The Effectiveness of the Comprehensive Voice Rehabilitation Program Compared With the Vocal Function Exercises Method in Behavioral Dysphonia: A Randomized Clinical Trial

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Summary: Objective. To evaluate the effectiveness of the Comprehensive Voice Rehabilitation Program (CVRP) compared with Vocal Function Exercises (VFEs) to treat functional dysphonia.

Study Design. This is a randomized blinded clinical trial.

Methods. Eighty voice professionals presented with voice complaints for more than 6 months with a functional dysphonia diagnosis. Subjects were randomized into two voice treatment groups: CVRP and VFE. The rehabilitation program consisted of six voice treatment sessions and three assessment sessions performed before, immediately after, and 1 month after treatment. The outcome measures were self-assessment protocols (Voice-Related Quality of Life [V-RQOL] and Voice Handicap Index [VHI]), perceptual evaluation of vocal quality, and a visual examination of the larynx, both blinded.

Results. The randomization process produced comparable groups in terms of age, gender, signs, and symptoms. Both groups had positive outcome measures. The CVRP effect size was 1.09 for the V-RQOL, 1.17 for the VHI, 0.79 for vocal perceptual evaluation, and 1.01 for larynx visual examination. The VFE effect size was 0.86 for the V-RQOL, 0.62 for the VHI, 0.48 for the vocal perceptual evaluation, and 0.51 for larynx visual examination. Only 10% of the patients were lost over the study.

Conclusions. Both treatment programs were effective. The probability of a patient improving because of the CVRP treatment was similar to that of the VFE treatment.

Key Words: Randomized clinical trial–Voice treatment–Voice quality–Vocal quality–Voice–Speech therapy–Voice disorders.

INTRODUCTION

The dissemination of evidence-based practice is encouraging scientific research to achieve better results in rehabilitation treatment. Until now, only few studies have evaluated the effects of speech rehabilitation and clinical trials with assessed quality.[1,2] The main limitations of these studies are related to the methodology such as the absence of sample size calculation, allocation and randomization, lack of clarity, and inappropriate assessment of the outcomes and statistical analysis.[1,3,4]

Despite these deficiencies, the literature indicates that vocal rehabilitation is the best treatment for behavioral dysphonia. Several intervention methods have been tested; the main problems facing these studies have been small sample sizes and the lack of randomization. However, the results from most of these interventions have been essentially positive.[5,6]

Dysphonia can be defined as an oral communication disorder, where the voice is unable to fulfill its basic role of transmitting verbal and emotional messages.[7,8] The main symptoms of dysphonia are hoarseness, aphonia, pain, vocal fatigue, voice failures, poor vocal projection, and difficulty while speaking at a high intensity.[9]

When the vocal disorder is directly related to the vocal behavior and results in incorrect voice use and negative habits, it can be classified as behavioral.[10,11] Therefore, behavioral dysphonia is a multifactorial problem and may involve vocal technique issues, intense vocal use, or misuse.[12–15] Its occurrence is very common among voice professionals such as teachers. The prevalence of chronic voice disorder in this group varies between 11.6% and 16%.[16]

Modern vocal rehabilitation includes three major approaches: vocal hygiene, a symptomatic approach, and a physiological approach.[5,17] Vocal hygiene is a component of a broader program or may also be used as a single approach. However, it results in better outcomes when it is applied as part of a larger treatment program.[18–22] A recent study has found that two vocal hygiene orientation sessions could improve teachers' quality of life.[23] The symptomatic approach, also referred to as traditional rehabilitation, has produced little evidence as to its effectiveness.[5,11] Finally, the physiological approach (holistic orientation) has been extensively studied. This holistic technique was designed and proposed in parallel with the development of the laryngeal modern examination through nasoendoscopy and telendoscopy. These techniques facilitate the analyses of physiological changes of voice production.

The Vocal Function Exercises (VFEs) program is the holistic physiologic method most tested for behavioral dysphonia treatment. It works all three vocal subsystems together: breath, phonation, and resonance.[18–20,24–29]

A 2014 literature review of behavioral or functional dysphonia treatment initially yielded 623 studies in four

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databases (Embase, Lilacs, PubMed, and Web of Science). After reviewing the database, we identified 15 clinical trials, five case-control studies, and five case studies that were relevant to our research. Among these studies, 15 tested the effect of VFE alone or in combination with other therapeutic techniques.[18–20,24–35] VFE efficacy is already proven. Therefore, we consider it to be the best design method.

The VFE studies highlighted positive results in different outcome measures, such as vocal quality,[26–28,30,34] dysphonia symptoms,[18,20,26,30] maximum phonation time,[20,25,28,29,35] acoustic parameters,[24,25,27,31–34] and improvement of glottal closure.[24,25] In addition, one study used a self-assessment protocol, the Voice Handicap Index (VHI),[18] and two other studies used the Voice-Related Quality of Life (V-RQOL).[26,30] The three articles highlighted a consistent improvement in quality of life regarding vocal aspects[26,30] as well as patients' perception of a reduction in vocal disadvantage.[18]

Only two studies investigated indirect laryngeal image. Their results indicated improvement in glottal closure as shown by the aerodynamic measures of phonation volume and maximum phonation time.[24,25] No research has yet included previsual and postvisual data of laryngeal examination.

The search of the literature also failed to find references that establish the duration of rehabilitation treatment for behavioral dysphonia. According to estimates done among Brazilian professionals, vocal rehabilitation usually happen once or twice a week in 40–45 minutes sessions during a period of 4–6 months, accounting for more than 10 sessions.[36] In the international clinical practice, the number of sessions varies between six and ten, but the length of session is not specified.[11]

The small amount of evidence in the literature, the poorly defined duration of treatment, the few holistic therapeutic programs properly described for behavioral dysphonia, and the Brazilian traditional symptomatic therapy with holistic focus led us to design an exercise program called the Comprehensive Voice Rehabilitation Program (CVRP).[37] The program originated from a research carried out by the Larynx Institute in São Paulo (INLAR) and Centre for the Study of Voice (CEV) in the 1990s. CVRP has been the basis of the voice clinical care of CEV, voice specialists, and UNIFESP. Therefore, it needs to be compared with a well-accepted program so that we can analyze differences between both.

If the CVRP shows advantages or equivalence to the VFE method, it could be considered as another treatment option for behavioral dysphonia.

Objective

To evaluate the effectiveness of the CVRP compared with VFEs to treat functional dysphonia.

MATERIALS AND METHODS

Samples and evaluations

Participants in this study were invited to take part in the research through announcements at their workplaces. Companies and institutions employing professional voice users such as schools, television or radio stations, telemarketing centers, and law firms throughout Greater São Paulo were contacted. Paper advertisements and radio calls were also used to gather volunteers. Those interested answered a questionnaire to confirm that they met the initial inclusion criteria. They also included signs and symptoms in e-mail responses, a method of data collection which has previously been used in other studies.[16,38,39] The initial inclusion criteria were age between 18 and 50 years, professional voice user, and vocal complaint with a minimum of four signs and symptoms for more than 6 months. The final inclusion criterion was determined by the otorhinolaryngological (ENT) examination confirming a behavioral dysphonia diagnosis with referral for vocal rehabilitation.

Subjects with acute or organic dysphonia and singing professionals were excluded. Figure 1 represents the flowchart for study participants.

To ensure the CONSORT criteria,[40] patients were randomized into two groups of treatment using computer software.

Participants were submitted to three assessments and six vocal rehabilitation sessions. The assessments included (1) ENT evaluation, (2) self-assessment evaluation, and (3) auditory-perceptual evaluation (APE).

(1) The ENT evaluation consisted of history of the patient, nasofibrolaryngoscopy, telelaryngoscopy, and stroboscopy evaluation. For patients with an overactive gag reflex, only the flexible endoscope and stroboscopy were used (40% of the examinations). Topical anesthetics (lidocaine 4%) were applied. Digital images were stored on a hard disk. Laryngoscope Machida (Machida Inc.) LYC30 700, Machida ENT-30PIII camera ASAP Popcam (Machida Inc.), scanner Endodigi, 12:10:07 software Version (Endodigi Inc.), WelchAllyn reference light source 501 (WelchAllyn Inc.), strobe Estrobolight Ecleris (Ecleris Inc.), scanning equipment for Apple iMac with a processor Core 2Duo were used for larynx examination (Apple Inc.). Patients were asked to sustain the vowels /e/ and /i/ at their habitual frequency and intensity. The same technique was used for immediate and 1 month after treatment assessments. The laryngologic examination was performed to confirm the behavioral diagnosis of dysphonia and to manage the vocal rehabilitation.
(2) Self-assessment evaluation consisted of the vocal impact analysis using the questionnaires from the VHI[41] and V-RQOL Index.[42,43]
(3) The perceptual auditory analysis was performed with the recorded sustained /ae/ vowel. For the voice recording, the microphone position was 5 cm from the mouth, at a 45° angle. The speech samples were recorded directly into the computer (HP Pavilion ZV6000 (Hewlett Packard Inc.), Athlon 64 AMD, microphone headset Genius HS-04SU (Genius Inc.)). For the perceptual evaluation, samples were played via a professional headset Sony MDR-7502 model (Sony Inc.).

All participants freely signed the consent form. The Ethical Committee of the institution approved this study, under the number CEP 0715/10, and it was registered in the Clinical Trials database under the number 2010/15 166-3.