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Case Report
Relato de Caso

Voice therapy for the elderly with progression of intensity, frequency, and phonation time: case reports

Terapia vocal para idosos com progressão de intensidade, frequência e duração do tempo de fonação: estudo de casos

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Keywords

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ABSTRACT

This study aims to verify the immediate and medium-term effects of an intensive voice therapy, with progression of vocal intensity and frequency and phonation time, on the voice and larynx of two elderly. A 79-year-old male and an 82-year-old female with vocal complaints and presbylarynx characteristics underwent 12 sessions of intensive voice therapy, with progression of voice intensity and frequency and phonation time, for three weeks. To analyze the therapeutic effects, the following assessments were performed pre-, post-immediately, and one month after voice therapy: auditory-perceptual analyses of the voice, acoustic analysis, and evaluation of maximum phonation time (MPT), self-reference voice-related quality of life, and laryngeal behavior. Most results of these measurements indicated positive changes immediately after voice therapy. There was reduction in the measures of vocal quality deviation, perturbation, and harmonics-to-noise pre-, post-immediately, and one month after voice therapy, which indicates vocal improvement. There was increase in fundamental frequency, maximum phonation time and self-reference voice-related quality of life. Assessment of the laryngeal images showed no consistent difference. One month after voice therapy, worsening of some results was observed compared with the post-immediate assessment, but improvements were maintained in relation to the initial evaluation. The results of this therapeutic proposal are promising, and their effects should be investigated in controlled clinical trials to verify their efficacy.

Descritores

Voz
Treinamento da voz
Fisiologia
Qualidade da voz
Idoso

RESUMO

Este trabalho pretende verificar o efeito imediato e em médio prazo na voz e na laringe de dois idosos submetidos à terapia vocal intensiva com progressão de intensidade e frequência vocais e de duração do tempo de fonação. Dois idosos (um homem, 79 anos e uma mulher, 82 anos) com queixa vocal e características de presbilaringe, realizaram 12 sessões de terapia vocal intensiva com progressão de intensidade e frequência da voz e duração do tempo de fonação, durante três semanas. Para analisar o efeito terapêutico foram realizadas avaliações perceptivoauditivas e acústicas da voz, de tempo máximo de fonação (TMF), de autorreferência da qualidade de vida em voz e do comportamento laríngeo nos momentos pré, imediatamente após e um mês depois do processo de terapia vocal. Os valores da maioria das medidas resultantes dessas avaliações indicaram mudanças positivas imediatamente após a terapia vocal para os idosos. Observou-se redução das medidas perceptivoauditivas de desvio da qualidade vocal e diminuição das medidas de perturbação e ruído do sinal acústico, o que indica melhora na voz. Houve elevação da frequência fundamental e, aumento do TMF, além de autorreferência de melhor qualidade de vida em voz. A avaliação das imagens laríngeas não mostrou diferença consistente. Após um mês do término da terapia alguns parâmetros pioraram em relação ao momento pós-imediato, mesmo assim, permaneceram melhores em relação ao momento pré-terapia. Desta forma os resultados da proposta terapêutica são promissores e seus efeitos devem ser pesquisados em estudos clínicos controlados para verificar sua eficácia em idosos.

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INTRODUCTION

Voice therapy for the elderly has been of great interest to researchers and professionals in the area due to the great demand of this population for treatments aimed at improving their quality of life with better vocal performance[1]. Studies on the physiological changes of the larynx in the elderly, prevalence of vocal impairments, their vocal quality, and voice involvement in their psychosocial conditions were reported in a literature review[1]. In addition, studies seeking scientific evidence of voice therapy for the elderly have been conducted[2-10]. The methodologies used in these studies, as well as the sample sizes and interventions applied, varied greatly. Among the interventions for vocal rehabilitation, it is worth highlighting studies with closed therapy proposals, such as the Vocal Function Exercises (VFE)[2-4], the Lee Silverman Voice Treatment (LSVT) method adapted to the elderly[5,6]; the Phonation Resistance Training Exercise (PhoRTE) method[7]; the Cognitive Vocal Program (CVP)[8]; the Vocal Therapy for Elderlies (VTE)[9], as well as a therapeutic proposal, based on exercise physiology, with electrical stimulation as adjuvant[10].Training based on exercise physiology should be discussed on the basis of five principles, namely,adaptation, overload, specificity, progression, and reversibility. The overload principle refers to increased habitual use of a system, whereas the progression principle is the continuous use of load increase, so that the desired habitual change is achieved[11].

In this context, it is worth highlighting a study conducted with the elderly that was based on the principles of progression and overload, in which, from the maximum measures of voice intensity and frequency and phonation time, exercises were proposed with loads of 60, 70, and 80% of this initial measures aiming to achieve increasing performance of these parameters (voice intensity and frequency and phonation time) in voice therapy for the elderly[10].

Success in the treatment of vocal impairment in the elderly depends on changes in vocal intensity, muscle use, respiratory support and, most importantly, on the maintenance of these resulting changes in the phonatory system. In view of the principles of exercise physiology and of the contemporary communication needs of the elderly, voice therapy based mainly on the progression principle has the potential to foster vocal balance in this population.

Based on knowledge about exercise physiology, the present study aims to verify the immediate and medium-term effects of intensive voice therapy, with progression of vocal intensity and frequency and phonation time, on the voice and larynx of two elderly.

METHODS

The cases reported are the preliminary result of a study approved by the Research Ethics Committee of the aforementioned Institution under protocol number CAEE: 56422916.9.0000.5417. Participants signed an Informed Consent Form (ICF) agreeing with the study procedures and dissemination of its results.

Participants

Study participants were a man (I1) and a woman (I2) aged 79 and 82 years, respectively, with voice complaints that appeared during the aging period, laryngeal examination compatible with presbylarynx, and presence of vocal fold bowing, prominence of vocal processes, and spindle- shaped glottic chink[12]. I1 presented good general health, lived with his wife, performed physical activities weekly, and participated in social activities. I2 also presented good general health, lived alone, and visited relatives on weekends. In addition, both individuals understood the proposed activities and had no history of head and neck cancer or neurological/neuromotor diseases, and were not smokers or former smokers.

Intervention

A voice therapy with progression of vocal intensity and frequency and phonation time was prepared based on the proposal by LaGorio, Carnaby-Mann, and Crary (2010)[10]. The proposal consists of a series of vocal exercises developed with the purpose of gradually increasing vocal resistance and expanding phonation capacity. From a basic measure of vocal emission, phonation targets were calculated with each participant. To this end, maximum phonation time (MPT) and vocal intensity and frequency of sustained phonation are measured. This measurement is performed three times, and the highest measure is considered as baseline, which is used to start the steps of the proposal.

The targets for each individual were calculated to develop training with 60, 70 and 80% of each baseline measure, thus proposing a hierarchy in the therapeutic procedure. The therapy was developed with emission of the vowels /a/ and /i/ and the consonant /m/, counting of numbers, and reading of phrases and texts[10]. Other vowels could be used according to the participant's ease, especially /o/ and /ɔ/.

At the beginning, the participant should sustain phonation of a vowel for 60% of the MPT of the baseline value until good vocal performance is achieved, and then move on to 70 and 80% of MPT. Similarly, phonations of other vowel and consonant are added. The same process is performed with vocal intensity and frequency. As the individuals improve their vocal performance with the sustained emission of /a/, /i/, and /m/, exercises with words, phrases, and conversation are included. After a sequence of exercises, in which the participant reaches all the goals, other baseline measures should be taken so that new targets can be proposed. The measures that the individuals achieve are noted for therapeutic control and to encourage them to achieve what was proposed.

Each step of this proposal should be conducted with the speech-language therapist's control over the quality of emission with respect to respiratory support and vocal stability, intensity and quality. Patients should be encouraged to pay attention to the exercise they are performing, and they should have proprioceptive and auditory control over phonation. In this way, therapeutic development is individualized, because it depends on the daily achievements throughout the therapy, but

the progression process is standardized, always following the targets of 60, 70, and 80% of the baseline values.

This therapeutic proposal was conducted for three weeks, four days a week, with 1 hour sessions. Each participant was encouraged to achieve their goals, and the measures were controlled by means of a chronometer, decibelimeter, and a fundamental frequency (F_0) estimation applicative[1]. Participants were offered water throughout the session. As of the session that the patients were able to perform good vocal quality, they were encouraged to repeat the exercises at home daily. The sequence of exercises was provided in writing, and as training of the list of phrases or poems occurred in the therapy session, the material was handed to the patients to be part of their daily task. At the end of the 12 sessions, each participant was advised of the importance of continuing to exercise daily.

Assessments

To analyze the therapeutic effects, the following assessments were performed pre- (Pre), post-immediately (PI), and one month after (PT) voice therapy: auditory-perceptual analyses of the voice, acoustic analysis, and evaluation of maximum phonation time (MPT), self-reported voice-related quality of life, and laryngeal behavior by means of nasoendoscopy and telelaryngoscopy.

For the auditory-perceptual and acoustic analyses, the participants' voices were recorded at the Pre, PI and PT moments. The recordings were performed in an acoustically treated room using a Marantz PMD660 digital recorder and a Sennheiser e845 microphone. The microphone was positioned laterally 4 cm away from the mouth of the participant, who remained seated in front of the examiner. Participants were instructed to sustain emission of the vowel /a/ as long as possible, keeping the usual pitch and intensity. Each recording was edited, maintaining approximately three seconds of sustained emission, cutting the beginning and the end of the acoustic signal so that vocal attack at the beginning and instability at the end of the emission did not interfere with analysis of the data.

For the auditory-perceptual assessment, the group of three recordings of the sustained vowel, which were performed at the Pre, PI and PT moments for each participant, were randomized and presented to the three speech-language pathologists trained for this activity and who did not participate in any other procedure of the study. A 100 mm analogic visual scale was used for the parameters Grade (Overall Severity), Roughness, Breathiness, Strain, Pitch, and Loudness, in which the lowest value of deviation found represents the best quality of this parameter and, the higher the value, the higher its deviation, according to the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) protocol[13].

The edited recordings were analyzed using the Multi-Dimensional Voice Program - MDVP (Kay Pentax®) for the following parameters: fundamental frequency(F_0), Jitter (%), Shimmer (dB), and Harmonics-to-noise Ratio (HNR). MPT was measured using the MDVP through sustained emission of /a/, /s/, and /z/ at habitual pitch and loudness. The longest of three emissions for the vowel and for each of the consonants was considered for the extraction of this measure.

Self-assessment of voice was conducted with application of the Voice-Related Quality of Life (V-RQOL) protocol[14] by a collaborating speech-language pathologist, who did not participate in the therapy process, at the Pre, PI and PT moments.

Laryngeal evaluation was conducted by an otorhinolaryngologist at the time of the initial assessment for inclusion of the study participants; the same professional performed the examinations at the post-therapy moments. Another experienced examiner, blinded to the assessments, compared the video images of the laryngeal examination to verify possible changes between the Pre, PI and PT moments. For this assessment, the videos of the examinations were edited; identification of the participants was removed and only the images of the vocal folds during respiration and phonation were maintained. The three files, resulting from the edition of each participant's examinations, were randomized for comparison between the moments PI and Pre, PT and Pre, and PT and PI, and then shown to the examiner.

The following parameters were evaluated in telelaryngoscopy: vocal fold bowing, prominence of vocal processes, and glottal closure. As for nasolaryngoscopy, the parameters assessed were glottal closure, medial constriction of vestibular folds, and anteroposterior constriction during vowel emission. Assessment criteria were as follows: the images showed improvement, worsening, or no change.

Data analysis

Descriptive statistics was used to analyze the data. The Pearson's correlation coefficient was applied to verify the reliability between the responses of the three speech-language pathologists who conducted the auditory-perceptual assessments. The results indicated positive paired correlations ($p<0.05$) between examiners 1 and 2 ($r=0.477$); 1 and 3 ($r=0.522$); 2 and 3 ($r=0.623$). From this result, the mean of the three values was calculated for further discussion.

RESULTS

Table 1 shows the measures of the auditory-perceptual, acoustic and maximum phonation time (MPT) assessments and of the voice-related quality of life (V-RQOL) protocol taken pre- (Pre), post-immediately (PI), and one month after (PT) therapy. With respect to auditory-perceptual evaluation, the data represent the mean values indicated by the three speech-language pathology examiners in millimeters (mm). Data collected through application of the self-reference V-RQOL protocol are presented in percentage in the total score and in the physical-functioning and socio-emotional domains.

Results of the perceptual assessment of the laryngeal examination images revealed that of the 36 responses of the analyzed parameters, 47.22% indicated no change; 27.77% showed worsening, and 13.99% indicated improvement in the laryngeal aspects; 11.11% of the examination images could not be analyzed.

[1] Tuna Lite (Play Store) applicative.

Table 1. Measures of the auditory-perceptual, acoustic and maximum phonation time assessments and of the voice-related quality of life protocol taken pre- (Pre), post-immediately (PI), and one month after (PT) therapy

	MG (Male gender)			FG (Female gender)		
	Pre	PI	PT	Pre	PI	PT
Vowel – Grade (Overall severity) (mm)	58.33	46	55	70.33	46.67	64
Vowel – Roughness (mm)	54.67	37.67	41.33	63.67	29	35.33
Vowel – Breathiness (mm)	40.33	37.33	45	54	39.33	54
Vowel – Strain (mm)	22	26	30	9.67	25.67	12.67
Vowel – Pitch(mm)	14.33 high	24.33 high	17.33 high	41.33 low	5.33 low	24.33 low
Vowel – Loudness(mm)	28	18.67	9.33	55	17.33	52.67
Speech – Grade (Overall severity) (mm)	59.67	41.67	45.67	66.33	35.67	55.33
Speech – Roughness(mm)	55.67	34.67	43.67	44	25	46.67
Speech – Breathiness (mm)	36.33	19.67	15.67	46.33	22	38.67
Speech – Strain (mm)	5.33	2.33	7.67	24.33	10.67	25
Speech – Pitch(mm)	17.67 high	19.33 high	20.67 high	19 low	11.33 low	17.67 low
Speech – Loudness (mm)	22.33	14.33	13.33	60.67	20.67	46
*F*0 (Hz)	163.023	199.848	189.868	201.022	212.85	217.48
Jitter(%)	2.989	1.347	1.003	3.713	0.756	3.264
v*F*0	3.892	1.392	1.518	4.358	1.06	2.99
Shimmer *(*dB)	1.1	0.289	0.324	0.38	0.185	0.292
vAm	21.767	11.897	3.978	23.813	6.229	9.356
HNR	0.218	0.11	0.123	0.13	0.108	0.092
MPT – /a/ (s)	8.79	12.137	8.12	14.4	14.09	14.3
MPT – /s/ (s)	5.05	10.8	9.88	8.12	9.45	8.66
MPT – /z/ (s)	8.2 6	10.61	7.9	10.95	16.24	10.76
V-RQOL – Total score (%)	82.5	87.5	90	37.5	85	72.5
V-RQOL – Physical-functioning (%)	70.83	79.16	83.33	29.16	75	66.66
V-RQOL – Social-emotional (%)	100	100	100	50	100	81.25

Captions: mm = millimeter; s = second; *F*0 = fundamental frequency; v*F*0 = coefficient of variation of *F*0; HNR = Harmonics-to-Noise Ratio, vAm = amplitude variation coefficient; MPT = Maximum Phonation Time; V-RQOL = Voice-Related Quality of Life Protocol

DISCUSSION

Assessments showed the immediate and medium-term effects of a voice therapy, with progression of vocal intensity and frequency and phonation time, on the voice and larynx of two elderly. In general, improvement in vocal quality and self-assessment of voice-related quality of life was verified immediately after the 12 therapy sessions conducted over a period of three weeks. Results of the measurements performed one month after the therapy showed some particularities of the participants.

Concerning the auditory-perceptual evaluation of sustained emission of the vowel /a/ and spontaneous speech, comparison between the Pre, PI and PT moments showed an overall trend to improvement at the PI moment, with worsening in vocal quality deviation at the PT moment.

Correspondence between cut grade and moderate and severe deviations was considered using an analogic visual scale as follows: for roughness, values ranging from 28.5 to 59.5 and from 59.5 to 100 were adopted as moderately deviant and severely deviant, respectively; for breathiness, values from 33.5 to 52.5 and from 52.5 to 100 were adopted as moderately deviant and severely deviant, respectively[15]. The results regarding sustained emission of the vowel /a/ found for the two elderly individuals (I1 and I2) who participated in the therapeutic proposal showed moderately deviant (I1) and severely deviant (I2) roughness at the Pre moment, moderately deviant roughness for both individuals at the PI and PT moments, with increased values at the PT moment but smaller than those observed at the Pre moment. Similarly, moderately deviant results were observed with respect to breathiness, which were slightly higher at the PT moment compared with those at the Pre moment for I2.

Because grade (overall severity) of vocal impact accompanies the highest results assessed, the values of this parameter followed the same trend. Perception of strain deviation indicated that its values, although small, increased after the voice therapy - a fact probably caused by the progression of intensity that usually develops throughout the therapeutic exercises. Another case report also indicated maintenance of mildly deviant strain in vocal quality[8]. With regards to the pitch parameter, the deviations found demonstrate a tendency of using a slightly higher voice for I1 and a slightly lower voice for I2 after therapy - a fact caused by progression of the exercises with voice frequency. The evaluations of loudness with sustained emission of the vowel /a/ showed significant reduction in deviation immediately after therapy for both participants. At the PT moment, I1 presented

the best result of his vocal intensity, showing that he was able to maintain it after finishing the therapeutic process; however, I2 did not achieve the same performance, agreeing with another study that verified lack of maintenance of vocal intensity post-therapy[9]. The improvement observed in the auditory-perceptual assessments in this survey was also found in the few studies that described this type of instrument to verify the therapeutic effects on the voice of the elderly[4,8,9].

Auditory-perceptual evaluation of the recordings of spontaneous speech presented the same trend as that of the recordings of the sustained vowels, that is, better results at the PI moment compared with those at the Pre moment, but with a decrease in quality gain at the PT moment. The same results were found after accomplishment of the proposal using the Voice Therapy for Elderlies (VTE) program[9].

As for the acoustic measures, increased fundamental frequency (F_0) was observed at the PI and PT moments compared with that at the Pre moment, and this findings support the perception of the examiners regarding variation in pitch between the participants. A survey[6] that analyzed the immediate effects of an intensive phonatory-respiratory therapy, the Lee Silverman Voice Treatment (LSVT), applied to two elderly patients, reported the same post-treatment outcome. In the therapeutic proposal conducted in this study, the parameters MPT and voice intensity and frequency were also assessed, but with an important difference - the control of hierarchy of the targets to be achieved from a baseline measure. This hierarchy is based on exercise physiology[11]. The same vocal behavior was observed in a study[8] in which, in addition to the objectives of increasing vocal intensity and frequency, exercises of cervical relaxation, glottal firmness, and nasal sounds were used, but focused on cognitive development processing. Increase in F_0 is a demonstration of muscle reaction during phonation, which is reinforced with vocal training at high intensity.

Measures of perturbation (Jitter, vF_0, Shimmer and vAm) and noise (HNR) showed significant decrease in their values, mainly in the comparison between the Pre and PI moments, with the largest difference found in the vAm values of the two participants. Measures of perturbation and harmonics-to-noise have been demonstrated in three previous studies[3,6,8], with positive, significant changes in two of them[6,8], suggesting that the proposals of the LSVT[6] and CVP[8] offered support for greater balance in the quality of vocal fold vibration and supposed adequacy to glottal closure. The acoustic variation measures vF_0 and vAm seem to have undergone greater changes in both reported cases. Intensive voice therapy, with progression of vocal intensity and frequency and phonation time, favored the balance of sound emission, with greater stability of sound production also throughout emission.

The therapeutic proposal presented in this study has hierarchy of exercise with MPT as one of its essential elements. Evaluation of these measures, both for the vowel /a/ and the consonants /s/ and /z/, showed an important reaction in the performance of the participants in sustaining these emissions, mainly in the comparison between the results at the Pre and PI moments, indicating greater efficiency in the respiratory dynamics. Similar results have been reported by other authors[6,8]; however, an additional decrease in MPT was observed in the elderly investigated in this study at the PT moment. Post-therapy results indicate a need for a different approach among the elderly in an attempt to show the importance of changing habits in their daily lives by performing vocal training more attentively.

Changes in vocal quality after the proposed therapeutic process were similar for both participants. Although no changes in the laryngeal aspects were observed for most of the analyzed parameters, there were vocal auditory-perceptual and acoustic modifications. The proposed intense voice therapy, with progression of vocal intensity and frequency and phonation time, has the potential to strengthen the intrinsic musculature of the larynx, improve mucosal vibration of the vocal folds, and balance airflow coordination, which reflect in reduction in hoarseness, breathiness and, consequently, in the grade (overall severity) of vocal deviation.

Development of the perception of a more balanced voice provided by the effects of daily vocal training and the generalization of these effects in connected speech and spontaneous conversation allowed some of the benefits observed at the PI moment to be maintained until the PT moment. The fact that the strain parameter increased during sustained emission of the vowel /a/ at the PI moment is a positive aspect, because the voice of the elderly with presbylarynx presents characteristics of decreased intensity and low vocal frequency, as reported in a literature review[1],and strain increases when voice strengthening exercises are performed, which corresponds to a more balanced voice for the elderly. This fact is reinforced by the result of reduced deviation in loudness, as the voice of the participants became stronger both in sustained emission of the vowel and in connected speech.

V-RQOL protocol values indicate how much a vocal impairment can influence quality of life. The total score (TS) and results in the Physical-Functioning (PF) and Social-Emotional (SE) domains for I1 show that his vocal impairment did not negatively influence his quality of life. Even so, it is possible to observe that the results at the PI and PT moments increased (TS and PF) or remained at maximum value (SE). I2 reported great improvement in her voice-related quality of life, considering that, at the Pre moment, the TS and PF domains had significant impact on her quality of life, whereas the SE domain presented moderate impact on it. At the PI moment, the values achieved normality in this relation; however, at the PT moment, I2 reported worsening, but without researching the same level of the Pre moment. The three-week intensive voice therapy provided perception of an excellent relationship between the voice-related quality of voice achieved and the quality of life of the participants. Among the studies that used self-assessment to verify the efficacy of a voice therapy proposal for the elderly[2,3,7,9,10], one of them[2] showed, according to the results of the V-RQOL protocol, that the proposed voice therapy based on VFE had provided significant improvement in the individuals' perception of the impact of voice on their lives, although values obtained after the therapeutic process still presented a mean of 77, indicating a mild impact of voice on quality of life. Another research[7] that compared the results obtained with the PhoRTE method, VFE, and a control group, using the V-RQOL protocol, reported that the two groups who

underwent voice therapy for four weeks presented significant improvements in the protocol scores. The mean total scores found by the researchers in the pre-therapy measurements were already high (88.5 and 80.8), and improved after intervention (96.9 and 87.5). In a study that used the VTE, the author found higher V-RQOL protocol values both for the intensive and extensive therapies[9]. This is one of the few surveys that evaluated the initial results one month after therapy completion, and observed that they remained the same[9]. Late evaluation of the effects of a therapeutic proposal is important to elicit information on how patients are relating to the effects of voice therapy. Self-assessment protocols are sensitive instruments to verify how much vocal exercise with the elderly favors their quality of life. With the increasing aging of the population, maintenance of the quality of life of the elderly has become a great challenge, with maintenance of effective communication and good vocal quality considered as an important aspect. Studies addressing the search of a therapeutic proposal for the elderly[1-10] have shown their importance by demonstrating that vocal improvement resulting from vocal training reduces the negative impact of voice on quality of life.

Assessment of the images of the laryngeal examinations, telelaryngoscopy and nasolaryngoscopy, showed that most of the responses of the analyzed criteria indicated no changes. Data on late evaluation to verify the effectiveness of therapeutic proposals for the elderly are scarce in the literature. A case report[6] described post-treatment assessments two weeks after its completion and found total glottal closure in one of the individuals (a 61-year-old woman) and reduction of the glottic chink in the other (an 88-year-old man). In the aforementioned study, strobolaryngoscopic examination was performed and the results were analyzed by means of numerical measures using appropriate software, with editing of a one-second video clip[6]. The difference in the methodology used does not favor comparison of the results; however, the best result found by the authors was from the youngest participant, corroborating the findings of the present study. Glottal closure was addressed in a study[5] that found varied results in the laryngeal examination after the proposed therapeutic process, indicating that, depending on the size of the glottic chink and on vocal fold atrophy, total glottal closure is more difficult to be achieved after vocal training. The relationship between vocal quality and laryngeal condition in the elderly should be addressed in future studies. Further studies should be conducted in order to better understand how glottal closure conditions, supraglottic region constriction, and vocal fold vibration relate to vocal quality resulting from voice therapy proposals for the elderly.

The following number of sessions and duration in weeks or months of therapeutic processes are described in the specific scientific literature: four sessions conducted in approximately five months[2]; six sessions conducted once a week[3] or six sessions with pre-established exercises in each of them[8]; eight weeks of exercises performed twice a day at home[4]; 13 sessions throughout three weeks with five sessions a week (two adaptation sessions)[10]; 16 sessions throughout four weeks[6,7,9]. All therapeutic proposals showed improvement in the vocal quality of participants, or in self-assessment reports. For speech-language pathology practice, it is important to conducted investigations that not only present scientific evidence for the vocal treatment of the elderly (VFE, LSVT, PhoRTE, CVP, VTE), but also seek its outcome over time (VTE)[9].

This intensive voice therapy, based on exercise physiology, with hierarchy of goals to be achieved in the parameters of vocal intensity and frequency and phonation time, was determined to be performed in three weeks with 12 one-hour sessions because it could facilitate patient adherence, be shorter, and be able to promote physiological changes in vocal emission. In these two cases, it was evident that the proposal provided improvements in vocal quality and self-assessment measures. The evaluations conducted one month after therapy completion (PT) showed, with the exception of some MPT measures, better results than those observed before the therapy (Pre).

FINAL COMMENTS

The proposal of intensive voice therapy with progression of vocal intensity and frequency and phonation time was beneficial to the voice and larynx of the participating elderly, showing that one month after the end of the therapeutic sessions this benefit was maintained in the vast majority of the results in all assessments.

Results of the evaluations of the two elderly participants showed the same trend between the Pre, PI and PT moments, but some particular outcomes could be observed. Difference was found in the V-RQOL protocol results between the participants, with consistent improvement immediately after therapy and divergent results one month after therapy. Acoustic analysis showed increased F_0 measures at the PI and PT moments in relation to the Pre moment and decreased perturbation and harmonics-to-noise measures at the PI moment, with smaller values at the PT moment compared with those at the Pre moment. Results of MPT from the three emissions were varied, but presented the same or longer times at the PI moment and the same times at the PT moment, with two of the results showing smaller values at the PT moment compared with those at the Pre moment.

The results of this therapeutic proposal are promising, and their effects should be investigated in controlled clinical trials, with larger sample sizes and with control groups, to verify their efficacy.

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Author contributions

EMGF: study design, execution of the therapies, analysis of the results, and writing of the manuscript; KCAS: study design, auditory-perceptual assessment, evaluation of the laryngeal examination images, analysis of the results, and writing of the manuscript; GBF: study design, analysis of the results, and critical revision of the manuscript; ECA: laryngeal examinations and initial otorhinolaryngologic diagnosis; PFS and PAMM: collection and processing of the data and discussion of the results; AGB: study design, analysis of the results, and writing of the manuscript.