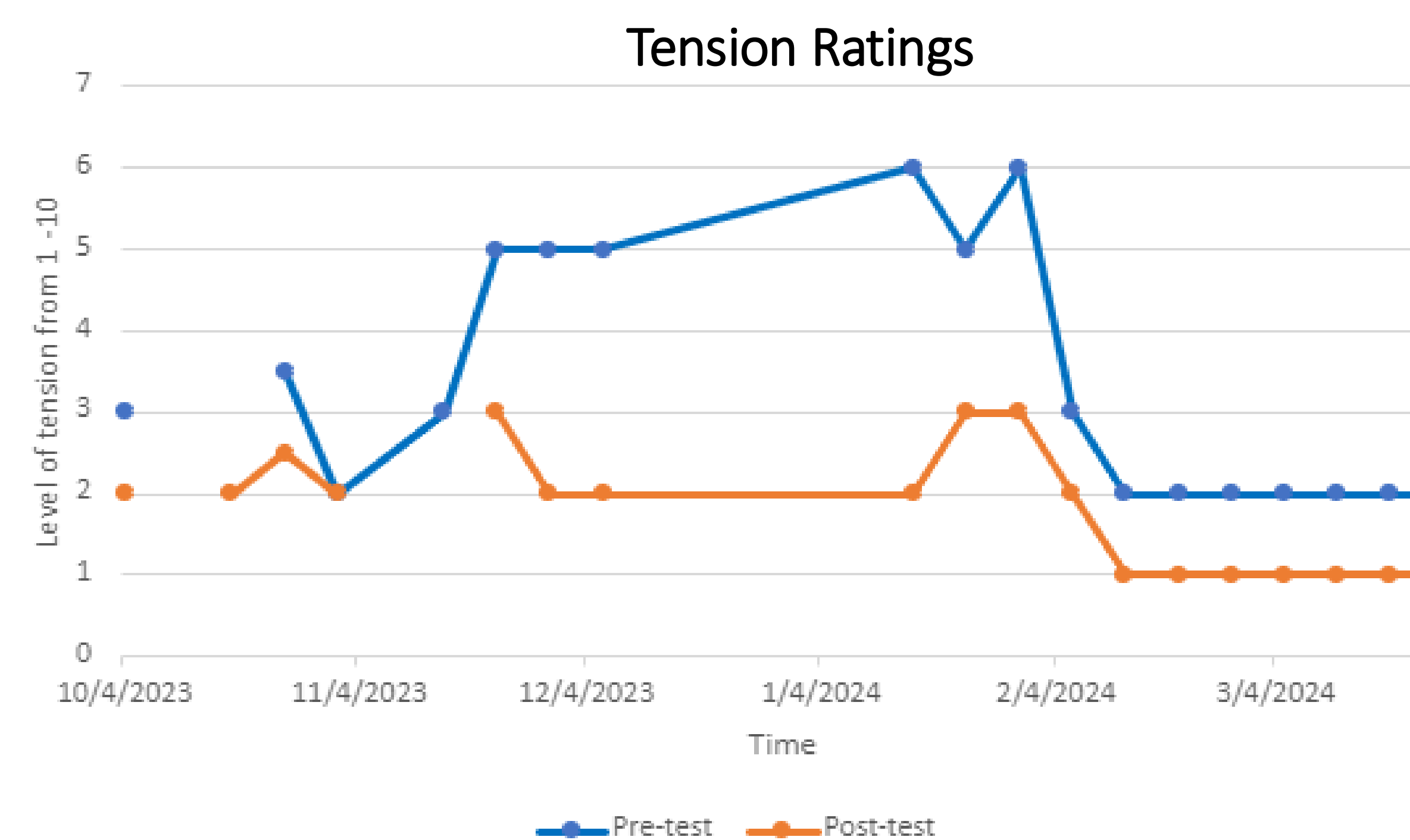
- Pre-post design
- Outcome measures: Grandfather Passage, Rainbow Passage, Sunnybrook Facial Grading System, Articulation Screener, Voice Handicap Index, maximum phonation time, and weekly tension and GRBAS self-assessment

INTERVENTION:

- 20 NMT sessions with VIT® and RSC® via telehealth and in-person sessions
- 9-week training period, followed by 4-week break, then 11-week training period.
- Sessions recorded and provided to client for home program



Results



Fall Sessions (9 weeks)		Winter Sessions (11 weeks)	
Pre-test	Post-test	Pre-test	Post-test
49%	60%	79%	84%

Fall Sessions (9 weeks)		Winter Sessions (11 weeks)	
Pre-test	Post-test	Pre-test	Post-test
6 errors	2 errors	6 errors	1 error ("book")

Assessment	Rainbow Passage		Grandfather Passage	
	Pre-test	Post-test	Pre-test	Post-test
Speech intelligibility	85%	95%	85%	94%
Speech rate (syl/sec)	2.41	2.75	2.32	2.28
Unrelated pauses	8	7	7	7

Weekly GRBAS Self-Assessment

Today my voice feels:

1 - mildly 2 - moderately 3 - extremely

(Normal)	Rough	Breathy	Weak
Strained	Hoarse	Dry	Other?

WEEK	Voice quality pre-test	Level (1-3)	Voice quality post-test	Level (1-3)
1	normal		breathy	1
2	rough	1	breathy	1
3			breathy	1
4	rough	2	normal	
5	breathy	2	normal	
6	rough	2		
7	breathy	1	normal	
8	breathy	2	normal	
9	breathy	1	normal	
BREAK				
10	weak	2	rough	1
11	breathy	2	normal	
12	hoarse	1	dry	1
13	rough	1	normal	
14	hoarse	1	dry	1
15	Rough	2	breathy	1
16	breathy	1	normal	
17	breathy	1	normal	
18			normal	
19	breathy	2	normal	
20	breathy	2	normal	

Maximum phonation time
Winter sessions (11 weeks):
5.31s-> 5.17s

Discussion & Summary

- RSC® and VIT® showed positive effects on articulation, speech intelligibility, voice quality, facial muscle mobility, and upper body tension across both training periods. No effect was seen for maximum phonation time in the 11-week training period.
- While speech rate decreased in the Grandfather Passage assessment, intelligibility increased as rated by blind raters. Raters reported having decreased sense of intelligibility when listening to recordings without text and increased when listening and reading.
- As tension was reduced, scores on the Sunnybrook Facial Grading System increased significantly, indicating more mobility in the facial muscles used in speech and expression.
- **Additional scientific inquiry into the efficacy of RSC® and VIT® for Parkinson's disease (PD) and other neurodegenerative disorders is warranted to advance understanding and inform evidence-based speech rehabilitation protocols.**

References