

CHANGES OF THE QUALITY OF VOICE IN NURSERY SCHOOL TEACHERS MEASURED BY THE DSI AND VHI METHODS: EVALUATION ON COMPLETION OF A TRAINING PROGRAMME

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Abstract: *The paper summarizes the experience of applying a preventive voice program in the group of 43 nursery school (women) teachers. After theoretical preparation directed towards voice problems (especially voice hygiene and prevention of voice disorders), the teachers took part in practical voice training. They did phonation and resonance exercises, staccato exercises, combined relaxation exercises, exercises for improving articulation and exercises for improving the strength and setting of the voice according to the manual. The changes of voice quality were evaluated by means of the DSI (Dysphonia Severity Index) measurements and analysis of the tested persons' subjective self-assessments, audio-visual recordings and the respondents' personal communications given in the course of recording.*

Key words: voice, nursery school teachers, voice hygiene, a preventive voice program, evalu

Introduction

The investigation I have up to now realized as part of the research grant SCHOOL AND HEALTH FOR 21st CENTURY, as well as the experience from my practice, suggest that the basic parameters of voice, ie. functionality, flexibility, polish etc. and especially resistance (voice condition) in teachers rarely reach the level that is required by their profession. This happens in spite of the fact that a functionally healthy and quality voice is an important prerequisite of pedagogically effective communication.

Many voice troubles develop not only from inadequate or demanding work conditions but also from incorrect voice technique or a bad style of the individual. Another problem is the attitude to voice, its quality and condition. On the one hand we meet with insufficient competence in the field of perception and evaluation of the

qualitative parameters of voice, and on the other with belittling of the importance of voice health, underestimating of the importance of vocal health and with indifference to voice hygiene. It is usually only after the first voice disorder that the person is ready to attend to his or her voice, as well as to appreciate the principles of prevention of voice disorders.

A number of authors have dealt with the nature of voice disorders, both at the general level and in relation to the demands of professional activities and various areas of social life. Teaching is one of the professions that have been investigated from this point of view and discussed in a number of studies with interesting results (V. Lejska (1967); Ch. Gotaas a C. D. Starr (1993); Russell, A. et al., (1998); L. Zapletalová (1993); S. Simberg, A. Laine, E. Salae a M. Rönnemaa (2000); M. Pešlová a P. Brhel (2002); G. Kovacic (2005); A. Kerekretiová a V. Krsňanová (2010); at.al.¹

A topical problem of today is thus seeking the methods, procedures, principles and measures which lead to the maintenance of a healthy voice or regeneration of a good voice, and which also motivate to early and responsible care of voice.

Professional literature offers a number of educational and therapeutic techniques and procedures which are good inspiration sources for making a coherent project of exercises aimed at a precisely defined group – in my case it is teachers and future teachers, e.g. W. Schumacher (1973); Johnson, T. (1985); T. Kaufmann a T. Johnson (1991); Martin, S. (1994); G. Pasa, J. Oates a G. Dacakis (2007).

My experience, similarly to Czech and foreign works dealing with education, re-education or voice therapy, shows that the educationally therapeutic intervention of training affects the following: the motivation component (discovering the motives for self-education and self-cultivation in work with voice), the knowledge component (ie. the necessary information concerning the anatomically physiological aspect of the speech organs and creation of voice as well as the psychosocial aspect of voice and speech in the context of one's lifestyle) and the skill component (the ability to evaluate and educate oneself including the correct performance of preventive, condition and remedial exercises. Expressed more simply, the client should learn especially:

to reflect and assess his or her voice thoroughly enough to be able to discover all the errors and bad habits in the technique of voice and speech,

to recognize the consequences of bad habits or **the signals** of the absence of the correct care of voice (such as a frequent feeling of voice fatigue, of permanent voice effort etc.),

to realize one's limits, but especially possibilities **of improving one's voice condition or development of certain voice parameters** (such as, eg., sonority).

The research objectives

The aim of the investigation was the evaluation of relatively objective changes of the vocal quality (by means of the DSI method) and of the respondents' subjective

¹ A more detailed survey and characteristics of such works, including those on educational and therapeutic techniques and projects, can be found in the present author's monograph *Péče o hlasovou kondici učitelů* (Care of teachers' voice condition), 2010.

views of the quality of their voices and its consequences in their professional and personal lives (by means of the VHI) in the context of the Training programme for improving teachers' voice condition.²

The training programme was structured as introduction, information, motivation, training, analysis of changes caused by the application of the exercises, feedback, and final evaluation (anticipating reflections on further possibilities of personal growth in the field of work with voice and voice hygiene:

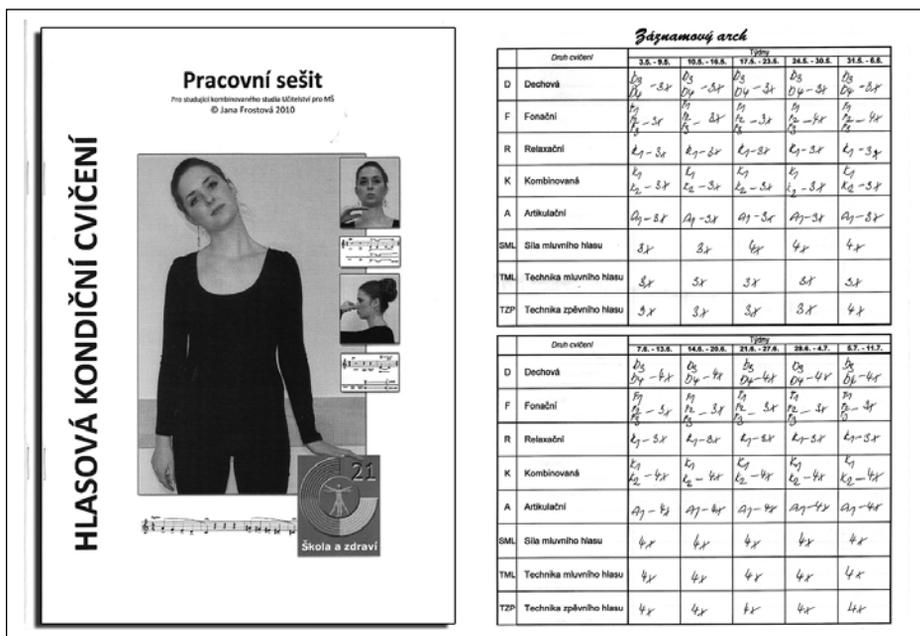
- 1) introduction (explanation of the purpose of the course and the methods of work),
- 2) explanation of the anatomical and physiological context of the exercises,
- 3) strategy of care of voice (voice hygiene),
- 4) getting acquainted with the workbook and the recording sheet,
- 5) getting acquainted with the exercises and their aims (the instructive part),
- 6) demonstration of some rather complicated exercises and drawing attention to possible mistakes during unaided training at home,
- 7) consultation concerning individual procedures and problems with the exercises,
- 8) evaluation, feedback, the direction of further work.

For unaided practising at home, the participants of the training had at their disposal the workbook and the recording sheet for noting down the frequency and intensity of individual exercises.

The workbook is a methodical manual and contains breathing, phonation and resonance exercises, relaxation glissandi, relaxation exercises with phonation and movement, training of the agility of the speech organs, exercises for improvement of the strength and setting of the speaking voice, exercises leading to the development of the speaking voice, exercises leading to the development of the singing voice.³ The workbook also includes instructions on the posture of the body, prevention of voice disorders and the principles of care of voice.

² The study only gives information on the research aimed at the students of nursery school teaching. Similar investigations aimed at the students of primary school teaching have been presented in the last few years. A study on teachers' voice development in the context of their profession (2008), Changes of the quality of voice measured by the DSI in relation to the teaching profession (2009), Changes of the voice quality of teachers using measures DSI in relation to the profession preparation (2010). The present paper interprets only the consequences of the Training programme measured by the DSI and VHI methods. The interpretation of further data obtained by supplementary methods will be the subject of another study.

³ The exercises are described in detail in Chapter 4 of Frostová, J., *Péče o hlasovou kondici učitelů* (Care of teachers' voice condition), 2010.



Picture 1: The methodical manual and the recording sheet for noting down the frequency and intensity of individual exercises

The monitoring of the changes of vocal quality described here was only one of the components in monitoring the effectiveness of the training programme.

The research set

The tested set was made up of 42 part-time students, all of them women trained at the Faculty of Education for nursery school teaching. At the time of training, half of the participants had been in pedagogical practice for 3 years and less, six of them from 3 to 6 years, thirteen for 7 to 13 years and two of them for more than 13 years.

The research methods

A. The Dysphonia Severity Index (DSI)

All the respondents' voices were recorded before and after the course for systematic monitoring of objective changes of the voice as potential consequences of the training programme. The visual aspect of each respondent's overall performance was also recorded (on video) in order to assess his or her posture and voice technique.

The computer software that we used provided us with recordings and their follow-up analysis. Wuyts (2000) defines the DSI as „a transfer of the audible vocal quality into the one-dimensional correlating dimension“. The DSI value is calculated according to the standard formula made up of the measured values of the highest

frequency (F0-High), the lowest loudness (I-Low), the maximum phonation time (MPT) and jitter. The values range from +5 (for the normal vocal quality) to -5 (for severe vocal disorders). The lower is the index value, the worse is the quality of voice.

B. The Voice Handicap Index (VHI)

The VHI questionnaire was worked out by B. H. Jacobson and her colleagues (1997). It establishes the subjective evaluation of the quality of the respondent's voice and the potential impact of the specific characteristics of his or her voice on his or her socioprofessional activities and relations. In the Czech Republic it has not been much used yet (FROSTOVÁ J., LEJSKA M., 2006, ŠVEC, J. et al., 2009).

The questionnaire is not a substitute for medical anamnesis, but is able to provide information on the seriousness of the troubles, problems, difficulties or restrictions that arise in the personal and professional lives of the respondents and are caused by or connected with various vocal difficulties or disorders. The respondents answered according to a five-degree scale. The questionnaire is divided into three groups of 30 questions each, described by the authors as: the physical factor (P), the functional factor (F) and the emotional factor (E). Each question has five variants of the answer (never, hardly ever, sometimes, almost always, always), which are assessed by 0 to 4 points. The resulting score (0-120 points) expresses the degree of the client's difficulties (0-30 no or minimal vocal difficulties, 31-60 medium vocal difficulties, 61-120 a serious impairment of the voice).

The questionnaire is aimed at the following three areas of socioprofessional life:

- I. *the physical area* (data on the feelings during one's speech and the perception of one's own voice),
- II. *the functional* (practical, operational) area (the impact of vocal difficulties on the respondent's life and life situations),
- III. *the emotional area* (the respondent's emotions caused by vocal problems and the impact of the vocal problems on his or her social environment).

The results

The results signalize slightly positive changes in the vocal characteristics (expressed by the DSI) as a consequence of the current work with voice. It seems that the DSI might also be used as an indicator of the need of re-education or therapy of vocal difficulties in teachers.

The following Chart 1 shows the proportions of the changing DSI values in persons who reached a positive shift (90% of all the respondents). The most significant number of those with a positive shift (63.2%) had a shift up to 2 points, while 36.8% had a shift that can be considered as noticeable (from 2 to 5 points).

The most significant factor causing shifts in the DSI values was the MPT. It follows from the talks with the participants in the training that they felt the greatest problem in the area of work with breathing, and therefore their home training contained primarily breathing exercises.

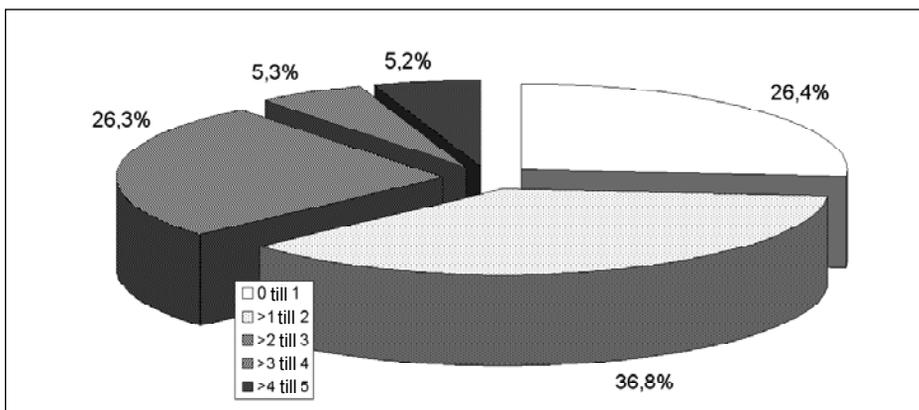


Chart 1: The shift of the DSI values on completion of the training

The following Chart 2 shows the frequency of the MPT changes after the training. Nearly all the tested persons reached an improvement of the maximum phonation time. About a third of the participants improved their MPT in the interval of 3-6 seconds.

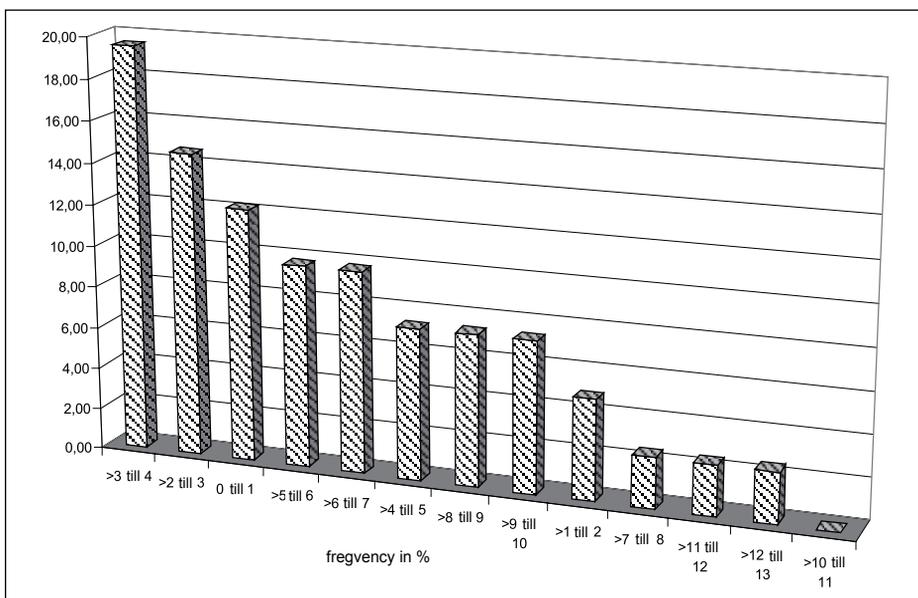


Chart 2: The distribution of the DSI values showing the differences of the MPT on completion of the training

Another consequence of the training was an improvement of the vocal technique (the work with breathing, the posture, the articulation and so on).

The subjective perception of vocal problems in the Training programme participants

Opinions of the nature of possible vocal problems and socioprofessional areas where their consequences might appear were measured by means of the VHI questionnaire.

The results confirmed the supposition that the participants in the training would not (thanks to their age and short teaching career) suffer from any significant voice disorders. As the following Chart 3 shows, a vast majority (80.95%) of the clients had the score of 0-30 points, which, according to the authors, means no or minimal difficulties with voice. The medium type of vocal difficulties was stated by 16.67% of the tested persons, and 2.38% complained of serious vocal problems.

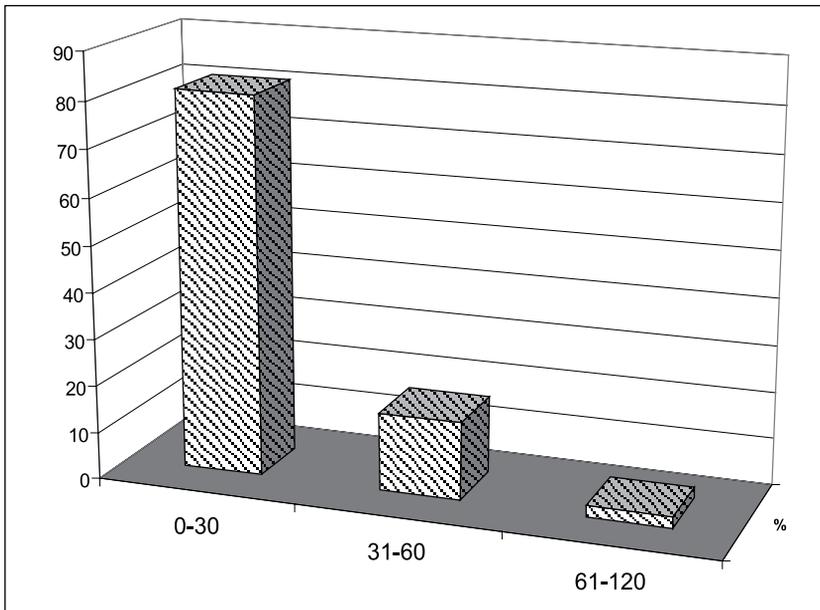


Chart 3: The degree of subjectively perceived vocal difficulties

Although the tested group is very small, this distribution corresponds with the results I obtained from more numerous groups of teachers and future teachers, as well as with other authors' findings. Czech and foreign authors agree on the fact that approximately one fifth of teachers state similar difficulties and need educational or therapeutic correction.

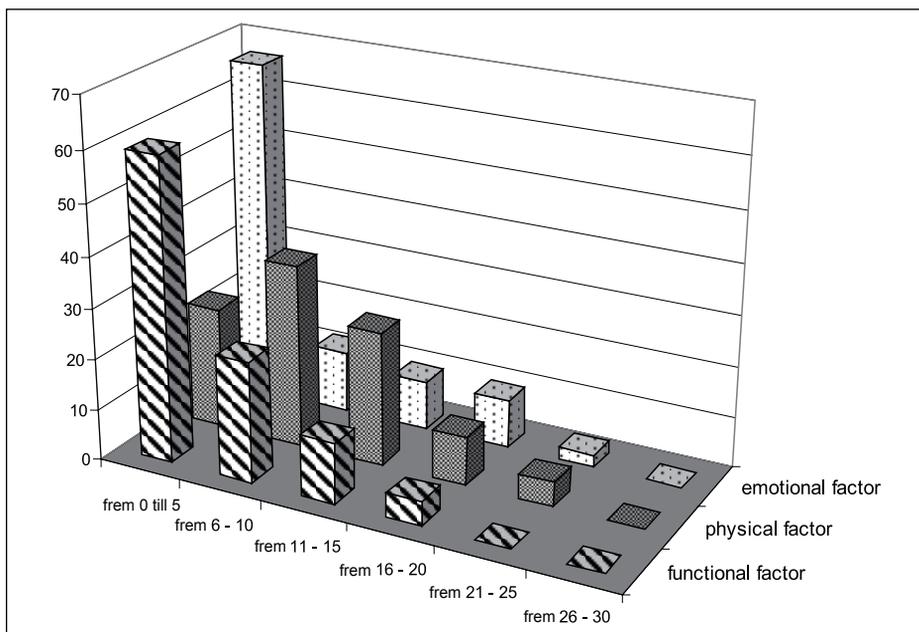


Chart 4: The distribution of the respondents' statements in the individual VHI factors

The individual VHI factors seem to be „saturated“ with vocal problems in different degrees: the answers in the „physical factor“ (directed to the self-perception of the basic vocal characteristics) are more differentiated than the answers in the other factors (which above all measure the consequences of vocal difficulties in socioprofessional contacts) (see Chart 4). People are obviously better at perceiving the basic vocal characteristics than the consequences of voice disposition in contacts, or they possibly consider these consequences so unimportant that they do not pay much attention to them.

The conclusions

The project of the Training programme for improving teachers' voice condition can be not only considered as an effective way of improving the condition and quality of voice, but also as a suitable didactic instrument for the participants' motivation for self-development in the field of vocal culture.

Teachers are very keen to get acquainted with the problems concerning improvement of the condition and quality of voice as their working tool, but it is necessary to connect the problems with the real difficulties they perceive, especially in their teaching practice.

Earlier evaluation of the vocal quality, which was in fact restricted to the amateurish oppositions of „sufficient“ vs. „insufficient“ vocal condition, is changing in the progress of the training into a more mature skill of assessing the individual vocal parameters (intensity, sonority, pitch – the setting of the voice, timbre, range).

Teachers and teachers-to-be have no classified and experienced knowledge of voice hygiene and are not accustomed to applying its principles in their professional and personal life. Especially the projection of knowledge onto the process of forming skills and partial special competences is relatively small if no experienced pedagogue leads it. The experience from the realization of the training shows, however, that a lack of knowledge is not as common as a lack of motivation to apply the principles of vocal (and mental) hygiene in practice.

The current educational system does not enable an individual approach that might lead to principal changes of the vocal quality and practical skills improving the vocal technique. In regard to the fact that the number of taught disciplines cannot be raised (for objective, ie. capacity and financial reasons), the training described here may be found very useful because it offers structured and goal-directed vocal exercises for home and free time. Those who are interested in improving their voice are instructed and given a detailed workbook explaining the exercises, and then all the systematic home work with voice is supervised by a pedagogue working as a consultant and motivator.

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ZMĚNY KVALITY HLASU U UČITELEK MATEŘSKÝCH ŠKOL MĚŘENÉ DSI A VHI: ZHODNOCENÍ PO TRÉNINKOVÉM PROGRAMU

Abstrakt: Práce shrnuje zkušenosti z aplikace preventivního hlasového programu u skupiny 43 učitelek mateřských škol. Po teoretické přípravě zaměřené na hlasovou problematiku (především na hlasovou hygienu a prevenci hlasových potíží) absolvovaly učitelky praktický hlasový výcvik. Na základě individuálních instrukcí a výcvikového manuálu prováděly cvičení dechová, fonačně rezonanční, staccatová a kombinovaná relaxační, pro zlepšení artikulace a pro rozvoj techniky mluvního a zpěvního hlasu. Změny hlasové kvality byly vyhodnoceny pomocí měření DSI (Dysphonia Severity Index), zhodnocením subjektivního sebeposouzení PO a ana-

lýzou audiovizuálních záznamů i osobních výpovědí respondentek při pořizování hlasových snímků.

Klíčová slova: hlas, učitelky mateřských škol, hlasová hygiena, tréninkový program, hodnocení hlasu, Dysphonia Severity Index