

# The Patient's Opinion Regarding Different Service Delivery Models for Voice Therapy

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## Abstract

**Purpose:** The purpose of this study was to compare the voice patient's opinion regarding three service delivery models for voice therapy: a short-term intensive voice therapy with individual sessions (IVT-I), a short-term intensive voice therapy with group sessions (IVT-G), or a long-term traditional voice therapy with individual sessions (TVT).

**Method:** Forty-six adult voice patients who followed either IVT-I, IVT-G, or TVT were contacted by e-mail with the request to fill in an online questionnaire reviewing their opinion about the received therapy. Several items concerning satisfaction, progress, time-related variables, transfer, and need for further therapy were scored by means of visual analog scales. Participants were also asked whether or not they continued voice therapy after the study.

**Results:** There were no significant differences between the three groups regarding the patients' perception of vocal quality improvement, degree of resolution of the voice disorder, duration of one session, total therapy duration, degree of transfer, need for further therapy, and actual continuation of therapy. A higher satisfaction rate was found for patients of the IVT-I and TVT groups than patients of the IVT-G group. The IVT-I group rated the therapy as too frequent compared with the TVT group who rated the frequency as optimal.

**Conclusion:** Results suggest that patients are equally satisfied and perceive a similar progress after individual short-term intensive voice therapy and individual long-term traditional voice therapy. This finding creates flexibility in selecting time-related variables depending on the specific case and situation. Patients who received individual therapy were more satisfied than patients who received group therapy. Future larger scale investigation is needed to confirm these results.

Traditional voice therapy is generally faced with poor session attendance and high dropout. Recent studies showed that 17%–24% of sessions in a traditional voice therapy schedule resulted in cancellations (Meerschman et al., 2019; Wenke et al., 2014). Portone et al. (2008) found that 38% (48/125) of patients did not attend a logopedic voice evaluation after referral by an otorhinolaryngologist. Of those who attended the voice evaluation, 47% (137/294) were not present at the first therapy session. Furthermore, 65% (95/146) of those who showed up at the first therapy session dropped out before therapy completion (Hapner et al., 2009; Portone et al., 2008). Frequent cancellations and high dropout rates may lead to frustrations for clinicians, reduced vocal and psychosocial outcomes, chronic or recurrent dysphonia, and eventually high costs for the health care system (Patel et al., 2011; Portone et al., 2008; Wenke et al., 2014).

As attendance and motivation are key components for successful therapy outcomes, research should focus on finding service delivery models that maximize these aspects (Hapner et al., 2009; Koufman & Blalock, 1982; Patel et al., 2011; Wenke et al., 2014). Traditionally, voice therapy sessions are organized according to a spaced practice schedule with weekly sessions spread over several weeks, months, or years (Behlau et al., 2014; Bergan, 2010; Carding et al., 1999; Chen et al., 2007; De Bodt et al., 2015; Demmink-Geertman & Dejonckere, 2010; Fischer et al., 2009; Patel et al., 2011). However, it has been shown that massed practice, that is, a short-term intensive voice therapy, can tremendously decrease or even eliminate nonattendance and dropout (Meerschman et al., 2019; Wenke et al., 2014). Other advantages of a high-intensity approach are creating a greater opportunity to practice, giving the ability to focus entirely on improving vocal behavior, and obtaining a better simulation of cognitive, motor, and physiological requirements of daily communication. These factors might in turn improve transfer of learned skills and boost the patient's motivation (Fu et al., 2015; Patel et al., 2011; Wenke et al., 2014). Consequently, better vocal outcomes and a higher time efficiency and cost effectiveness can be expected (Patel et al., 2011; Portone et al., 2008; Wenke et al., 2014). Although massed practice is not yet generally established in our field, important founders of short-term intensive therapy programs are the Lee Silverman Voice Treatment (Ramig, 1994) and the vocal function exercises (Stemple et al., 1994).

Three clinical trials actually compared the effect of a short-term intensive voice therapy with a more traditional one and found promising results (Fu et al., 2015; Meerschman et al., 2019; Wenke et al., 2014). In the study of Wenke et al. (2014), patients with functional dysphonia ( $n = 16$ ) received either four 1-hr treatment sessions a week over 2 weeks or one 1-hr treatment session a week over 8 weeks. The authors found an overall high satisfaction across both treatments. The Voice Handicap Index significantly decreased after the intensive treatment. Moreover, attendance rates were significantly higher in the intensive group (98.2%) compared with the traditional group (76.7%). Fu et al. (2015) also compared the effect of both delivery models (eight 45-min sessions over 3 weeks vs. eight 45-min sessions over 8 weeks) in 53 women with vocal fold nodules and found comparable positive perceptual, physiological, and acoustic outcomes. In a previous study of our research group (Meerschman et al., 2019), 46 patients with dysphonia received either a short-term intensive voice therapy with individual sessions, a short-term intensive voice therapy with group sessions, or a long-term traditional voice therapy with individual sessions. The intensive groups made an equal vocal quality progress in only 2 weeks and 12 hr of therapy compared with the traditional group that received 6 months and 24 hr of therapy. Attendance rates were clearly higher in the intensive groups (98.5%–100%) than in the traditional group (83%). Furthermore, no subjects dropped out in the intensive groups versus 19% in the traditional group.

A second service delivery model worth exploring in terms of potential motivation and attendance gains is group therapy. Traditionally, voice therapy sessions are provided individually. A first important benefit of working in groups is that patients feel supported and realize that others have similar problems, which may relieve shame (Guttmacher & Birk, 1971; Law et al., 2012; Rollin, 2000). Second, a simulated real-life situation can be created with more opportunities for transfer (e.g., group conversations; Graham & Avent, 2004; Mishna, 1996). Third, patients can observe, evaluate, and learn from each other (Graham & Avent, 2004; Guttmacher & Birk, 1971; Law et al., 2012; McIlwaine et al., 2010). Such peer modeling is hypothesized to be even more effective than observing the expert (Graham & Avent, 2004; McIlwaine et al., 2010). Additionally, like short-term intensive therapy, group treatment is a type of service delivery that can increase time efficiency and cost effectiveness (Simberg et al., 2006). To our knowledge, only two studies actually compared the effect of a group voice therapy with an individual one (Abrahamsson et al., 2018; Meerschman et al., 2019). Both studies showed a similar progress for the two types of treatment.

Although research evidence supports the use of massed and/or group practice as service delivery models for voice therapy, other aspects should be taken into account before making a clinical decision. The best available research evidence is only one component of the evidence-based practice triad (De Bodt et al., 2015; Haynes et al., 1996; McKibbin, 1998; Sackett et al., 1996; Satterfield et al., 2009). The clinician's expertise and the patient's preference are equally important in the decision-making process. By asking the patient's feedback, therapies can be made more achievable and pleasant, which might again positively affect motivation, adherence, and attendance (Ziegler et al., 2014). Therefore, shared decision making deserves sufficient attention in today's clinical practice (Satterfield et al., 2009). Notwithstanding, less is known about the patient's perception on how voice therapy is delivered.

Therefore, the objective of this study was to investigate and compare the voice patient's opinion regarding three different service delivery models for voice therapy: a short-term intensive voice therapy with individual sessions (IVT-I), a short-term intensive voice therapy with group sessions (IVT-G), or a long-term traditional voice therapy with individual sessions (TVT).

## **Material and Method**

This study was approved by the Ethics Committee of Ghent University Hospital (EC/2014/1194).

### ***Participants***

The same participants as in our previous study were contacted (Meerschman et al., 2019). This group consisted of 46 patients, 44 women and two men, with a mean age of 23.2 years ( $SD = 10.1$  years, range: 18–60 years). They were all diagnosed with a voice disorder by an otorhinolaryngologist and a speech-language pathologist (SLP) at Ghent University Hospital between October 2014 and January 2017. Diagnoses were based on the results of a standardized and multidimensional voice assessment: anamnesis, flexible videolaryngostroboscopy, auditory–perceptual evaluation, maximum performance task, aerodynamic measurements, acoustic analyses, and multiparametric voice indices (based on the European Laryngological Society protocol; Dejonckere et al., 2003). In the previous study, participants received one of three therapy programs: IVT-I ( $n = 15$ ), IVT-G ( $n = 15$ ),

or TVT ( $n = 16$ ). The IVT groups practiced with a frequency of 1 hr 20 min a day and a duration of 10 consecutive work days (2 weeks) with no therapy in the weekends and one extra rest day in one of the 2 weeks (total: 12 hr). The TVT group practiced with a frequency of two 30-min sessions a week and a duration of 6 months (total: 24 hr). The IVT-I and TVT groups received individual sessions, whereas the IVT-G group practiced in small groups of three patients. All therapies were identical in terms of voice exercises and vocal demand tasks (see Table 1), and all sessions were guided by the same voice therapist (I. M.). The patients did not follow voice therapy elsewhere during the intervention. Dropout rates were 0% (0/30) in the IVT groups and 19% (3/16) in the TVT group. Reasons for dropout were need for phonosurgery, lack of therapy progress, or medical (non-voice-related) reasons. Dropout took place after 2–3 months of traditional therapy.

**Table 1. The voice therapy program.**

Education and counseling	Explaining the anatomy and functioning of the larynx, indicating the current pathology or dysfunction • Use of educational images • Use of patient's flexible videolaryngoscopy
Vocal hygiene program	Program proposal based on results questionnaire (risk factors, vocal abuse, vocal load, and lifestyle habits) • Selection and discussion of vocal hygiene criteria based on impact and feasibility • Use of a logbook (e.g., throat clearing, drinking water) • Follow-up during the course of the therapy program
Posture	Correct and eutonic posture for phonation in sitting and standing positions: • Explanation and demonstration by the therapist, imitation by the subject • Feedback and correction by the therapist during the course of the therapy program (if needed) Local relaxation of the neck, shoulders, larynx, and pharynx • Neck: e.g., moving the head sideways as much as possible so that the ear almost touches the shoulder • Shoulders: e.g., lifting the shoulders as high as possible without movement of the back or trunk for a few seconds and then slowly lowering the shoulders • Larynx, pharynx: e.g., pretending to drink out of cupped hands with deep inhalations; introducing a yawn while feeling a slight tension in the palate, lowering of the larynx, and widening of the pharynx; yawn-sigh
Relaxation	Costo-abdominal respiration type and adequate breath support for phonation • Discussing and demonstrating the different respiration types (clavicular, costal, costo-abdominal, abdominal) • Awareness through tactile-kinesthetic (hand on thorax, hand on abdomen) and visual feedback (mirror) • Laying, sitting, and standing positions • Practicing on different hierarchical levels: inhaling through the nose and exhaling while producing voiceless fricatives (/f/ and /s/), voiced fricatives (/v/ and /z/), other consonants and vowels, words, automatic sequences, sentences, texts, and spontaneous speech • Feedback and correction by the therapist during the course of the therapy program (if needed)
Respiration	Obtaining an “easier” phonation and an improved source-filter interaction with the aid of resonant voice exercises • Humming nasal consonants /m/, /n/, and /ŋ/ • Nasal consonants combined with rounded vowels, unrounded vowels, and consonants • Speech-embedded nasals: words, sentences, texts, and spontaneous speech • Gradually reducing resonance levels • Sensory feedback of vibratory sensations in the midfacial region, forward focus
Resonant voice exercises	Adequate voice placing and forward focus • Awareness through negative practice: alternation between backward and forward focus (“bringing the voice in and out the throat”) • Often combined with resonant voice exercises, gradual reduction of excessive resonance but maintenance of forward focus • Sensory feedback: vibratory sensation in the midfacial region, mask resonance • Feedback and correction by the therapist during the course of the therapy program (if needed)
Voice placing, forward focus	Adequate voice onset • Correction hard onset if applicable • Awareness through negative practice • Adding an /h/ sound before the vowel/diphthong, gradually reducing the /h/ production • Words, phrases, sentences, texts, and spontaneous speech
Voice onset	

	starting with target vowels • Auditory playback • Feedback and correction by the therapist during the course of the therapy program (if needed)
Semi-occluded vocal tract exercises (SOVTE)	Obtaining an “easier” phonation and an improved source–filter interaction with the aid of SOVTE • Humming, lip trill, tongue trill, water resistance therapy (flexible soft-walled tube, gradually increasing water depth 2–5 cm), straw phonation (drinking straws and stirring straws), finger kazoo, lip-rounded vowels combined with blowing, and cork exercise • Focus on warm-up and cool-down (e.g., pitch and loudness exercises), focus on transfer to speech (“reading exercises,” use of intonation patterns, variation between SOVTE and normal open-mouth phonation)
Laryngeal manipulation	Relaxing tense (peri)laryngeal musculature that inhibits normal vocal function by manual massage techniques • Based on Lieberman (1998), Aronson (1990), Roy & Leeper (1993), Van Lierde et al. (2010), and D'haeseleer et al. (2013) • Laying and sitting positions
Pitch and loudness exercises	Strengthening and balancing the laryngeal musculature by exercises on pitch and loudness • Ascending/descending pitch glides, pitch inflections • Crescendo/decrescendo, loudness shifts • Often combined with SOVTE
Correction of pitch, loudness, tempo, and intonation	Adequate pitch, loudness, tempo, and intonation • Correction only if applicable • Texts, spontaneous speech • Feedback by the therapist • Audio and video playback
Generalization and transfer	Combination of all learned techniques: costo-abdominal breathing pattern, adequate breath support, resonant voice, forward focus, adequate voice onset, and adequate pitch/loudness/tempo/intonation • Different levels: reading (words, phrases, sentences, texts), semispontaneous speech (introducing themselves, describing something), spontaneous speech (answering questions, dialogues) • Creation or imitation of specific contexts (under stress, in loud environment, in front of audience, etc.) • Feedback by the therapist, focus on self-correction • Audio and video playback

Thirty-three of the 46 participants were randomly assigned based on the moment of recruitment. The remaining 13 participants were assigned to one of the three treatment groups according to their availability or preference. There were no differences between the three groups in gender (chi-square test,  $p = .602$ ) or age (Kruskal–Wallis test,  $p = .126$ ). Participants' professions or studies are summarized per group in Table 2. An overview of the type of voice disorders per group can be found in Table 3. Tables 4 and 5 show the pre- to posttherapy evolution of the primary outcome variables (multiparametric vocal quality indices, patient's self-report, and auditory–perceptual evaluation). There were no significant differences in these variables between the three groups at baseline, except for the Voice Handicap Index, which was higher in the TVT group compared with the IVT-G group (estimated mean difference = 23,  $p < .001$ ).

**Table 2.** Professions or studies of the participants in the IVT-I, IVT-G, and TVT groups.

	IVT-I (n = 15)	IVT-G (n = 15)	TVT (n = 16)
<b>Professions</b>			
Teacher	2	0	1
Nurse	1	0	0
Home care	0	0	1
Assistant medical staff	0	0	1
Supervisor living group patients with dementia	0	0	1
<b>Studies</b>			
Speech-language pathology	10	15	10
Linguistics & literature	0	0	1
Physical education	1	0	0
Civil engineering	0	0	1
Business engineering	1	0	0

*Note.* IVT-I = intensive voice therapy with individual sessions; IVT-G = intensive voice therapy with group sessions; TVT = traditional voice therapy.

**Table 3.** Type of voice disorders in the IVT-I, IVT-G, and TVT groups.

Type of voice disorder (flexible videolaryngostroboscopy)	IVT-I		IVT-G		TVT	
	%	n	%	n	%	n
Functional voice disorder	53.3	8/15	33.3	5/15	50.0	8/16
Glottic insufficiency	20.0	3/15	13.3	2/15	31.2	5/16
Muscle tension dysphonia	33.3	5/15	20.0	3/15	18.8	3/16
Organic voice disorder	46.7	7/15	66.7	10/15	50.0	8/16
Irritation and mucus stasis anterior 1/3 true vocal fold	13.3	2/15	6.7	1/15	6.3	1/16
Beginning vocal fold nodules ("soft" nodules)	13.3	2/15	26.7	4/15	31.2	5/16
Vocal fold nodules ("hard" nodules)	13.3	2/15	0	0/15	0	0/16
Edema	6.7	1/15	26.7	4/15	12.5	2/16
Polyp	0	0/15	6.7	1/15	0	0/16

Note. IVT-I = intensive voice therapy with individual sessions; IVT-G = intensive voice therapy with group sessions; TVT = traditional voice therapy.

**Table 4.** Pre- to posttherapy evolution of the primary outcome variables in the IVT-I, IVT-G, and TVT groups (Part 1).

Variable		Baseline 1	Baseline 2	Post	Time x Group	Evolution baseline - post
	Group	EM [95% CI]	EM [95% CI]	EM [95% CI]	p value	EM difference
Multiparametric indices						
	DSI				.975	3.1 (*)
						3.2 (*)
AVQI					.916	3.0 (*)
						-0.64
						-0.46
Patient's self-report					.018	-0.55
	VHI					-4
						-4
VTDS					.314	-13 (*)
						-8
						-3

Note. Em dashes indicate data not available. IVT-I = intensive voice therapy with individual sessions; IVT-G = intensive voice therapy with group sessions; TVT = traditional voice therapy; EM = estimated mean; CI = confidence interval; DSI = Dysphonia Severity Index; AVQI = Acoustic Voice Quality Index; VHI = Voice Handicap Index; VTDS = Vocal Tract Discomfort Scale.

\*Significant effect ( $p < .001$ ).

**Table 5.** Pre- to posttherapy evolution of the primary outcome variables in the IVT-I, IVT-G, and TVT groups (Part 2).

Variable	Group	Baseline 1		Baseline 2		Post		Time x Group	Wilcoxon signed-ranks test
		Mdn (IQR)	M (SD)	Mdn (IQR)	M (SD)	Mdn (IQR)	M (SD)		
Auditory-perceptual									
	G							.204	.025
									.783
R								.990	.007
									.022
									.009
B								.741	.071
									.581
									.107
A								.654	.633
									.527
									.480
S								.876	.031
									.015
									.257
I								.908	.389
									.461
									.564

Note. IVT-I = intensive voice therapy with individual sessions; IVT-G = intensive voice therapy with group sessions; TVT = traditional voice therapy; IQR = interquartile range; G = grade; R = roughness; B = breathiness; A = asthenia; S = strain; I = instability.

## Survey

In August 2018, participants were contacted by e-mail with the request to fill in an online questionnaire that reviews their opinion about the received therapy. This e-mail was sent

through the secretariat of the department instead of the therapist to lower the risk of response bias. Two reminders were sent to increase the response rate.

The questionnaire consisted of 10 questions. First of all, subjects were asked to select the specific treatment they received (IVT-I, IVT-G, or TVT). By asking this question, notification of their names was not needed and all responses could be analyzed anonymously. Questions 2–9 were scored by means of a visual analog scale from 0 to 100 using a slider. The following items were scored: degree of general satisfaction with the therapy, degree of vocal quality improvement after therapy, degree of resolution of the voice disorder after therapy, opinion on the duration of one session, opinion on the total therapy duration, opinion on the frequency of therapy, degree of transfer, and need for further therapy. In Question 10, people were asked if they actually continued voice therapy elsewhere after the treatment at Ghent University Hospital. The questionnaire can be found in the Appendix.

### *Statistical Analysis*

The data were statistically analyzed using SPSS Version 25 (SPSS Corporation). A One-way Analysis of Variance (ANOVA) or Kruskal–Wallis test was used to determine significant differences in visual analog scale scores between the three groups for normally or nonnormally distributed data, respectively. Analyses were conducted at a corrected  $\alpha = .005$  due to multiple testing. Effect sizes were calculated if a significant group effect was found: omega squared ( $\omega^2$ ) for one-way ANOVA and epsilon squared ( $\epsilon^2$ ) for Kruskal–Wallis. A  $\omega^2$  of .01, .06, or .14 is considered a small, medium, or large effect size, respectively (Cohen, 1988; Field, 2013). For  $\epsilon^2$ , these values are .01, .04, or .36 (Rea & Parker, 1992). Post hoc pairwise comparisons using the Tukey (for one-way ANOVA) or Dunn–Bonferroni (for Kruskal–Wallis) approach were performed at  $\alpha = .05$  for variables that showed a significant group effect.

A Fisher's exact test was used to determine if there was a significant difference between the three groups in actual continuation of voice therapy.

### **Results**

The response rate of the survey was 87% (40/46). Three subjects of the IVT-I group, two subjects of the IVT-G group, and one subject of the TVT group did not respond to the invitation to fill in the questionnaire. There was a significant difference between groups for “degree of general satisfaction with the therapy” with a large effect size,  $F(2, 37) = 6.360$ ,  $p = .004$ ,  $\omega^2 = .21$ , as determined by one-way ANOVA (see Table 6). A Tukey post hoc test revealed that the IVT-I ( $M = 79$ ,  $SD = 15$ ,  $p = .045$ ) and TVT ( $M = 83$ ,  $SD = 14$ ,  $p = .004$ ) groups were significantly more satisfied with the treatment compared with the IVT-G group ( $M = 65$ ,  $SD = 12$ ). There was no difference in satisfaction rate between the IVT-I and TVT groups ( $p = .696$ ).

**Table 6.** Results of the survey for the IVT-I, IVT-G, and TVT groups.

Variable	IVT-I (n = 12)		IVT-G (n = 13)		TVT (n = 15)		One-way ANOVA	
	M	SD	M	SD	M	SD	F	p value
VAS (normal data)								
General satisfaction	79	15	65	12	83	14	6.360	.004*
Vocal quality improvement	71	17	63	18	67	22	0.548	.583
Resolution	63	18	60	19	53	19	0.950	.396
Transfer	67	25	72	22	72	23	0.198	.821
Need for further therapy	38	22	29	18	53	25	4.289	.021
							<b>Kruskal–Wallis</b>	
VAS (nonnormal data)	<i>Mdn</i>	<i>IQR</i>	<i>Mdn</i>	<i>IQR</i>	<i>Mdn</i>	<i>IQR</i>	<i>H</i>	<i>p</i> value
Duration of one session	51	50–52	50	47–50	50	50–50	6.119	.063
Duration total therapy	50	37–51	50	42–51	50	49–51	0.329	.848
Frequency therapy	59	55–64	54	50–60	50	49–51	13.362	.001*
							<b>Fisher's exact</b>	
Number of participants	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	<i>p</i> value	
Continued voice therapy	25	3	23	3	40	6	.684	

Note. IVT-I = intensive voice therapy with individual sessions; IVT-G = intensive voice therapy with group sessions; TVT = traditional voice therapy; ANOVA = analysis of variance; VAS = visual analog scale; IQR = interquartile range.

\*Significant effect ( $p < .005$ ).

A Kruskal–Wallis test showed that the groups also responded significantly different on “frequency of therapy” with a relatively large effect size,  $H(2) = 13.362$ ,  $p = .001$ ,  $\epsilon^2 = 0.34$  (see Table 5). A post hoc Dunn–Bonferroni test revealed that the IVT-I group rated the therapy as too frequent (or less optimal;  $Mdn = 59$ ,  $IQR = 55–64$ ) compared with the TVT group who rated the frequency as optimal ( $Mdn = 50$ ,  $IQR = 49–51$ ,  $p = .001$ ). No significant differences between the three groups were found for “degree of vocal quality improvement,” “degree of resolution of the voice disorder after therapy,” “degree of transfer,” “need for further therapy,” “opinion on the duration of one session,” “opinion on the total therapy duration,” and “actual continuation of voice therapy” (see Table 6).

## Discussion

The objective of this study was to investigate and compare the patient's opinion regarding three different service delivery models for voice therapy: IVT-I, IVT-G, or TVT. A first important finding is that there were no differences in the patients' perception regarding the degree of vocal quality improvement and the degree of resolution of the voice disorder after therapy. This corresponds to the results of our previous study showing an actual similar vocal quality improvement after IVT-I, IVT-G, and TVT (Meerschman et al., 2019).

A second reassuring result is that patients of the IVT-I and TVT groups were equally satisfied with the received therapy, which corresponds to the findings of Wenke et al. (2014). This suggests that the duration and frequency of therapy are not decisive factors for being satisfied with treatment or not, which creates flexibility in selecting particular time-related variables depending on the specific case and situation. Support for this hypothesis can be found in the patients' perception regarding the session and therapy durations, which were rated optimal in each group. The therapy frequency, on the other hand, was scored as too frequent (or less optimal) in the IVT-I group compared with optimal in the TVT group. Therefore, clinicians should monitor the feasibility of intensive programs in terms of practice frequency.

The therapy programs did differ not only in time-related variables but also in the size of the treatment groups. Results showed that this factor might impact the patients' satisfaction with treatment. Patients who received individual therapy (IVT-I and TVT) were more satisfied than patients who received group therapy (IVT-G). A major benefit of individual sessions is that more time and attention are available for one specific person to meet individual needs



(Law et al., 2012). Although the exercises and vocal demand tasks of the therapy were kept identical for each subject, personalized feedback is easier to provide during individual treatment. These advantages might have contributed to the higher satisfaction found in the individual groups. It should be noted that the above-described advantages of group treatment are not reflected in the current satisfaction rates. A possible explanation for this finding is that 2 weeks might be too short to actually create an engaging group climate (Law et al., 2012) or, in other words, an interaction between time-related variables and group size cannot be excluded. Despite the relatively lower satisfaction rates, subjects who received group sessions were still generally satisfied with the treatment. Further research is needed to explore the exact reason for the found differences. Also interesting to determine is the impact of patients' characteristics and personality traits on the preference for individual versus group sessions.

Limitations of this study should be recognized and taken into account for further research. Although the response rate of this study was excellent (87%, 40/46), the opinion of six (13%) participants was not obtained. Given the relative small sample size, this lack of information might have influenced the results. Second, the interval between the therapy and survey varied from 1.5 to 3.8 years depending on the patient. It is possible that a longer interval led to less reliable answers. Nevertheless, the three therapy interventions were dispersed over the duration of the experiment. Therefore, a difference in memory effect between the three groups is not expected. Third, the specific reason for the subjects' rating was not questioned, although this could have yielded valuable information. At last, shortcomings of the original study design (Meerschman et al., 2019) should be taken into account; that is, the group assignment was not completely based on randomization, and the IVT-G group consisted solely of SLP students with a somewhat milder baseline dysphonia severity. The perception of this group should therefore be compared with caution. In general, the high number of SLP students might limit the generalizability to other dysphonic patients.

The research evidence found for massed and/or group practice as service delivery models for voice therapy (Abrahamson et al., 2018; Fu et al., 2015; Meerschman et al., 2019; Wenke et al., 2014) has now been evaluated from the patient's perspective. In conclusion, patients were equally satisfied and perceived a similar progress after both individual short-term intensive voice therapy and individual long-term traditional voice therapy. Therefore, other factors of the evidence-based practice model (i.e., clinician and context) might be decisive in the selection of time-related variables. Possible benefits of massed practice, such as a higher motivation, time efficiency, and cost effectiveness, can play a role in the decision process (Patel et al., 2011; Portone et al., 2008; Wenke et al., 2014). The current results also showed that patients who received individual sessions were more satisfied than patients who received group sessions. Further research is needed to investigate whether individual therapy is indeed preferable and whether this is the case for all types of voice disorders or patients' personality traits.

At last, when interpreting voice therapy outcomes, one should always keep in mind that these are the result of a complex interplay of ingredients (Van Stan et al., 2019). Although this study succeeded to control several of them across the three groups (identical voice exercises, vocal demand tasks, and therapist), others might still influence outcomes. Therefore, conclusions on the effect and the patient's opinion of the different service delivery models need to be made with caution, and a further larger scale investigation is needed.

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## References

- Abrahamsson, M., Millgard, M., Havstam, C., & Tuomi, L. (2018). Effects of voice therapy: A comparison between individual and group therapy. *Journal of Voice*, 32(4), 437–442. <https://doi.org/10.1016/j.jvoice.2017.06.008>
- Aronson, A. E. (1990). *Clinical voice disorders*. Thieme. Behlau, M., Madazio, G., Pacheco, C., & Gielow, I. (2014). Intensive short-term voice therapy: The Brazilian experience. *SIG 3 Perspectives on Voice and Voice Disorders*, 24(2), 98–103. <https://doi.org/10.1044/vvd24.2.98>
- Bergan, C. (2010). Motor learning principles and voice pedagogy: Theory and practice. *Journal of Singing*, 66(4), 457–468.
- Carding, P. N., Horsley, I. A., & Docherty, G. J. (1999). A study of the effectiveness of voice therapy in the treatment of 45 patients with nonorganic dysphonia. *Journal of Voice*, 13(1), 72–104. [https://doi.org/10.1016/S0892-1997\(99\)80063-0](https://doi.org/10.1016/S0892-1997(99)80063-0)
- Chen, S. H., Hsiao, T.-Y., Hsiao, L.-C., Chung, Y.-M., & Chiang, S.-C. (2007). Outcome of resonant voice therapy for female teachers with voice disorders: Perceptual, physiological, acoustic, aerodynamic, and functional measurements. *Journal of Voice*, 21(4), 415–425. <https://doi.org/10.1016/j.jvoice.2006.02.001>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum.
- D'haeseleer, E., Claeys, S., & Van Lierde, K. (2013). The effectiveness of manual circumlaryngeal therapy in future elite vocal performers: A pilot study. *The Laryngoscope*, 123(8), 1937–1943. <https://doi.org/10.1002/lary.24050>
- De Bodt, M., Heylen, L., Mertens, F., Vanderwegen, J., & Van de Heyning, P. V. (2015). *Stemstoornissen: Handleiding voor de klinische praktijk* [Voice disorders: Manual for clinical practice]. Garant.
- De Bodt, M. S., Patteuw, T., & Versele, A. (2015). Temporal variables in voice therapy. *Journal of Voice*, 29(5), 611–617. <https://doi.org/10.1016/j.jvoice.2014.12.001>
- Dejonckere, P. H., Crevier-Buchman, L., Marie, J. P., Moerman, M., Remacle, M., & Woisard, V. (2003). Implementation of the European Laryngological Society (ELS) basic protocol for assessing voice treatment effect. *Revue de Laryngologie-Otologie-Rhinologie*, 124(5), 279–283.
- Demmink-Geertman, L., & Dejonckere, P. H. (2010). Differential effects of voice therapies on neurovegetative symptoms and complaints. *Journal of Voice*, 24(5), 585–591. <https://doi.org/10.1016/j.jvoice.2008.12.013>

- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage.
- Fischer, M. J., Gutenbrunner, C., & Ptokb, M. (2009). Intensified voice therapy: A new model for the rehabilitation of patients suffering from functional dysphonias. *International Journal of Rehabilitation Research*, 32(4), 348–355. <https://doi.org/10.1097/MRR.0b013e32832c0d8f>
- Fu, S., Theodoros, D. G., & Ward, E. C. (2015). Intensive versus traditional voice therapy for vocal nodules: Perceptual, physiological, acoustic and aerodynamic changes. *Journal of Voice*, 29(2), 260.e31–260.e44. <https://doi.org/10.1016/j.jvoice.2014.06.005>
- Graham, M. S., & Avent, J. (2004). A discipline-wide approach to group treatment. *Topics in Language Disorders*, 24(2), 105–117. <https://doi.org/10.1097/00011363-200404000-00003>
- Guttmacher, J. A., & Birk, L. (1971). Group therapy: What specific therapeutic advantages? *Comprehensive Psychiatry*, 12(6), 546–556. [https://doi.org/10.1016/0010-440X\(71\)90037-X](https://doi.org/10.1016/0010-440X(71)90037-X)
- Hapner, E., Portone-Meira, C., & Johns, M. M., III (2009). A study of voice therapy dropout. *Journal of Voice*, 23(3), 337–340. <https://doi.org/10.1016/j.jvoice.2007.10.009>
- Haynes, R. B., Sackett, D. L., Gray, J. M. A., Cook, D. F., & Guyatt, G. H. (1996). Transferring evidence from research into practice: 1. The role of clinical care research evidence in clinical decisions. *Evidence-Based Medicine*, 1(7), 196–198. <https://doi.org/10.1136/ebm.1996.1.196>
- Koufman, J. A., & Blalock, P. D. (1982). Classification and approach to patients with functional voice disorders. *Annals of Otology, Rhinology & Laryngology*, 91(4), 372–377. <https://doi.org/10.1177/000348948209100409>
- Law, T., Lee, K. Y.-S., Ho, F. N.-Y., Vlantis, A. C., van Hasselt, A. C., & Tong, M. C.-F. (2012). The effectiveness of group voice therapy: A group climate perspective. *Journal of Voice*, 26(2), e41–e48. <https://doi.org/10.1016/j.jvoice.2010.12.003>
- Lieberman, J. (1998). Principles and techniques of manual therapy: Application in the management of dysphonia. In T. Harris, S. Harris, J. S. Rubin, & D. M. Howard (Eds.), *The voice clinic handbook*. Whurr Publishers.
- McKibbin, K. A. (1998). Evidence-based practice. *Bulletin of the Medical Library Association*, 86(3), 396–401.
- Mellwaine, A., Madill, C., & McCabe, P. (2010). Voice therapy prepractice and the principles of motor learning. *Acquiring Knowledge in Speech, Language and Hearing*, 12(1), 29–32.
- Meerschman, I., Claeys, S., Bettens, K., Bruneel, L., D'haeseleer, E., & Van Lierde, K. (2019). Massed versus spaced practice in vocology: Effect of a short-term intensive voice therapy versus a long-term traditional voice therapy. *Journal of Speech, Language, and Hearing Research*, 62(3), 611–630. [https://doi.org/10.1044/2018\\_JSLHR-S-18-0013](https://doi.org/10.1044/2018_JSLHR-S-18-0013)

- Mishna, F. (1996). Finding their voice: Group therapy for adolescents with learning disabilities. *Learning Disabilities Research & Practice*, 11(4), 249–258.
- Patel, R. R., Bless, D. M., & Thibeault, L. (2011). Boot camp: A novel intensive approach to voice therapy. *Journal of Voice*, 25(5), 562–569. <https://doi.org/10.1016/j.jvoice.2010.01.010>
- Portone, C., Johns, M. M., III, & Hapner, E. R. (2008). A review of patient adherence to the recommendation for voice therapy. *Journal of Voice*, 22(2), 192–196. <https://doi.org/10.1016/j.jvoice.2006.09.009>
- Ramig, L. (1994). Voice treatment for patients with Parkinson disease: Development of an approach and preliminary efficacy data. *Journal of Medical Speech-Language Pathology*, 2, 191–209.
- Rea, L. M., & Parker, R. A. (1992). *Designing and conducting survey research: A comprehensive guide*. Jossey-Bass.
- Rollin, W. J. (2000). *Counseling individuals with communication disorders: Psychodynamic and family aspects*. Butterworth-Heinemann.
- Roy, N. (2012). Optimal dose–response relationships in voice therapy. *International Journal of Speech-Language Pathology*, 14(5), 419–423. <https://doi.org/10.3109/17549507.2012.686119>
- Roy, N., & Leeper, H. A. (1993). Effects of the manual laryngeal musculoskeletal tension reduction technique as treatment for functional voice disorders: Perceptual and acoustic measures. *Journal of Voice*, 7(3), 242–249. [https://doi.org/10.1016/S0892-1997\(05\)80333-9](https://doi.org/10.1016/S0892-1997(05)80333-9)
- Sackett, D. L., Rosenberg, W. M. C., Gray, J. A. M., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *British Medicine Journal*, 312, 71–72. <https://doi.org/10.1136/bmj.312.7023.71>
- Satterfield, J. M., Spring, B., Brownson, R. C., Mullen, E. J., Newhouse, R. P., Walker, B. B., & Whitlock, E. P. (2009). Toward a transdisciplinary model of evidence-based practice. *The Millbank Quarterly*, 87(2), 368–390. <https://doi.org/10.1111/j.1468-0009.2009.00561.x>
- Simberg, S., Sala, E., Tuomainen, J., Sellman, J., & Rönnemaa, A.-M. (2006). The effectiveness of group therapy for students with mild voice disorders: A controlled clinical trial. *Journal of Voice*, 20(1), 97–109. <https://doi.org/10.1016/j.jvoice.2005.01.002>
- Stemple, J. C., Lee, L., D'amico, B., & Pickup, B. (1994). Efficacy of vocal function exercises as a method of improving voice production. *Journal of Voice*, 8(3), 271–278. [https://doi.org/10.1016/S0892-1997\(05\)80299-1](https://doi.org/10.1016/S0892-1997(05)80299-1)
- Van Lierde, K. M., De Bodt, M., D'haeseleer, E., Wuyts, F., & Claeys, S. (2010). The treatment of muscle tension dysphonia: A comparison of two treatment techniques by means of an objective multiparameter approach. *Journal of Voice*, 24(3), 294–301. <https://doi.org/10.1016/j.jvoice.2008.09.003>
- Van Stan, J. H., Dijkers, M. P., Whyte, J., Hart, T., Turkstra, L. S., Zanca, J. M., & Chen, C.

