

## The Impact of Vocal Function Exercises vs Vocal Hygiene on the Vocal Performance of Speech-Language Pathologists

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### Abstract

This research investigates the impact of vocal function exercises (VFE) versus vocal hygiene (VH) on the vocal performance of speech-language pathologists (SLPs), considering the prevalent risks of voice disorders in vocally demanding professions. A quasi-experimental design involving 20 female SLPs was conducted, with 10 participants assigned to each intervention group. The participants underwent pre-test and post-test assessments using the voice handicap index (VHI) and the consensus auditory-perceptual evaluation of voice (CAPE-V). Statistical analyses revealed significant improvements in vocal health for both groups, indicating the effectiveness of both interventions. However, VH demonstrated a more pronounced impact on emotional aspects, while both interventions showed improvements in functional and physical domains. The findings underscore the importance of proactive measures for maintaining optimal vocal health among professional voice users, with implications for enhancing therapy outcomes and job satisfaction in vocally demanding professions.

**Keywords:** Voice Disorders; Voice Handicap Index; Vocal Hygiene; Vocal Function Exercises; The Consensus Auditory Perceptual Evaluation of Voice

### Introduction

According to Stockholm public health, the overall prevalence of voice disorders among the general population is estimated to be 16.9%, where women have significantly higher rates of voice disorders than men [1]. The American speech and hearing association [2] defines a voice disorder as one in which the quality, pitch, and loudness of one's voice differ from others due to an individual's age, gender, culture, or geographic location. Normal voice production depends on three subsystems: respiration, phonation, and resonance. A deficit in any subsystem may lead to voice disorders. Changes to the structure or function of the larynx can cause voice disorders [3].

Voice disorders impact the overall voice quality, which affects the individual's performance in some activities, such as communicating with others. Professional voice users such as teachers, call centers, and singers are more likely to have voice disorders [3].

Vocal disorders can significantly impact an individual's communication skills and work performance. Those in vocally demanding professions are at a higher risk of developing such disorders due to factors like extended periods of vocal use, frequent exposure to background noise, and the necessity to project their voices. Stemple, *et al.* [3] stress the importance of taking a proactive approach to prevent, diagnose, and manage these conditions within these professional groups.

Professionals who use their voice extensively are at a higher risk of developing voice disorders, making it crucial to explore effective interventions and therapies. One such approach is vocal function exercises (VFE), which was developed by Angadi and colleagues [4] and focuses on enhancing vocal performance and endurance through warm-up, stretching, contracting, and power exercises. Another practical strategy is vocal hygiene (VH), as advocated by Stemple, *et al.* [3], which involves minimizing factors that can harm vocal health. This includes drinking plenty of water, reducing caffeine intake, avoiding overuse of the voice, resting the voice, reducing smoking habits, and getting enough sleep. By adopting these practices, individuals in vocally demanding professions like speech-language pathologists (SLPs) can maintain optimal vocal health and proactively prevent potential voice disorders. These interventions are vital in ensuring their continued effectiveness and well-being in their respective vocations. Furthermore, research findings by Stemple, *et al.* [3] confirm that these strategies help individuals maintain optimal vocal health in the face of professional demands.

Vocal function exercises (VFE) comprise four vocal exercises. The first is warm-up by sustaining the /i/ vowel as long as possible. The second step is stretching, gliding the /O/ vowel from the lowest to the highest note. The third step is contracting, gliding the /O/ vowel from the lowest note to the highest note and then from the highest to the lowest note. The last step is the power exercises, sustaining the /O/ vowel following musical notes (C-D-E-F-G) for as long as possible [4].

On the other hand, vocal hygiene (VH) teaches the patient how to reduce factors that negatively impact their voice quality and strategies to maintain their voice quality [3]. The significance of vocal hygiene for SLPs is paramount, considering that their voices are invaluable assets in their clinical practice. SLPs rely extensively on effective communication to assess, diagnose, and treat speech and language disorders in their clients. Therefore, SLPs need to be aware of the risks associated with vocal strain because of the demands of their profession, including prolonged speaking sessions, articulating a variety of sounds, and ensuring vocal clarity. Prioritizing vocal hygiene practices is essential for SLPs, aiding them in preserving their vocal health, facilitating clear communication, and ensuring optimal therapy outcomes.

By implementing strategies such as proper hydration, employing correct vocal techniques, and avoiding vocal abuse, SLPs can sustain their vocal longevity, enhancing their ability to provide therapy with precision and confidence. A healthy voice fosters effective communication and contributes significantly to the overall well-being and job satisfaction of SLPs. These practices are vital for maintaining vocal health and ensuring the success of SLPs in their professional endeavors [5].

SLPs play a significant role in assessing and treating voice disorders by evaluating laryngeal function using auditory and visual perception tasks, acoustic analysis, and aerodynamic measures. A widely recognized and standardized voice assessment is the consensus auditory-perceptual evaluation of voice (CAPE-V, see appendix 1) and voice handicap index (VHI, see appendix 2).

The protocol speech-language pathologists use is the CAPE-V, which focuses on perceptual voice characteristics. CAPE-V assesses pitch, loudness, resonance, breathiness, roughness, strain, pitch breaks, and overall voice quality. Additionally, the VHI is often employed, allowing individuals to self-assess the impact of their voice disorders on their daily lives. In the framework of the international classification of functioning, disability, and health [6], these assessments serve different purposes. CAPE-V involves auditory and perceptual tasks, assesses the activity level, and provides insights into the patient's vocal abilities and challenges. On the other hand, self-rated scales such as the VHI assess the participation level, reflecting the impact of voice disorders on an individual's social and communicative interactions. These assessments collectively contribute to a comprehensive understanding of voice disorders, aligning with the WHO ICF model, where self-rated scales and perceptual measures address different levels of activity and participation according to the classification of impairment, disabilities, and handicaps by international classification of functioning, disability, and health [6].

CAPE-V is used in voice therapy and speech pathology to evaluate the perceptual characteristics of an individual's voice. A trained speech-language pathologist or voice expert uses auditory assessment to assess vocal quality and performance [7]. The CAPE-V assessment involves three specific vocal tasks performed by the individual assessed, referred to as the "patient". First, the patient sustains the vowels /a/ and /i/ three times each, allowing for the evaluation of vowel prolongations without articulatory influences. Acoustic analysis of these vowels is also conducted. Second, the patient reads six specific sentences with diverse phonetic contexts. These sentences are designed to assess various elements of vocal quality, including articulatory influences, glottal attacks, transitions from voiceless to voiced sounds, the ability to maintain voicing between words, and the presence of nasal consonants. Sentence variations enable the evaluation of different vocal challenges. Lastly, the patient engages in natural conversation, considered the assessment's most essential and relevant part. While conversation is formally assessed after the vowels and sentences, clinicians continuously observe this aspect throughout the evaluation session. The tasks encompass a comprehensive evaluation of the patient's vocal abilities and challenges, providing valuable insights for clinicians [7]. It is instrumental in diagnosing and monitoring voice disorders and assessing treatment outcomes.

The CAPE-V-V assessment encompasses a comprehensive evaluation of several vocal parameters, including: 1) Pitch: This aspect evaluates the overall pitch of the voice, which can range from too high (hyperfunctional) to too low (hypofunctional) or within a normal pitch range. 2) Loudness: which can be excessively soft (hypo-functional) or too loud (hyper-functional). 3) Resonance: Resonance refers to the quality of vibrations in the vocal tract during speech. Abnormal resonance can indicate issues like hypernasality or hyponasality. 4) Breathiness: Breathiness refers to the perception of excess air escaping during speech, resulting in a whispery or airy voice quality. 5) Roughness: Roughness assesses the presence of irregular vibrations in the vocal folds, leading to a hoarse or gravelly voice quality. 6) Strain: Strain refers to the perception of excessive effort or tension during phonation, which can contribute to vocal fatigue. 7) Pitch breaks: This aspect evaluates instances where the voice unexpectedly jumps or breaks in pitch during sustained phonation. 8) Voice quality: Overall voice quality is assessed, considering parameters such as breathy, rough, strained, or regular pitch [7]. The CAPE-V assessment is typically performed by having the individual produce sustained vowels, sentences, or specific phonemes, which the clinician then evaluates. The assessment results provide valuable insights into the nature and severity of voice disorders, aiding in developing personalized treatment plans [7].

Another perceptual measure is the VHI, which statistically measures the subjective impact of voice disorders and is validated in many languages, including Arabic. The original questionnaire, VHI-30, included 30 items addressing functional, physical, and emotional perceptual self-ratings related to dysphonia. The questions are answered on a scale of 0 (never) to 4 (always), resulting in an overall score of 0 to 120 [8]. The Arabic version of the VHI (VHI-Arab) was developed by Saleem and Natour [9] and it is a valid and reliable instrument for measuring participation in Arabic speakers.

The study by Couch, *et al.* [10] was conducted to determine the effect of service delivery on the perceptual and acoustic features of voice among speech-language pathology students. The study aimed to assess the changes in vocal parameters and effectiveness before and after two consecutive hours of therapy. The study noted clinically significant changes in perceptual and acoustic voice parameters, including decreased vocal effectiveness, reduced pitch range, impaired vocal fold vibration, and increased vocal fatigue. No statistically significant changes were observed, and some participants showed improvements, possibly due to a warm-up effect during the experimental session [10].

In 2015, Cielo, *et al.* [11] conducted a study to explore the vocal symptoms experienced by future professional voice users. The study utilized the VoiceSymptomScale (VoiSS) and discovered that participants on average reported 11.38 vocal symptoms. As a result, the study recommends early vocal health education and preventative measures to mitigate the risk of voice disorders among those pursuing a career in professional voice use.

Other researchers have identified the importance of VFE and VH as evidence-based practice (EBP) methods to improve overall voice quality for individuals with normal and disordered voices and professional voice users. However, professional voice users are at a high risk of developing voice disorders; as such, vocal health is essential to expand the use of their voice.

### Objective of the Study

This study objectives are to 1) Examine the effectiveness of VFEs and VH in enhancing vocal performance among speech-language pathologists, and 2) Explore the difference between VFEs and VH in improving vocal quality and performance. The research question is 1) What is the impact of vocal function exercises versus vocal hygiene on improving the vocal performance of speech-language pathologists?

### Methodology

This study is a quasi-experimental study conducted during 2023, starting at the end of the first semester and lasting approximately four months. The informed consent form (ICF) included potential risks, confidentiality, and privacy, and a study description was sent with a survey through the platform "WhatsApp" to participants. The survey included questions regarding initials, gender, contact information, age, workplace, and spoken language, and information about any former diagnosis of speech-language/neurological/voice or hearing deficits. The researchers only had exclusive access to the data gathered. Approval from the School Research Committee was obtained from Dar al-Hekma University as a protocol to adhere to ethical principles for publications.

The study included 20 participants; all were females aged between (25 - 60 years). The VFE treatment approach was used with 10 participants, and the VH treatment approach with 10 participants. The participants were randomly distributed into these two groups. All participants were speech-language pathologists-in Jeddah. The inclusion criteria were that they were speech-language pathologists, female, bilingual (Arabic and English) speakers, and not diagnosed with voice disorders. Participants were excluded if they were not speech-language pathologists, were not native bilingual Arabic or English speakers, or had a voice disorder. A pre-test and post-test were administered to both groups, which included the following sections of the VHI-30 English test: Part I: Functional, Part II: Physical, Part III: Emotional, and the total score. Additionally, the pre-test and post-test included the CAPE-V test, which assessed the following aspects and their degrees by percentage: 1) Overall severity, 2) Roughness, 3) Breathiness, 4) Strain, 5) Pitch, 6) Loudness, and 7) Resonance.

They were given the instructions and training through the platform "WhatsApp. Any extra instruction needed was shown on an individual basis. Documents for the VHI self-assessment were sent through emails to participants to fill out and send back. Also, records for the CAPE-V assessment were sent to their email, and a recording of their voice using the evaluation sentences was requested. VHI and CAPE-V assessments were sent to the participants before and after the treatments. The first group was given the VH treatment approach, and the second group was assigned the VFE treatment approach. The VFE treatment group conducted the exercises twice a day for two weeks. Each exercise has several trials. The first exercise (warm-up) was performed for two trials. The second and third exercises (stretching and contracting) were performed for five trials. The fourth exercise (power exercise) was performed for two trials for each musical note (C-E-D-F-G). Moreover, record sheets were given to the participants to record their data. The VH group was assigned a list of dos and don'ts, and a recording sheet was given to the participant to record their data.

The current study makes an important contribution to the field of speech-language pathology (SLP) by conducting a comparative analysis of VFE and VH and their impact on enhancing vocal performance among professional voice users. Moreover, it may have been vital in changing SLPs' vocal habits and raising awareness of the importance of improving vocal health and performance.

### Statistical analysis

An inferential statistical analysis was conducted using MS Excel (MS Office 2019) and IBM SPSS (Statistical Package for Social Sciences, version 28.0) [12]. In all statistical tests, the significance level was set at  $< 0.05$ . The Paired Samples t-test was utilized to compare the

means of two measurements obtained from the participants (pre-test and post-test scores) in each group and each test (VHI and CAPE-V test).

**Results**

After completing the experiment, a post-test was administered to both groups to address the study’s question: “What is the impact of vocal function exercises versus vocal hygiene on improving the vocal performance of speech-language pathologists?” The results of the post-test were as follows:

**Vocal hygiene group**

			Mean	SD	t	P value
VHI	Part I-F	Pre-test	2.81	0.89	4.472	0.002**
		Post-test	1.45	0.46		
	Part II-P	Pre-test	5.08	1.61	2.976	0.016*
		Post-test	2.75	0.87		
	Part III-E	Pre-test	1.03	0.33	4.714	0.001**
		Post-test	0.88	0.28		
Total	Pre-test	7.63	2.41	4.560	0.001**	
	Post-test	4.38	1.39			
CAPE-V	Overall severity	Pre-test	4%	1%	8.500	< 0.001***
		Post-test	3%	1%		
	Roughness	Pre-test	4%	1%	4.272	0.002**
		Post-test	3%	1%		
	Strain	Pre-test	4%	1%	4.881	<0.001***
		Post-test	3%	1%		
	Pitch	Pre-test	4%	1%	4.714	0.001**
		Post-test	3%	1%		
	Loudness	Pre-test	2%	1%	1.256	0.250
		Post-test	3%	1%		

**Table 1:** Paired t-test results for the vocal hygiene group (n = 10) comparing the pre-test and post-test scores for VHI and CAPE-V.

\*: p value < 0.05, \*\*: P value < 0.01, \*\*\*: P value < 0.001.

Table 1 shows statistically significant differences in the VHI test across its three sections and overall score in favor of the pre-test. This means that the Vocal Hygiene group had higher scores in the pre-test than in the post-test, and these differences are statistically significant (p-value < 0.05). Furthermore, the results also showed statistically significant differences in favor of the pre-test for the CAPE-V test in the sections of overall severity, roughness, strain, and pitch. The group’s scores were higher in the pre-test compared to the post-test in these sections. However, there were no statistically significant differences in the areas of Loudness, where (p-value > 0.05). Additionally, no results were available for the sections of Breathiness and Resonance, as the group’s pre-test and post-test scores were zero.

Vocal function exercises group

			Mean	SD	t	P value
VHI						
	Part I-F	Pre-test	4.11	1.96	7.249	0.001***
		Post-test	2.22	1.48		
	Part II-P	Pre-test	4.80	2.97	3.632	0.005**
		Post-test	2.50	1.51		
	Part III-E	Pre-test	2.14	1.07	1.549	0.172
		Post-test	1.57	0.53		
	Total	Pre-test	10.20	4.71	4.867	0.001**
		Post-test	5.60	2.41		
CAPE-V						
	Overall severity	Pre-test	7%	2%	9.303	< 0.001***
		Post-test	4%	1%		
	Roughness	Pre-test	5%	2%	5.547	< 0.001***
		Post-test	3%	1%		
	Strain	Pre-test	3%	1%	4.400	0.002**
		Post-test	1%	1%		
	Pitch	Pre-test	5%	2%	6.708	< 0.001***
		Post-test	3%	2%		

Table 2: Paired t-test results for the vocal function exercises group (n = 10) comparing the pre-test and post-test scores for VHI and CAPE-V.

\*: p value < 0.05, \*\*: P value < 0.01, \*\*\*: P value < 0.001.

Table 2 shows statistically significant differences in the VHI test across its three sections and overall score in favor of the pre-test, except for Part III-E (p-value > 0.05). This means that the Vocal Function Exercises group had higher scores in the pre-test than in the post-test, and these differences are statistically significant (p-value < 0.05). Furthermore, the results also showed statistically significant differences in favor of the pre-test for the Cape-V test in the sections of overall severity, roughness, strain, and pitch. The group’s scores were higher in the pre-test compared to the post-test in these sections. However, no results were available for the areas of breathiness, resonance, and loudness, as both the pre-test and post-test scores for the group were zero.

Discussion

The findings of this study provide valuable insights into the impact of vocal function exercises (VFE) and vocal hygiene (VH) on the vocal performance of speech-language pathologists (SLPs). The results suggest that VFE and VH interventions significantly affect various aspects of vocal health, as measured by the VHI and the CAPE-V.

The vocal hygiene group exhibited statistically significant improvements in VHI scores, specifically in the functional (Part I-F), physical (Part II-P), and emotional (Part III-E) domains, as well as the overall score. This indicates that participants who engaged in vocal hygiene

practices experienced positive changes in their self-perceived vocal well-being. Moreover, the Cape-V results significantly improved overall severity, roughness, strain, and pitch. However, no significant differences were observed in loudness.

Similarly, the vocal function exercises group demonstrated statistically significant improvements in VHI scores, particularly in the functional and physical domains and the overall score. However, there were no significant changes in the emotional domain. The Cape-V results indicated significant improvements in overall severity, roughness, strain, and pitch, aligning with the improvements seen in the VH group. Like the VH group, no significant changes were observed in loudness.

While both VFE and VH groups showed improvements, comparing the two interventions is crucial for understanding their relative effectiveness. In the context of VHI scores, both groups experienced significant improvements in functional and physical aspects. However, the emotional domain showed significant improvements only in the VH group. This suggests that VH practices have a more pronounced impact on the emotional aspects of vocal health.

Both groups improved overall severity, roughness, strain, and pitch when considering Cape-V results. The absence of significant changes in loudness for both groups may indicate that these interventions might not directly impact this aspect of vocal quality.

These findings carry practical implications for the field of speech-language pathology. Professionals working in vocally demanding professions, such as SLPs, can benefit from incorporating VFE or VH into their routine to enhance vocal performance and mitigate the risk of developing voice disorders. The choice between VFE and VH may depend on individual preferences, the specific demands of their profession, and the aspects of vocal health they aim to address.

According to this study, voice disorders are prevalent in vocally demanding professions, as Stemple, *et al.* [3] outlined. In both studies, occupational risks are highlighted for individuals in occupations with high vocal demands, as well as proactive measures to prevent, diagnose, and manage voice disorders.

By Couch, *et al.* [10], this study acknowledges that speech-language pathologists (SLPs) are susceptible to vocal disorders because of their occupation. Voice rest and hydration are crucial for SLPs to consider after periods of voice use, as both studies highlight the importance of vocal hygiene programs.

The characteristics and symptoms of vocal symptoms among future professional voice users are similar to those of Cielo, *et al.* [11]. There is a high prevalence of vocal symptoms among individuals pursuing careers requiring significant vocal output, and both studies emphasize the need for early vocal health education and preventative measures.

According to this study, the voice handicap index (VHI) measures the subjective impact of voice disorders on individuals' daily lives, similar to the study by Jacobson, *et al.* [8]. According to both studies, self-rated scales, such as the Voice Health Index, help assess the level of participation and the impact of voice disorders on social interactions and communication.

Based on Angadi, *et al.* [4], this study incorporates vocal function exercises (VFE). Through warm-up, stretching, contracting, and power exercises, VFE can enhance vocal performance and endurance. The studies collectively contribute to understanding voice disorders and interventions for vocally demanding professions. This research builds upon existing literature by directly comparing the impact of vocal function exercises (VFE) and vocal hygiene (VH) on the vocal performance of speech-language pathologists.

While previous studies have addressed the impact of specific interventions or highlighted the risks and characteristics of voice disorders, this study uniquely compares VFE and VH in the context of SLPs, providing insights into their relative effectiveness. It is essential

to acknowledge the limitations of this study, such as the relatively small sample size and the focus on female SLPs. Future research could expand the participant pool to include males and individuals from diverse professions. Additionally, investigating the long-term effects of VFE and VH interventions would provide a more comprehensive understanding of their sustainability and continued benefits [13-15].

**Conclusion**

In conclusion, this study contributes valuable insights into the effectiveness of VFE and VH in enhancing the vocal performance of speech-language pathologists (SLPs). Both interventions demonstrated significant improvements in various aspects of vocal health, as evidenced by changes in VHI and Cape-V scores.

These findings emphasize the importance of proactive measures in maintaining optimal vocal health, particularly for professionals in vocally demanding occupations like SLPs. By incorporating VFE or VH into their routine, individuals can positively impact their vocal performance and reduce the risk of developing voice disorders.

It is essential to recognize that ongoing research in this area is crucial for refining interventions, expanding our understanding of vocal health, and promoting the wellbeing of individuals who rely on their voices in their professional lives. The outcomes of this study provide a foundation for further exploration and may catalyze the integration of evidence-based practices in speech-language pathology.

**Appendix 1**

**Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V)**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

The following parameters of voice quality will be rated upon completion of the following tasks:

- Sustained vowels, /a/ and /i/ for 3-5 seconds duration each.
- Sentence production:
 

a. The blue spot is on the key again.	d. We eat eggs every Easter.
b. How hard did he hit him?	e. My mama makes lemon muffins.
c. We were away a year ago.	f. Peter will keep at the peak.
- Spontaneous speech in response to: "Tell me about your voice problem." or "Tell me how your voice is functioning."

**Legend:** C = Consistent I = Intermittent  
 MI = Mildly Deviant MO = Moderately Deviant  
 SE = Severely Deviant

	C	I	SCORE
Overall Severity _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
Roughness _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
Breathiness _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
Strain _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
Pitch (Indicate the nature of the abnormality): _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
Loudness (Indicate the nature of the abnormality): _____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
_____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100
_____ <small style="display: flex; justify-content: space-around; width: 100%;">MI MO SE</small>	C	I	/100

COMMENTS ABOUT RESONANCE:    NORMAL    OTHER (Provide description): \_\_\_\_\_

ADDITIONAL FEATURES (for example, diplophonia, fry, falsetto, asthenia, aphonia, pitch instability, tremor, wet/gurgly, or other relevant terms): \_\_\_\_\_

Clinician: \_\_\_\_\_

**Figure 1:** CAPE-V form.



Appendix 2

**VOICE HANDICAP INDEX**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

These are statements that many people have used to describe their voices and the effects of their voices on their lives. Circle the response that indicates how frequently you have the same experience.

0-never      1-almost never      2-sometimes      3-almost always      4-always

**Part I-F**

My voice makes it difficult for people to hear me.	0	1	2	3	4
People have difficulty understanding me in a noisy room.	0	1	2	3	4
My family has difficulty hearing me when I call them throughout the house.	0	1	2	3	4
I use the phone less often than I would like to.	0	1	2	3	4
I tend to avoid groups of people because of my voice.	0	1	2	3	4
I speak with friends, neighbors, or relatives less often because of my voice.	0	1	2	3	4
People ask me to repeat myself when speaking face-to-face.	0	1	2	3	4
My voice difficulties restrict my personal and social life.	0	1	2	3	4
I feel left out of conversations because of my voice.	0	1	2	3	4
My voice problem causes me to lose income.	0	1	2	3	4
<b>SUBTOTAL</b>	_____				

**Part II-P**

I run out of air when I talk.	0	1	2	3	4
The sound of my voice varies throughout the day.	0	1	2	3	4
People ask, "What's wrong with your voice?"	0	1	2	3	4
My voice sounds creaky and dry.	0	1	2	3	4
I feel as though I have to strain to produce voice.	0	1	2	3	4
The clarity of my voice is unpredictable.	0	1	2	3	4
I try to change my voice to sound different.	0	1	2	3	4
I use a great deal of effort to speak.	0	1	2	3	4
My voice is worse in the evening.	0	1	2	3	4
My voice "gives out" on me in the middle of speaking.	0	1	2	3	4
<b>SUBTOTAL</b>	_____				

**Part III-E**

I am tense when talking to others because of my voice.	0	1	2	3	4
People seem irritated with my voice.	0	1	2	3	4
I find other people don't understand my voice problem.	0	1	2	3	4
My voice problem upsets me.	0	1	2	3	4
I am less outgoing because of my voice problem.	0	1	2	3	4
My voice makes me feel handicapped.	0	1	2	3	4
I feel annoyed when people ask me to repeat.	0	1	2	3	4
I feel embarrassed when people ask me to repeat.	0	1	2	3	4
My voice makes me feel incompetent.	0	1	2	3	4
I am ashamed of my voice problem.	0	1	2	3	4
<b>SUBTOTAL</b>	_____				
<b>TOTAL</b>	_____				

Score Range	Severity	Common Association
0-30	Mild	Minimal amount of handicap
31-60	Moderate	Often seen in patients with vocal nodules, polyps, or cysts
60-120	Severe	Often seen in patients with vocal fold paralysis or severe vocal fold scarring.

The Voice Handicap Index (VHI): Development and Validation. Barbara H. Jacobson, Alex Johnson, Cynthia Grywalski, Alice Silbergleit, Gary Jacobsen, Michael S. Benninger. American Journal of Speech-Language Pathology, Vol 6(3), 66-70, 1997. The Voice Handicap Index is reprinted with permission from all authors and ASHA. Copyright 1997-2001 American Speech-Language-Hearing Association.

Figure 2: Voice handicap index (VHI).

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