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Effects of a voice therapy program in a group of patients with dysphonia: a pilot study

Efeitos de um programa de fonoterapia da voz em grupo de pacientes com disfonia: estudo piloto

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ABSTRACT

Purpose: To identify the effects of a phonotherapy program in a group of patients with dysphonia through auditory-perceptual and vocal self-perception assessments. **Methods:** Pilot study: an uncontrolled clinical trial with a convenience sample. Twenty-two patients with an otorhinolaryngological diagnosis of dysphonia participated in the study, including 15 women and 7 men, with a mean age of 59.4 ± 12.53, who underwent 10 speech therapy sessions in groups of 5 to 6 people, with direct and indirect therapy based on the Comprehensive Vocal Rehabilitation Program (CVRP). Patients were individually assessed before and after the therapeutic program, the assessment included auditory-perceptual analysis with the Vocal Symptoms Scale (VSS) and auditory-perceptual analysis of voice quality GRBAS, performed by speech-language pathologists specializing in voice. **Results:** After the therapeutic program, there was a significant difference in the score for the general degree of change in the VSS (p=0.002), and also in the limitation (p=0.002) and emotional (p=0.006) subscales, indicating selfperceived reduction in vocal symptoms after intervention. However, no significant results were found in the pre- and posttreatment comparison regarding vocal quality. **Conclusion:** The study demonstrated that the voice therapy program had statistically significant effects in relation to self-reported vocal symptoms, thus signaling a promising path for an eclectic approach to group vocal therapy.

Keywords: Voice training; Dysphonia; Rehabilitation; Voice disorders; Voice

RESUMO

Objetivo: Identificar os efeitos de um programa de fonoterapia da voz em grupo de pacientes com disfonia, por meio de avaliações perceptivo-auditiva e autopercepção vocal. **Métodos:** Estudo-piloto de ensaio clínico não controlado, com amostra de conveniência. O estudo contou com 22 participantes com diagnóstico otorrinolaringológico de disfonia. Dentre eles, 15 mulheres e sete homens, com média de idade de 59,4 ± 12,53. Foram realizadas dez sessões de terapia fonoaudiológica em grupos de cinco a seis pessoas, com abordagens diretas e indiretas, baseadas no Programa Integral de Reabilitação Vocal (PIRV). Os participantes foram avaliados individualmente, antes e após a realização do programa terapêutico. A avaliação incluiu análise de autopercepção com a Escala de Sintomas Vocais (ESV) e perceptivo-auditiva da qualidade vocal com a escala *Grade, Roughness, Breathness, Asteny, Strain,* (GRBAS), realizadas por fonoaudiólogos especialistas em voz. **Resultados:** Após o programa terapêutico, observou-se diferença significativa na pontuação de grau geral de alteração da ESV (p=0,002) e também nas subescalas Limitação (p=0,002) e Emocional (p=0,006), indicando autopercepção de redução dos sintomas vocais após intervenção. No entanto, destaca-se que não foram encontrados resultados significativos na comparação pré e pós-tratamento com relação à qualidade vocal. **Conclusão:** O programa de fonoterapia da voz teve efeitos estatisticamente significativos em relação aos sintomas vocais autorrelatados, sinalizando um caminho promissor de abordagem eclética para a terapia vocal em grupo.

Palavras-chave: Treinamento da voz; Disfonia; Reabilitação; Distúrbios da voz; Voz

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INTRODUCTION

In group care, the bond cultivated between participants and the speech therapist encourages knowledge formation in a social context. This transforms the therapeutic space into an environment that re-signifies pathological processes, which can help to reduce negative feelings about the voice[1] and to promote healthy vocal habits[2]. Given this type of approach, it is essential to implement an effective therapeutic program, using a combination of direct and indirect methods[3].

In the Brazilian public hospital health system, it is necessary to optimize resources, with group therapy practices being a common response for a wide range of health care services[4]. For Speech Therapy - specifically in the voice area - group therapy initially focused on meeting these demands. Over time, however, the richness and value of exchange of experiences between patients regarding their difficulties with dysphonia became evident[5].

Multidimensional evaluation of the voice includes phonoaudiological evaluation through perceptual-auditory and acoustic analysis, otorhinolaryngological evaluation with qualitative and quantitative analysis of laryngeal images and, finally, the patient's self-assessment of the impact of dysphonia on quality of life[6]. In this context, group therapy presents benefits, not necessarily for vocal quality, but rather for proprioception, since the patient acquires greater awareness of his/her voice individually and together with the other group members[7,8] when carrying out the exercises. Consequently, it is important that speech therapists also evaluate the patient's opinion about his/her own voice throughout the therapeutic process.

A therapeutic program based on the Integral Program for Vocal Rehabilitation – IPVR (*Programa Integral de Reabilitação Vocal* (PIRV))[9] was created to provide a comprehensive but nuanced approach, to meet the needs of patients with diverse etiological profiles. The patients were from a voice outpatient clinic associated with the otorhinolaryngology service of a Universal Health System (*Sistema Único de Saúde* (SUS)) hospital in the city of Porto Alegre (in the state of Rio Grande do Sul (RS)). In this context, the present pilot study aimed to identify the effects of a voice speech therapy program in a group of patients with dysphonia, through perceptual-auditory evaluations and vocal self-perception.

METHODS

Research participants

This study was characterized as a non-controlled clinical trial, with convenience sample, approved by the Ethics Committee of the Federal University of Health Sciences of Porto Alegre - CEP - UFCSPA, No. 1.788.628. All participants signed an Informed Consent Form (ICF).

The study included 22 adults with a previous otorhinolaryngological diagnosis of dysphonia, subsequently allocated into groups according to the Behlau et al.[10] classification for dysphonia[10]. The use of this classification provided a more homogenous sample compared to the otorhinolaryngological diagnosis, since it considers the involvement of the vocal behavior underpinning dysphonia, identifying similar habits, and working conditions within the sample, among others. Seven participants (31.8%) were men and 15 (68.2%) were women. After the initial medical evaluation, participants were referred to the group speech therapy program, located in the voice clinic of the Otorhinolaryngology sector of *Santa Casa de Misericórdia de Porto Alegre*. Individuals over 18 years without previous voice therapy experience were included. Those who did not follow up on treatment and those with neurological, cognitive and/or psychiatric disorders which rendered the application of the protocol unfeasible were excluded.

Sample characterization

The characteristics of the study participants are outlined in Table 1, with information obtained from the anamnesis. For the grouping, Behlau et al.[10] classification was chosen[10] (Chart 1).

Procedures

Vocal symptoms scale

The 30-question Vocal Symptoms Scale (VSS)[11,12] was used as the vocal symptom self-assessment instrument. Participants answered the questionnaire individually, assisted by the assessor. Questions were answered using the following 5-point scale: never = 0 points; almost never = 1 point; sometimes = 2 points; almost always = 3 points and always = 4 points. To obtain the overall score, the simple sum of the scores of all questions was made, with 16 points being the cutoff[13].

Table 1. Sample characterisation

Variables	n=22
Gender - n (%)	
Female	15 (68.2)
Male	7 (31.8)
Age (years) - mean ± SD	59.4 ± 12.53
Classification of dysphonia - n (%)	
Organic dysphonia	11 (50.0)
Organofunctional dysphonia	5 (22.7)
Functional dysphonia	6 (27.3)

Subtitle: n = Number of participants; % = Percentage; SD = Standard deviation

Chart 1. Characterisation of the groups

Group 1 - Organic Dysphonia	Spasmodic torticollis (cervical dystonia) (n=2)
	Bilateral paralysis (n=3)
Group 2 - Organic Dysphonia	Presbyphonia (n=6)
Group 3 - Organofunctional Dysphonia	Nodules (n=3)
	Cysts (n=1)
	Reinke's Edema (n=1)
Dysphonia 4 - Functional/ Organofunctional Dysphonia	Psychogenic dysphonia (n=2)
	Vocal sulcus (n=1)
	Vocal fold without particularities (n=3)

Subtitle: n = Number of participants

Perceptual-auditory evaluation

Vocal quality was assessed using the GRBAS[14] scale, with G (grade, general degree of alteration), R (roughness, roughness or hoarseness), B (breathiness, soprosity), A (astheny, asthenia or weakness) and S (strain, tension). Each item varies from 0 to 3 with 0 corresponding to absent, 1 to mild, 2 to moderate and 3 to intense.

Registration and voice recording

Participants were asked to stand up and articulate a sustained vowel /a/ and a chained speech passage (counting from 1 to 10). The recording was made individually, in a quiet environment using a Sony LCD-PX440 digital recorder, maintaining a distance of five centimeters from the sustained vowel emission and the automatic speech emission.

Assessors' evaluation

Three speech therapists with voice specialization and at least eight years clinical experience in the area were selected. They received a CD with the recordings numbered randomly, without identifying the participants' name, gender, age, pathology or treatment phase. Assessors placed their name at the top of the sheet and indicated the number corresponding to the recording beside the GRBAS table.

Vocal therapy programme

The vocal therapy programme was based on the study by Behlau et al.[9], in their PIRV proposal, with the participants' orientation, psychodynamics and vocal training being its main focus.

The program sought to improve knowledge about vocal hygiene and changes in emission for healthier vocal production. To this end, indirect approaches were adopted[15], using resources such as informative leaflets, explanation about anatomy of the phonatory system and exhibition of educational videos about healthy vocal habits.

In the direct voice approach, breathing techniques, sound facilitators for emission and semi-occluded vocal tract exercises were used to encourage vocal projection and glottal adjustment (Chart 2).

The intervention was carried out over ten weeks, with a weekly thirty minute session. Each technique was applied for three minutes, conducted by two speech therapists, both specialists in the voice area, who participated in all the sessions with the four groups. After the ten sessions, the participants were reassessed, following the same protocols.

Participants were instructed to perform at home the same sequence of five exercises practiced in the therapy session, each one for three minutes, twice a day. At the beginning of each session, they were asked individually regarding the performance of the exercises at home and if there was difficulty in their execution.

Statistical analysis

The ordinal qualitative and quantitative variables were presented as frequency and percentage and the normality of the data was verified with the Shapiro-Wilk test. The inferential analysis for comparison of pre- and post-therapy results was done with Student's t-test for paired samples. For the analysis of the GRBAS scale findings and for the individual analysis of the VSS questions, intra-assessor agreement was measured by means of the Intraclass Correlation Coefficient (ICC). Spearman's Post Correlation test was performed for the VSS and GRBAS scales, however, no significant results were observed. The ICC was applied to check the homogeneity of the assessors' vocal quality evaluations, finding excellent reliability (Table 2). Therefore, the most prevalent value from the assessors could be analyzed, or the intermediate value, when the three evaluations diverged. A 5% ($p \leq 0.05$) significance level was adopted and the analyses were performed in the Statistical Package for Social Science (SPSS), version 23.0.

RESULTS

Vocal Symptoms Scale (VSS)

The mean values for the general degree of alteration were above the cutoff value, for both pre- and post-therapy. However, a statistically significant difference was observed when comparing the periods, indicating that a reduction in vocal symptoms was observed after the intervention. Values above the cut-off point[16] before and after therapy were also noticed for the subscales, with the cut-off values being: 11.5 for the limitation component, 1.5 for the emotional component and 6.5 for the physical component. The results of the VSS evaluation can be seen in Table 3.

Table 2. Intraassessor evaluation - Intraclass Correlation Coefficient (ICC)

	Pre-intervention				Post-intervention			
	IC	LL	UL	*p*-value*	IC	LL	UL	*p*-value*
General grade	0.848	0.679	0.933	0.000	0.992	0.984	0.996	0.000
Roughness	0.973	0.946	0.988	0.000	0.993	0.986	0.997	0.000
Breathiness	0.960	0.918	0.982	0.000	0.979	0.958	0.991	0.000
Asthenia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tension	0.966	0.931	0.985	0.000	0.950	0.900	0.978	0.000

*Intraclass Correlation Coefficient (ICC) (H0 = 0.5)
Subtitle: IC = Intraclass correlation; LL = Lower limit; UL = Upper limit

Chart 2. Therapeutic programme

Session number	Techniques applied
1	10 minutes - orientation on the anatomy and functioning of the voice 5 minutes of breathing exercise. Participant standing, with hands positioned on waist for proprioception of inspiration and expiration.
	3 minutes of fricative sound /s/
	3 minutes of fricative sound /s/ + vowels
	3 minutes fricative sound /z/
	3 minutes fricative sound /z/ + vowels
	3 minutes fricative sound (deaf and sonorous) /s/ + /z/
2	10 minutes - dynamics with pictures to explain vocal disorders and how the voice works
	5 minutes of breathing exercise. Participant standing with hands positioned on waist for proprioception of inspiration and expiration.
	3 minutes of fricative sound /s/ with head rotation
	3 minutes of fricative sound /z/ with head rotation
	3 minutes of nasal sound
	3 minutes nasal sound with chewing technique
	3 minutes yawn-sigh
3	10 minutes - educational video on healthy vocal habits
	5 minutes of breathing exercise. Participant standing with hands on their waist for proprioception of inspiration and expiration.
	3 minutes of nasal sound with tongue rotation
	3 minutes of fricative sounds (/v/, /z/, /j/) + vowels
	3 minutes of fricative with glissando
	3 minutes nasal sound with chewing technique
	3 minutes yawn-sigh
4	10 minutes - discussion about resources for doing the proposed exercises at home
	5 minutes of breathing exercise. Participant standing with hands positioned on waist for proprioception of inspiration and expiration.
	3 minutes of nasal sound with tongue rotation in oral vestibule
	3 minutes of fricative sounds (/v/, /z/, /j/) + vowels
	3 minutes of fricative with glissando
	3 minutes tongue vibrating. If this could not be done, lip vibrating was suggested
	3 minutes yawn-sigh
5	10 minutes - dynamics of healthy vocal habits with pictures
	5 minutes of breathing exercise. Participant standing, with hands positioned on waist for proprioception of inhalation and exhalation.
	3 minutes of fricative sound with ascending and descending musical scales
	3 minutes tongue vibrato in scale
	3 minutes counting of numbers with a cork
	3 minutes nasal sound with chewing technique
	3 minutes yawn-sigh
6	10 minutes - discussion of habits that are bad for the voice
	5 minutes of breathing exercise. Participant standing with hands positioned on waist for proprioception of inhalation and exhalation, along with counting numbers, in order to observe body posture and check for tension during phonation.
	3 minutes of nasal sound with tongue click
	3 minutes of fricative sounds (/v/, /z/, /j/) + vowels
	3 minutes of fricative sound /s/ + vowels
	3 minutes of finger kazoo
	3 minutes yawn-sigh
7	10 minutes - discussion about the difficulties of having a voice problem
	5 minutes breathing exercise. Participant standing with hands positioned on waist for proprioception of inspiration and expiration, along with talking about the days of the week, in order to observe body posture and check for tension during phonation.
	3 minutes of nasal sound with musical scale
	3 minutes of voiced and voiceless fricatives (/s/ and /z/) + vowels
	3 minutes of fricative with glissando
	3 minutes of SOVT with paper card (business card)
	3 minutes of yawn-sigh

Subtitle: SOVT = Semi-occluded vocal tract

Chart 2. Continued...

Session number	Techniques applied
8	10 minutes - video on the use of the professional voice
	5 minutes of breathing exercise. Participant standing with hands positioned on waist for proprioception of inhalation and exhalation, along with speaking the months of the year, in order to observe body posture and check for tension during phonation.
	3 minutes of fricative sound /s/ with head rotation
	3 minutes of voiced and voiceless fricatives (/s/ and /z/)
	3 minutes of nasal sound with chewing technique
	3 minutes SOVT with silicone tube in water
	3 minutes yawn-sigh
9	10 minutes - discussion on healthy habits that impact the voice
	5 minutes of breathing exercise. Participant standing, with hands positioned on waist for proprioception of inhalation and exhalation, along with speaking simple sentences, in order to observe body posture and check for tension during phonation.
	3 minutes of nasal + vowel sounds
	3 minutes of nasal sound + ascending and descending musical scales
	3 minutes of fricative sounds (/v/, /z/, /j/) + vowels
	3 minutes SOVT with silicone tube in water
	3 minutes yawn-sigh
10	10 minutes - reading and discussion of a folder with guidelines for the voice
	5 minutes of breathing exercise. Participant standing, with hands positioned on waist for proprioception of inhalation and exhalation, together with the speaking of simple sentences, in order to observe body posture and check for tension during phonation.
	3 minutes of fricative sound /s/ with head rotation
	3 minutes of nasal + ascending and descending musical scales
	3 minutes of nasal + tongue rotation
	3 minutes SOVT with silicone tube in water
	3 minutes yawn-sigh

Subtitle: SOVT = Semi-occluded vocal tract

Table 3. Comparison of the pre- and post-voice therapy results of the Vocal Symptoms Scale with the subscales

	Pre-voice therapy		Post-voice therapy		*p*-value*	EF	Power
	Mean	SD	Mean	SD			
General level of change	53.27	22.54	40.68	23.18	0.002	0.693	91.8%
Limitation	32.73	14.26	24.95	13.78	0.002	0.742	93.3%
Emotional	10.77	9.15	7.14	8.36	0.006	0.625	89.17 %
Physical	10	4.35	8.55	4.32	0.116	0.348	71.24 %

*Student's t-test

Subtitle: SD = Standard deviation; EF = Effect size; % = Percentage

GRBAS scale

No significant results were found when comparing pre- and post-treatment values, indicating no change in vocal quality following intervention. Data on the GRBAS scale parameters of general grade, roughness, soprosity, asthenia and tension are presented in Table 4.

Table 4. Comparison of the results of the GRBAS scale pre and post-intervention

	Median (P25 - P75)		*p*-value*
	Pre-intervention	Post-intervention	
General grade	2 (3 - 2)	2 (3 -1)	0.132
Roughness	2 (3 - 1)	2 (2,3 - 1)	0.608
Breathiness	2 (2 - 1)	1 (2 - 1)	0.581
Asthenia	0 (0 - 0)	0 (0 - 0)	1
Tension	2 (2 - 1)	1.5 (2 - 1)	0.739

*Wilcoxon's test

Subtitle: P = Percentile

DISCUSSION

This study aimed to identify the effects of a speech therapy program on perceptual-auditory evaluation parameters and self-reported vocal symptoms in groups of patients with dysphonia treated in a SUS hospital environment.

Regarding the characterization data for the participants, the literature[4] addresses the need to group subjects according to similar therapeutic demands to generate synergy in the exchange of experiences among participants. Therefore, we tried to group the participants according to the Behlau et al.[10] classification, to promote greater homogeneity, despite the subjects' varied otorhinolaryngological diagnoses, given the high complexity

of the hospital that houses the outpatient clinic from which they were referred.

Regarding the VSS, statistically significant differences were observed for the general degree of alteration, suggesting that participants experienced modifications in their perception of everyday situations in relation to the use of voice. The literature suggests that group therapy may be effective in reducing vocal risk factors(17), and being able to generalize the knowledge acquired during its realization for situations of work and social life.

There was also a significant change in the limitation subscale, which suggests improved functionality and is related to the manifestation of communication difficulties noted by Deary et al.[12] in their proposition of the VSS scale, precisely because these are frequent complaints in voice clinics and a fundamental dilemma for patients' social relationships. The emotional subscale showed changes, indicating the psychological benefits of therapy. A study[17] suggests that participation in group therapy reinforces self-reflection and increases feelings of confidence. On the other hand, the physical component did not show a statistically significant difference, although it presented a decrease in the mean after therapy.

When comparing results before and after GRBAS therapy, no statistically significant difference was observed for any of the scale parameters. According to Behlau et al. the data obtained from the self-perception instruments differed from the objective evaluations and did not present a direct correlation between self-reported and auditory perceptual evaluations[13,16,18]. In one study[19], participants from the organic dysphonia group obtained higher scores on the GRBAS scale compared with the control group, indicating that this type of dysphonia generates greater impacts on the listener, a fact that may have contributed to the high scores in this group, even presenting possible improvement in the pre- and post-therapy period, since the audios of the participants were organized randomly and without identification, during the assessors' analyses.

Noticeably, from the point of view of the participants, there was a decrease in self-reported vocal symptoms, with changes in the scores of general, limitation and emotional degree being observed. This demonstrated that group work promoted positive changes in the self perception of their voice. The data suggest that the group context acts as a space to discuss health practices, with a character complementary to the individual speech therapy clinic. It may also help to reduce long waiting list periods.

The results of this pilot study indicated that further research with greater methodological rigor and greater homogeneity in terms of type of dysphonia may provide more robust results about the effects of the therapeutic group program.

CONCLUSION

The speech therapy program had statistically significant effects on self-reported vocal symptoms for the general level of alteration and in the limitation and emotional subscales, thus indicating a promising and diversified approach to group vocal therapy.

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