

# Delivery of Intensive Voice Therapy for Vocal Fold Nodules Via Telepractice: A Pilot Feasibility and Efficacy Study

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**Summary: Objectives.** This pilot study examined voice outcomes and patient perceptions after intensive voice therapy for vocal fold nodules via telepractice.

**Study Design.** Pilot, within-subjects experimental trial.

**Methods.** Participants included 10 women diagnosed with bilateral vocal fold nodules who received intensive voice treatment via a free videoconferencing platform *Skype*, (Microsoft Corp., Redmond, WA). All participants completed one vocal hygiene session in person, followed by eight sessions of therapy via telepractice over 3 weeks. Before and immediately after treatment, patients attended a clinic in person to complete perceptual, stroboscopic, acoustic, and physiological assessments of vocal function. Analyses were performed by a speech-language pathologist and an otolaryngologist independent to and blinded to the study. Participants also completed the Voice Handicap Index and a telepractice satisfaction questionnaire, or an anticipated satisfaction questionnaire, before and after the treatment.

**Results.** Significant improvements were found in perceptual, vocal fold function, acoustic, and physiological parameters as well as nodule sizes and patient perceptions of voice-related quality of life post-treatment. Participants were highly positive about their first experience with telepractice. Results were similar to those from a separate study investigating the effects of an intensive voice therapy delivered in conventional face-to-face (FTF) format.

**Conclusions.** This study is consistent with possible benefits of telepractice in the delivery of intensive treatment for vocal fold nodules. Pending final verification with a FTF comparison group, telepractice could be recommended as an alternate treatment modality for patients with vocal fold nodules.

**Key Words:** Telepractice–Vocal fold nodules–Perception–Physiology–Acoustic–Aerodynamic–Participant satisfaction.

## INTRODUCTION

The primary etiologic factor for vocal fold nodules is proposed to be cumulative perpendicular impact stress between the vocal folds over time, which increases with voice use.<sup>1</sup> Certain forms of voice use, such as pressed voice, seem to increase the risk of injury.<sup>1</sup> It has been well established that the presence of vocal fold nodules can lead to lost time at work, reduced productivity, and impaired quality of life.<sup>2</sup>

Many people with vocal fold nodules work in professions that have high vocal demands; therefore, it is essential that they recover their vocal function so that their ability to perform their jobs is not compromised.<sup>2</sup> Several studies have been conducted on the efficacy of treatment for vocal fold nodules, with voice therapy recommended as first-line treatment.<sup>3–11</sup> Although it has been established that voice therapy is often effective,<sup>3–5,10,11</sup> it has been noted that rates of therapy completion can be poor.<sup>12–15</sup> This presents a challenge for clinicians and a critical barrier for full voice recovery in this patient population.

As with other behavioral intervention, it is noted that effective delivery of voice therapy is impacted by problems of resistance to change, therapy dropout, and lack of follow-through outside

the therapy session.<sup>13–15</sup> Numerous factors contribute to therapy noncompliance. However, ready access to services is a key factor. In many settings internationally, individuals work long hours with sometimes inflexible work conditions or hold occupations that do not allow them to easily take time off work, which impact their ability to attend regular voice treatment sessions. For others who live in more regional or rural areas, the travel time associated with sometimes large distances needed to access clinicians experienced in voice disorders also can limit therapy attendance. Ultimately, issues of access can contribute to missed appointments and a high dropout rate in the clinical population of individuals with vocal fold nodules. Such nonadherence to voice therapy not only affects treatment success but also results in unnecessary extensions to treatment and repeated examinations without sufficient behavioral change to effect improvement, which lead to excess costs to health care and third-party payers. There is also a cost of cancellations and no-shows to health care.<sup>15</sup> Furthermore, there may be loss of revenue or loss of employment as patients are unable to meet the vocal requirements of their occupations.<sup>12,15</sup> Consequently, there is a need to explore ways to facilitate greater access to voice therapy to maximize attendance and ultimately enhance outcomes for people with vocal fold nodules and other conditions affecting voice.

Recent research<sup>16</sup> supports the efficacy of intensive voice therapy for vocal fold nodules. However, the ability to undertake such high-intensity therapy programs (total program included: nine sessions over 3 weeks) in a traditional face-to-face (FTF) clinical model may not be possible for many patients owing to the access issues previously discussed. Therefore, alternate modes of

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delivery for voice treatment need to be considered. One possible service delivery mode is telepractice, in which services are provided at a distance.<sup>17</sup> A growing body of evidence is available to support the use of telepractice in speech pathology.<sup>18</sup> Speech pathology services in general seem to be well suited to telepractice delivery owing to the audiovisual nature of the patient-clinician interaction in most consultations.

A number of studies have explored the use of telepractice with various types of voice disorders. Most have focused on the assessment and treatment of voice disorders associated with Parkinson disease and revealed very positive outcomes.<sup>19–23</sup> Only one investigation, however, has explored the use of telepractice with a group of patients with voice disorders of various etiologies, including some patients with vocal fold nodules.<sup>24</sup> Participants were treated via either conventional therapy or telepractice. All of the therapy sessions for the remote group were delivered in adjacent rooms via a real-time audiovideo monitoring system. The system consisted of Sony Hi-8 video cameras with remote lapel microphone and color monitors. In addition, FTF contact between patient and clinician was minimized as much as possible during the course of the conventional treatment protocol. The study found that both groups demonstrated improvements in voice quality, acoustic, and physiological parameters after voice treatment. Furthermore, no significant differences were found between the extent of change in either group, indicating that voice therapy delivered via telepractice was as effective as conventional therapy.<sup>24</sup> The authors suggested that the use of telepractice would be helpful in overcoming the barrier of geographic distance and eliminating the commute time to the clinic. In a discussion article about this service published 2 years later, Mashima and Holtel<sup>25</sup> commented on their telepractice service model and its potential to increase accessibility and availability for patients with voice disorders.

Although there is preliminary evidence supporting the use of telepractice in the management of various voice disorders, to date, no investigations have been conducted with a cohort of patients with vocal fold nodules, specifically, in telepractice. In addition, no studies have been performed with patients with vocal fold nodules receiving telepractice at home or in the workplace. Therefore, the aim of this pilot study was to investigate the feasibility and efficacy of telepractice in delivering intensive voice therapy to individuals with vocal fold nodules in their own homes or workplace. It is hypothesized that telepractice will be a service delivery mode that is both feasible and effective in improving voice outcomes for patients with vocal fold nodules.

## METHODS

This study was approved by ethics committee at the Taipei Veterans General Hospital and a human research ethics committee at The University of Queensland.

### Participants

Participants were recruited from the outpatient clinic at the Department of Otorhinolaryngology, Taipei Veterans General Hospital, Taiwan. For inclusion, participants had to present

with bilateral vocal fold nodules, as determined by an otolaryngologist under stroboscopic examination, with planned behavioral management of the nodules by a speech-language pathologist (SLP). Participants were excluded from this study if they: (1) were not aged between 18 and 55 years; (2) had articulation, resonance, or language disorders; (3) had hearing impairment as determined by a screening test at 20 decibels hearing level (dB HL) at 500, 1000, and 2000 Hz; (4) had previous professional singing or speaking training; (5) had previous voice therapy or laryngeal surgical treatment; (6) used prescription medication that may cause changes in laryngeal function, mucosa, or muscle activity (list provided by National Center for Voice and Speech [NCVS]<sup>26</sup>); (7) had psychiatric or neurologic conditions; (8) had a history of allergies, lung disease, or other concomitant vocal pathology (eg, vocal polyp and vocal cyst); (9) presented with bamboo nodules; or (10) had no access to internet and *Skype*.

Ten women (mean age = 33.7 years, range = 19–49 years) with vocal fold nodules and mild-to-moderate vocal impairments in perceptually evaluated voice quality were included in the study. Severity of dysphonia was determined from a recorded speech sample (a standard Mandarin passage) and rated using the “Grade” scale from the GRBAS (Grade, Roughness, Breathiness, Asthenia, Strain) scale<sup>27</sup> (where 0 = normal and 3 = severe). A single SLP experienced in the assessment and treatment of voice disorders but blind to the study purpose conducted the severity ratings. The participants’ occupations were categorized into nonprofessional voice users (eg, factory worker, student, catering, clerical worker, home carer, and unemployed) and professional voice users (eg, teacher, health professional, and sales personnel). The decisions on the extent to which various professions constituted professional voice use were made somewhat arbitrarily. All participants were diagnosed before treatment with bilateral broad-based nodules with surrounding edema. The nodules were located at the midpoint of the membranous, vibrating vocal folds for all participants. None had any previous experience with telepractice. Demographic information of the 10 participants is detailed in [Table 1](#).

## Procedure

Following recruitment, each individual attended the hospital clinic in person for a comprehensive baseline assessment of their voice and speech production. They then completed one

**TABLE 1.**  
**Demographic Information of Participants**

Demographic Variables	
Total number of participants	10
Mean age	33.7
Severity of dysphonia	
Mild-moderate	8
Moderate	2
Occupations	
Professional voice user	6
Nonprofessional voice User	4

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