http://dx.doi.org/10.1590/S2317-64312014000200015

# Effects of vocal rehabilitation on voice handicap of professional popular singers

## Efeitos da reabilitação fonoaudiológica na desvantagem vocal de cantores populares profissionais

*Fernanda Ferreira da Silva[1], Felipe Moreti[2], Gisele Oliveira[1], Mara Behlau[2]*


## ABSTRACT

**Purpose:** To verify the effect of a vocal rehabilitation program in voice handicap by a self-reported questionnaire in popular professional singers with dysphonia. **Methods:** Forty-nine professional popular singers, between 18 and 45 years old, assessed by the ENT and diagnosed with behavioral dysphonia, with or without mass lesions, that were related to of vocal behavior, were submitted to vocal rehabilitation. The singers were divided into two groups: Experimental Group (EG), with 29 singers undergoing voice therapy and a Control Group (CG), with 20 singers on the clinical waiting list for vocal rehabilitation. The CG was attended after the research finished. All participants completed the Moderns Singing Handicap Index (MSHI) and self-assessed their speaking and singing voices at the first and last session of therapy (assessment and reassessment). **Results:** There were significant differences between the experimental and control groups in the post- therapy for all MSHI protocol scores. There were no changes in the number of singing lessons after the intervention. The EG reported perceiving improvement in the speaking and singing vocal qualities. **Conclusion:** Professional popular singers who performed voice therapy had lower self-assessed of voice handicap while singing, when compared with singers with vocal complaints and without treatment.


**Keywords:** Voice; Dysphonia, Quality of life; Evaluation studies; Music; Speech therapy; Speech, language and hearing sciences


## RESUMO

**Objetivo:** Verificar o efeito de um programa de reabilitação de voz na desvantagem vocal autorrelatada por um questionário, em cantores populares profissionais com disfonia. **Métodos:** Quarenta e nove cantores populares profissionais, entre 18 e 45 anos, avaliados pelo otorrinolaringologista e diagnosticados como portadores de disfonia comportamental, com ou sem lesão de massa, relacionada, em maior ou menor grau, ao comportamento vocal, foram encaminhados para fonoterapia. Os cantores foram distribuídos em dois grupos: Experimental (GE), com 29 cantores submetidos à fonoterapia imediata e Controle (GC), com 20 cantores aguardando em fila de espera do serviço para terapia fonoaudiológica, atendidos após a finalização da pesquisa. Todos os participantes responderam ao protocolo de Índice de Desvantagem para o Canto Moderno (IDCM) e autoavaliaram suas vozes falada e cantada, na primeira e na última sessão de atendimento (avaliação e reavaliação). **Resultados:** Houve diferença entre o GE e o GC no momento pós-terapia, para todos os escores do protocolo IDCM. Não houve mudanças em relação ao número de aulas de canto, após a intervenção. O GE relatou melhoria na qualidade da voz falada e cantada. **Conclusão:** Cantores populares profissionais que realizaram terapia fonoaudiológica apresentaram redução na desvantagem vocal autorrelatada no canto, quando comparados aos cantores com queixas vocais e sem tratamento.


**Descritores:** Voz; Disfonia; Qualidade de vida; Estudos de avaliação; Música; Fonoterapia; Fonoaudiologia

Research performed at Centro de Estudos da Voz – CEV – Sao Paulo (SP), Brazil, as a graduation project for the Voice Specialization Program.
(1) Centro de Estudos da Voz – CEV – São Paulo (SP), Brazil.
(2) Centro de Estudos da Voz – CEV – São Paulo (SP), Brazil; Speech-Language Pathology Department, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
**Conflict of interests:** No
**Authors' contribution:** *FFS* principal investigator, research design, literature search, data collection/analysis and composition of the manuscript; *FM* research co-advisor, research design, literature search, data analysis, manuscript revision and submission; *GO* research co-advisor, research design, data analysis and manuscript revision; *MB* research advisor, research design, manuscript revision and approval of the final manuscript version.
**Correspondence address:** Fernanda Ferreira da Silva. R. Machado Bittencourt, 361/1001, Vila Mariana, São Paulo (SP), Brasil, CEP: 04044-905. E-mail: fernandaferreira.s@gmail.com
**Received on:** 5/1/2013; **Accepted on:** 11/18/2013

## INTRODUCTION

Voice disorders can cause important impact on the well-being of singers, not only by compromising their daily and professional activities, but also their quality of life. During the last decades, questionnaires have been used to address this broader concept of quality of life related to voice[1,2].

Some voice deviations are socially accepted and may be part of a singer's vocal quality, whereas others constitute real voice disorders, which may limit his/her career. Voice problems may cause a great vocal and emotional impact on singers that can be expressed by the perception of a singing handicap or difficulties in maintaining vocal quality. In other words, the singer may present vocal deviations more frequently and report different symptoms. Therefore, it is obvious that the impact of voice problems on the singer's life will be completely different from the one on the lives of individuals with a low vocal demand[1].

Vocal self-assessment provides important information about the individual's perception regarding specific aspects related to his/her voice problem. Such information is essential both to quantify and qualify the impact produced by the voice disorder on the individual's life. In addition, vocal self-assessment aids the development of an awareness regarding the effects of a voice problem and identification of treatment effectiveness[3].

The prominent questionnaires that evaluate the impact of a voice deviation on the quality of life are the *Voice Related Quality of Life* (V-RQOL)[4], the *Voice Handicap Index* (VHI)[5] and the *Voice Activity Participation Profile* (VAPP)[6]. These instruments were primarily developed in English and validated into Brazilian Portuguese as Qualidade de Vida em Voz (QVV)[7], Índice de Desvantagem Vocal (IDV)[8] and Perfil de Participação em Atividades Vocais (PPAV)[9].

However, these questionnaires were designed to assess speaking voice. They do not show the same results for the assessment of singing voice. Some researches have shown that singers have better VHI scores than non-singers; possibly because the VHI is not sensitive to deviation and complaints of singing voice[1,10].

In 2007, an American group of researchers proposed a validated questionnaire, entitled Singing Voice Handicap Index (S-VHI)[11]. In Portuguese this questionnaire is called *Índice de Desvantagem Vocal para o Canto* (IDV-C)[12]. This questionnaire evaluates the physical, emotional, social and economic impact of voice problems in singers. During the same time, an Italian research group also adapted the VHI for singers, producing two versions[13]: Modern Singing Handicap Index (MSHI) and Classical Singing Handicap Index (CSHI). These versions were translated and culturally adapted into Brazilian Portuguese as *Índice de Desvantagem para o Canto Moderno* (IDCM)[14] and *Índice de Desvantagem Vocal para Canto Clássico* (IDCC)[15]. Studies that employed the IDCM and IDCC to their respective singing style[14,15] and compared their results have already been carried out. These studies show that classical singers with vocal complaint perceive a greater voice handicap than pop singers also with vocal complaint. Whereas, classical singers without vocal complaint report a lower handicap than pop singers without vocal complaint, suggesting that classical singers have a greater perception about their own voice[16].

The speech-language pathology treatment for dysphonias, i.e. voice therapy, is a process that involves diverse procedures in order to develop a better oral communication, reducing phonatory effort and amending vocal quality to the individual's personal, social and professional needs[17]. Usually a combination of direct approaches is used, including specific exercises to control and coordinate various aspects of the vocal system. In addition, voice therapy includes indirect approaches that focus on helping the patient to control and maintain his/her voice, by means of educating him/her on vocal production, vocal hygiene, stress control and overall relaxation[18].

This research had the purpose of identifying the effect of a voice rehabilitation program on vocal handicap self-reported by professional pop singers with dysphonia.

## METHODS

The study was approved by the Research Ethics Board from Fundação do ABC (FMABC) (CAAE: 14021213.9.0000.0082, document number 248.952). All participants signed the Consent Form assenting to participate and with the publication of the results, as per act #196/96.

The population of the study included 49 professional pop singers, 30 males and 19 females, aged between 18 to 45 years, with a mean age of 27.51 years. Inclusion criteria were: professional popular singer, ages between 18 and 45 years, otolaryngological diagnosis of behavioral dysphonia and consent to participating. Individuals were excluded according to the following criteria: being non-singer and ages below 18 and above 45 years, having no otolaryngological diagnosis and missing voice therapy sessions.

All participants reported vocal complaint and were submitted to otolaryngological evaluation, in which there had been the identification of voice deviations due to voice use, diagnosed as behavioral dysphonia, with or without benign mass lesions related somehow with the vocal behavior. All participants were referred to vocal rehabilitation and were randomly assigned to treatment or waiting list, when there was no more availability for being assigned to the first group. Those that were immediately in treatment composed the Experimental Group (EG), which had 20 male singers and nine female singers, with mean age of 26.8 years. The participants that were assigned to the waiting list composed the Control Group (CG), which had ten men and ten women, with mean age of 28.6 years. The participants of the latter group received the same treatment after the completion of the research.

The procedures used for the two groups were: demographic information questionnaire, the *Índice de Desvantagem para o Canto Moderno* (IDCM)[14,16] (Appendix 1) and the Characterization and Voice Self-assessment questionnaire (Appendix 2), before and after eight sessions of a vocal rehabilitation program.

The Characterization and Voice Self-assessment questionnaire (Appendix 2) included information about the participant and his/her singing activities. For the Vocal Self-assessment the individual assessed both his/her speaking and singing voice on a 5-point rating scale: "very good, good, fair, poor, I don't know". The *Índice de Desvantagem para o Canto Moderno* (IDCM)[14,16] (Appendix 1), that includes 30 questions distributed in three subscales, was filled out by all participants, without any help. Each question is answered on a 5-point rating scale: "never, almost never, sometimes, almost always and always". The maximum total and subscales' score are 40 and 120 respectively. At the first meeting, the singer was instructed to answer the questionnaires in the following order: first the Characterization and the Vocal Self-assessment and then the IDCM.

Participants of the Experimental Group were submitted to eight individual therapy sessions that focused both on vocal hygiene (Vocal health and wellbeing) and vocal exercises; as they were related to the incorrect use of voice. The selected exercises were as follows: strap muscles relaxation, respiratory-phonatory-articulatory coordination, stimulation of mucosal wave movement, softening of vocal output, resonance balance, improvement of articulation and specific warming-up and cooling-down programs. The exercises were performed in the aforementioned order by all participants. Necessary adjustments were implemented. The eighth session, time of the re-evaluation, did not necessarily correspond to the dismissal session. A maximum of two absences were allowed.

The individuals assigned to the Control Group did not receive any voice rehabilitation during the period that the Experimental Groups was undergoing treatment, however they were asked to fill out the instruments at the same time interval. After the completion of the research, they received voice rehabilitation, as per availability.

The statistical analysis was performed using the SPSS V16 and Minitab 15. The level of significance adopted was 5% (0.05). The Mann-Whitney test was used to compare the variables of the independent samples, two by two. The Equality of Two Proportions test was used to check whether the proportion of two variables and their levels were significant. The Confidence Interval was used to complement the descriptive analysis.

## RESULTS

Findings showed that there was a difference between the Experimental and Control groups after voice therapy, as to total score and all the subscales. It was observed that the mean total score for the IDCM for the Control group was 47.35 versus 15.31 for the Experimental group, after voice therapy (Table 1).

There has not been any difference in regards to the average of singing lessons (hours/week), after voice therapy for the Experimental Group and for the Control Group re-evaluation. Some of the singers used to take singing lessons before starting

**Table 1.** Comparison between the control and experimental groups for the Índice de Desvantagem para o Canto Moderno (IDCM)

| IDCM | | | Mean | Median | Standard deviation | n | Confidence interval | p-value |
|---|---|---|---|---|---|---|---|---|
| Disability | Pre | Control | 16.10 | 15.5 | 6.64 | 20 | 2.91 | 0.863 |
| | | Experimental | 16.76 | 16.0 | 8.42 | 29 | 3.06 | |
| | Post | Control | 16.75 | 17.0 | 5.78 | 20 | 2.54 | <0.001* |
| | | Experimental | 4.41 | 3.0 | 3.67 | 29 | 1.34 | |
| Handicap | Pre | Control | 9.00 | 7.0 | 6.82 | 20 | 2.99 | 0.089 |
| | | Experimental | 13.10 | 10.0 | 9.00 | 29 | 3.27 | |
| | Post | Control | 9.95 | 8.0 | 7.25 | 20 | 3.18 | <0.001* |
| | | Experimental | 2.59 | 2.0 | 2.50 | 29 | 0.91 | |
| Impairment | Pre | Control | 20.35 | 20.5 | 6.62 | 20 | 2.90 | 0.185 |
| | | Experimental | 23.21 | 25.0 | 8.65 | 29 | 3.15 | |
| | Post | Control | 21.55 | 20.5 | 5.87 | 20 | 2.57 | <0.001* |
| | | Experimental | 8.69 | 10.0 | 4.13 | 29 | 1.50 | |
| Total | Pre | Control | 44.80 | 42.0 | 16.35 | 20 | 7.17 | 0.295 |
| | | Experimental | 52.72 | 46.0 | 23.79 | 29 | 8.66 | |
| | Post | Control | 47.35 | 45.0 | 14.66 | 20 | 6.43 | <0.001* |
| | | Experimental | 15.31 | 14.0 | 9.30 | 29 | 3.39 | |

*Significant values (p≤0.05) – Mann-Whitney Test

voice rehabilitation. The singers that did not take singing lessons were advised to; however they did not comply with the recommendation (Table 2).

Both for singing and speaking voice self-assessment, the Experimental group reported improvement in vocal quality, rating it as excellent and good after voice therapy. On the other hand, the Control group did not perceive changes after eight weeks with no intervention, just as it was expected (Table 3).

## DISCUSSION

Dysphonic singers are professionals that belong to a special category of voice disorders due to the fact that they have high vocal demand and greater risk of developing voice deviation[19]. A mild vocal deviation, which may be imperceptible to other patients, can be devastating to a singer[1]. The impact of a dysphonia for this group of professionals is usually severe, as it may jeopardize the singer's career longevity. The perception that the patients have about their vocal function provides essential and unique information that no other procedure does[21]. Currently, the main available tools, designed to quantify and qualify the impact of these voice problems on the life of the patient are the self-assessment questionnaires, sanctioned by the World Health Organization (WHO). Even though a comprehensive clinical history is essential, the literature points out the difficulty in collecting an accurate history, and therefore suggests the use of structured and systematized self-assessment instruments. These instruments can be of great help for clinicians, especially for the younger ones, however many important aspects of the singing voice are left out. This problem was solved when singing voice questionnaires were developed[11,13].

The IDCM quantifies the vocal impairment perceived in singing activities, caused by a voice problem. It is a self-assessment tool focused on any style of modern singing. The greater the complaint, the greater the deviation of its scores[14,22].

**Table 2.** Comparison between the control and experimental groups in terms of hours per week of singing lessons

| Singing lessons | Pre | | Post | |
|---|---|---|---|---|
| | Control | Experimental | Control | Experimental |
| Mean | 1.15 | 0.97 | 1.25 | 1.34 |
| Median | 0.0 | 0.0 | 1.0 | 1.0 |
| Standard deviation | 1.39 | 1.40 | 1.37 | 1.37 |
| n | 20 | 29 | 20 | 29 |
| Confidence Interval | 0.61 | 0.51 | 0.60 | 0.50 |
| p-value | 0.675 | | 0.767 | |

Mann-Whitney Test (p≤0,05)

**Table 3.** Comparison between the control and experimental groups in the singing and speaking voice self-assessment distribution

| | | | Control | | Experimental | | p-value |
|---|---|---|---|---|---|---|---|
| | | | n | % | n | % | |
| Singing voice | Pre | Good | 13 | 65.00% | 13 | 44.80% | 0.164 |
| | | I don't know | 0 | 0.00% | 2 | 6.90% | 0.23 |
| | | Very good | 4 | 20.00% | 1 | 3.40% | 0.06 |
| | | Fair | 3 | 15.00% | 11 | 37.90% | 0.081 |
| | | Poor | 0 | 0.00% | 2 | 6.90% | 0.23 |
| | Post | Good | 15 | 75.00% | 13 | 44.80% | 0.036* |
| | | Very good | 2 | 10.00% | 16 | 55.20% | 0.001* |
| | | Fair | 3 | 15.00% | 0 | 0.00% | 0.031* |
| Speaking voice | Pre | Good | 10 | 50.00% | 14 | 48.30% | 0.906 |
| | | I don't know | 0 | 0.00% | 1 | 3.40% | 0.401 |
| | | Very good | 2 | 10.00% | 2 | 6.90% | 0.697 |
| | | Fair | 8 | 40.00% | 11 | 37.90% | 0.884 |
| | | Poor | 0 | 0.00% | 1 | 3.40% | 0.401 |
| | Post | Good | 11 | 55.00% | 15 | 51.70% | 0.821 |
| | | Very good | 2 | 10.00% | 14 | 48.30% | 0.005* |
| | | Fair | 7 | 35.00% | 0 | 0.00% | <0.001* |

* Significant values (p≤0.05) – The Equality of Two Proportions Test

Deviated MSHI scores may be correlated with lack of singing technique and high vocal demand both for pop and amateurs singers[14].

The literature shows similar findings for deviated scores of vocal quality, impact of voice problem on professional activities and psychological aspects observed before therapy in choir singers (Table 1). This is possibly explained by the lack of singing techniques and high vocal demand that popular and amateur singers have. The research that studied choir singers[14] found lower values (5.05%) for the emotional subscale, when compared to our study (13.1%). This may be a reflection of the differences between amateur and professional singers, who lean financially on their voices.

In the present study, there was a significant reduction of all scores after voice therapy. The handicap subscale presented the lowest scores (2.6%), followed by the impairment (4.4%) and disability (8.7%) scales. The total score had a 15.3% reduction. These findings reassure other studies that also detected a positive influence of vocal rehabilitation on quality of life, as it reduces phonatory effort and better the voice to meeting personal, social and professional needs of the individual[18,21,23,24].

The vocal handicap reduction perceived after voice therapy was crystal clear. The handicap subscale showed the lowest final score, followed by the impairment and disability subscales, with a subsequent reduction of the total score. Although there are no pre and post-treatment studies with the MSHI, our data indicated that voice rehabilitation may positively influence quality of life, reducing the perceived handicap of singers and promoting improvement and adjustments of personal, social and professional aspects[23,24].

The control group, which was not submitted to voice treatment, behaved opposite to the experimental group in regards to all aspects. The scores before treatment were lower than the ones obtained after eight-waiting weeks. Voice therapy is beneficial and reduces vocal symptoms[21,25-27].

The translated and adapted version of the MSHI into Portuguese showed to be appropriate to the evaluation of these singers. Therefore, it may be considered as a tool for the voice clinic, as it quantifies the vocal handicap specific for this professional category. In addition, it identifies in a better way the type and degree of the perceived vocal impact, which can help the design of a more precise design of treatment plan.

Popular singers usually start off their careers informally and afterwards become a professional with high performance demands. In some cases, they do not have a well-developed singing technique, thus they can end up using their voice inadequately[28].

All the individuals included in the Experimental group reported improvement in their speaking and singing voice after therapy (Table 3). Previous studies that investigated different rehabilitation programs showed that singers reported improvement regarding vocal production after intervention[21,24-27]. The instrument used also detected improvement in voice production, showing that the treatment was efficient and the questionnaire was sensitive. Singers constitute a peculiar population as far as vocal perspective is concerned, as they present higher risk to develop vocal deviations, have more vocal awareness and low tolerance to any symptom that changes their voice[29].

The limitations of this study resides on the therapeutic approach used, a holistic set of various techniques, which is commonly utilized in Brazil. It is a more flexible and tailored set than the American methods of voice therapy; however it has very few studies that prove its efficacy. After eight sessions of therapy, the participants completed the voice self-assessment questionnaire, which did not necessarily correspond to the dismissal therapy.

## CONCLUSION

Professional popular singers that were submitted to voice therapy reported reduction of singing voice handicap and greater satisfaction, both in regards to their singing and speaking voice. The evaluation using a specific singing voice questionnaire was essential, since it demonstrated the individual's own perception as well as measured the vocal impact on vocal activities, which is a crucial aspect for a successful voice therapy for singers. The self-awareness of their voice and speech makes singers conscious of intrinsic aspects that facilitates voice therapy.

## REFERENCES

1. Rosen CA, Murry T. Voice handicap index in singers. J Voice. 2000;14(3):370-7.

2. Jotz GP, Bramati O, Schimidt VB, Dornelles S, Gigante LP. Aplicação do "Voice Handicap Index" em coralistas. Arq Otorrinolaringol. 2002;6(4)260-4.

3. Rosen CA, Murry T, Zinn A, Zullo T, Sonbolian M. Voice handicap index change following treatment of voice disorders. J Voice. 2000;14(4):619-23.

4. Hogikyan ND, Sethuraman G. Validation of an instrument to measure voice-related quality of life (V-RQOL). J Voice. 1999;13(4):557-69.

5. Jacobson BH, Johnson A, Grywalski C, Silbergleit A, Jacobson G, Benninger MS et al. The Voice Handicap Index (VHI): development and validation. Am J Speech Lang Pathol. 1997;6(3):66-70. http://dx.doi.org/10.1044/1058-0360.0603.66

6. Ma EP, Yiu EM. Voice activity and participation profile: assessing the impact of voice disorders on daily activities. J Speech Lang Hear Res. 2001;44(3):511-24.

7. Gasparini G, Behlau M. Quality of life: validation of the Brazilian version of the voice-related quality-of-life (V-RQOL) measure. J Voice. 2009;23(1):76-81.

8. Behlau M, Santos LMA, Oliveira G. Cross-cultural adaptation and validation of the voice handicap index into Brazilian Portuguese. J Voice. 2011;25(3):354-9. http://dx.doi.org/10.1016/j.jvoice.2009.09.007

9. Ricarte A, Oliveira G, Behlau M. Validação do protocolo Perfil de Participação e Atividades Vocais no Brasil. CoDAS. 2013;25(3):242-9. http://dx.doi.org/10.1590/S2317-17822013000300009

10. Behrman A, Sulica L, He T. Factors predicting patient perception of dysphonia caused by benign vocal fold lesions. Laryngoscope. 2004;114(10):1693-700. http://dx.doi.org/10.1097/00005537-200410000-00004

11. Cohen SM, Jacobson BH, Garret CG, Noordzij JP, Stewart MG, Attia A, et al. Creation and validation of the Singing Voice Handicap Index. Ann Otol Rhinol Laryngol. 2007;116(6):402-6.

12. Paoliello K, Oliveira G, Behlau M. Desvantagem vocal no canto mapeado por diferentes protocolos de autoavaliação. CoDAS. 2013;25(5):463-8. http://dx.doi.org/10.1590/S2317-17822013005000008

13. Fussi F, Fuschini T. Foniatria artistica: la presa in carico foniatrico-logopedica del cantante classico e moderno. Audiol Foniatr. 2008;13(1-2):4-28.

14. Moreti F, Rocha C, Borrego MC, Behlau M. Desvantagem vocal no canto: análise do protocol Índice de Desvantagem para o Canto Moderno - IDCM. Rev Soc Bras Fonoaudiol. 2011;16(2):146-51. http://dx.doi.org/10.1590/S1516-80342011000200007

15. Ávila MEB, Oliveira G, Behlau M. Índice de desvantagem vocal no canto classic (IDCC) em cantors eruditos. Pro Fono R Atual Cient. 2010;22(3):221-6. http://dx.doi.org/10.1590/S0104-56872010000300011

16. Moreti F, Ávila MEB, Rocha C, Borrego MCM, Oliveira G, Behlau M. Influência da queixa e do estilo de canto na desvantagem vocal de cantores. J Soc Bras Fonoaudiol. 2012;24(3):296-300. http://dx.doi.org/10.1590/S2179-64912012000300017

17. Behlau M, Madazio G, Feijó D, Azevedo R, Gielow I, Rehder MI. Aperfeiçoamento vocal e tratamento fonoaudiológico das disfonias. In: Behlau M, organizador. Voz: o livro do especialista. Rio de Janeiro: Revinter; 2010. Volume 2, p.409-564.

18. Bos-Clark M, Carding P. Effectiveness of voice therapy in functional dysphonia: where are we now? Curr Opin Otolaryngol Head Neck Surg. 2011;19(3):160-4. http://dx.doi.org/10.1097/MOO.0b013e3283448f85

19. Braun-Janzen C, Zeine L. Singers' interest and knowledge levels of vocal function and dysfunction: survey findings. J Voice. 2009;23(4):470-83. http://dx.doi.org/10.1016/j.jvoice.2008.01.001

20. Sataloff RT, editor. Professional voice: the science and the art of clinical care. 2nd ed, San Diego: Singular; 2005. Voice impairment, disability, handicap, and medical-legal evaluation, p. 1433-41.

21. Behrman A, Rutledge J, Hembree A, Sheridan S. Vocal hygiene education, voice production therapy, and the role of patient adherence: a treatment effectiveness study in women with phonotrauma. J Speech Lang Hear Res. 2008;51(2):350-66. http://dx.doi.org/10.1044/1092-4388(2008/026)

22. Prestes T, Pereira EC, Bail DI, Dassie-Leite AP. Desvantagem vocal em cantores de igreja. Rev CEFAC. 2012;14(5):901-9. http://dx.doi.org/10.1590/S1516-18462012005000035

23. Ramig L, Verdolini K. Treatment efficacy: voice disorders. J Speech Lang Hear Res. 1998;41(1):S101-16.

24. Goulart BNG, Rocha JG, Chiari BM. Intervenção fonoaudiológica em grupo a cantors populares: estudo prospectivo controlado. J Soc Bras Fonoaudiol. 2012;24(1):7-18. http://dx.doi.org/10.1590/S2179-64912012000100004

25. Roy N, Gray SD, Simon M, Dove H, Corbin-Lewis K, Stemple JC. An evaluation of the effects of two treatment approaches for teachers with voice disorders: a prospective randomized clinical trial. J Speech Lang Hear Res. 2001;44(2):286-96.

26. Pedersen M, Beranova A, Møller S. Dysphonia: medical treatment and a medical voice hygiene advice approach. A prospective randomised pilot study. Eur Arch Otorhinolaryngol. 2004;261(6):312-5.

27. Wingate JM, Brown WS, Shrivastav R, Davenport P, Sapienza CM. Treatment outcomes for professional voice users. J Voice. 2007;21(4):433-49.

28. Behlau M, Feijó D, Madazio G, Rehder MI, Azevedo R, Ferreira AE. Voz profissional: aspectos gerais e atuação fonoaudiológica. In: Behlau M, organizador. Voz: o livro do especialista. Rio de Janeiro: Revinter; 2010. Volume 2, p.288-407.

29. García-López I, Núñez-Batalla F, Gavilán Bouzas J, Górriz-Gil C. Validación de la versión en español del índice de incapacidad vocal (S-VHI) para el canto. Acta Otorrinolaringol Esp. 2010;61(4):247-54. http://dx.doi.org/10.1016/j.otorri.2010.01.012

**Appendix 1.** Brazilian version of the Modern Singing Handicap Index (MSHI) questionnaire[13], entitled *Índice de Desvantagem para o Canto Moderno* (IDCM)[14,16]

Marque a resposta que indica o quanto você compartilha da mesma experiência:
Chave de resposta: 0: nunca; 1: quase nunca; 2: às vezes; 3: quase sempre; 4: sempre

O impacto do problema de voz nas atividades profissionais
*Disability* – Incapacidade

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Sinto minha voz cansada desde o começo de uma apresentação. | 0 | 1 | 2 | 3 | 4 |
| 2 | Minha voz fica cansada ou alterada durante a apresentação. | 0 | 1 | 2 | 3 | 4 |
| 3 | Tenho que ajustar a minha técnica vocal, porque o problema de voz prejudica a minha emissão. | 0 | 1 | 2 | 3 | 4 |
| 4 | Meu problema vocal me obriga a modificar as músicas, limitar meu repertório ou mesmo mudar o tom. | 0 | 1 | 2 | 3 | 4 |
| 5 | Por causa do meu problema de voz sou forçado a limitar meu tempo de estudo/ensaio. | 0 | 1 | 2 | 3 | 4 |
| 6 | Sinto dificuldade nas apresentações por causa das alterações no meu rendimento vocal. | 0 | 1 | 2 | 3 | 4 |
| 7 | Não consigo fazer duas ou mais apresentações consecutivas. | 0 | 1 | 2 | 3 | 4 |
| 8 | Preciso da ajuda do operador de som para mascarar meu problema de voz. | 0 | 1 | 2 | 3 | 4 |
| 9 | Preciso tomar remédios continuamente para mascarar meu problema de voz. | 0 | 1 | 2 | 3 | 4 |
| 10 | Meu problema vocal me obriga a limitar o uso social da voz. | 0 | 1 | 2 | 3 | 4 |

O impacto psicológico do problema de voz
*Handicap* – Desvantagem

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Minha ansiedade antes das apresentações está maior que a habitual. | 0 | 1 | 2 | 3 | 4 |
| 2 | As pessoas com as quais convivo não compreendem minha queixa de voz. | 0 | 1 | 2 | 3 | 4 |
| 3 | As pessoas com as quais convivo têm criticado a minha voz. | 0 | 1 | 2 | 3 | 4 |
| 4 | Meu problema de voz me deixa nervoso e/ou menos sociável. | 0 | 1 | 2 | 3 | 4 |
| 5 | Fico preocupado quando me pedem para repetir um vocalize ou uma frase musical. | 0 | 1 | 2 | 3 | 4 |
| 6 | Sinto que minha carreira está em risco por causa do meu problema de voz. | 0 | 1 | 2 | 3 | 4 |
| 7 | Colegas, empresários e críticos já perceberam minhas dificuldades vocais. | 0 | 1 | 2 | 3 | 4 |
| 8 | Sou obrigado a cancelar alguns compromissos profissionais por causa da voz. | 0 | 1 | 2 | 3 | 4 |
| 9 | Evito agendar futuros compromissos profissionais. | 0 | 1 | 2 | 3 | 4 |
| 10 | Evito conversar com as pessoas. | 0 | 1 | 2 | 3 | 4 |

Auto-percepção das características de minha voz
*Impairment* – Defeito

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Tenho problemas com o controle da respiração para o canto. | 0 | 1 | 2 | 3 | 4 |
| 2 | Meu rendimento vocal varia durante o dia. | 0 | 1 | 2 | 3 | 4 |
| 3 | Sinto que minha voz está fraca ou tem ar na voz. | 0 | 1 | 2 | 3 | 4 |
| 4 | Sinto minha voz rouca. | 0 | 1 | 2 | 3 | 4 |
| 5 | Sinto que tenho que forçar minha voz para produzir os sons. | 0 | 1 | 2 | 3 | 4 |
| 6 | Meu rendimento vocal varia de modo imprevisível durante as apresentações. | 0 | 1 | 2 | 3 | 4 |
| 7 | Tento modificar minha voz para melhorar a qualidade. | 0 | 1 | 2 | 3 | 4 |
| 8 | Cantar está sendo uma tarefa difícil ou cansativa. | 0 | 1 | 2 | 3 | 4 |
| 9 | Minha voz fica pior à noite. | 0 | 1 | 2 | 3 | 4 |
| 10 | Minha voz fica facilmente cansada durante as apresentações. | 0 | 1 | 2 | 3 | 4 |

**Appendix 2.** Characterization and voice self-assessment questionnaire

Name: _____ Gender: _____
Date of birth: ___ / ___ / _____ Date: ___ / ___ / _____

Singing style: _____
Singing lessons (hours/week): _____
Vocal technique lessons (hours/week):_____
How long have you been singing? (days, months or years):_____
Hours of rehearsal per week (consecutive or alternate days):_____

Do you have a voice problem?
( ) no ( ) yes ( ) sometimes. How long ago? _____

How do you assess your speaking voice?
( ) very good ( ) good ( ) fair ( ) poor ( ) I don't know

How do you assess your singing voice?
( ) very good ( ) good ( ) fair ( ) poor ( ) I don't know

Do you have any of these throat symptoms?
( ) 1. burning ( ) 2. itching ( ) 3. pain ( ) 4. dryness sensation
( ) 5. tightness sensation ( ) 6. globus

Have you ever done any voice treatment?
( ) no ( ) yes, what? ( ) exercises ( ) medicine ( ) surgery