

Hoarseness in School-Aged Children and Effectiveness of Voice Therapy in International Classification of Functioning Framework

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Summary: Objectives. The hoarseness in school-aged children disrupts the educational process because it affects the social progress, communication skills, and self-esteem of children. Besides otorhinolaryngological examination, the first treatment option is voice therapy when hoarseness occurs. The aim of the study was to determine the factors increasing the hoarseness in school-aged children by parental interview and to know preferable voice therapy on school-aged children within the frame of International Classification of Functioning (ICF).

Study Design. Retrospective analysis of data gathered from patient files.

Method. A total of 75 children (56 boys and 19 girls) were examined retrospectively. The age range of school-aged children is 7–14 years and average is 10.86 ± 2.51 . A detailed history was taken from parents of children involved in this study. Information about vocal habits of children was gathered within the frame of ICF and then the voice therapies of children were started by scheduling appointments by an experienced speech-language pathologist.

Results. The differences between before and after voice therapy according to applied voice therapy methods, statistically significant differences were determined between maximum phonation time values and s/z rate. The relationship between voice therapy sessions and s/z rate with middle degree significance was found with physiological voice therapy sessions. According to ICF labels, most of voice complaints are matching with “body functions” and “activity and limitations.”

Conclusions. The appropriate voice therapy methods for hoarseness in school-aged children must be chosen and applied by speech-language therapists. The detailed history, which is received from family during the examination, within the frame of ICF affects the processes of choosing the voice therapy method and application of them positively. Child’s family is very important for a successful management.

Key Words: School age–Child–Hoarseness–Voice therapy–ICF.

INTRODUCTION

Voice disorders can be classified as abnormal pitch, loudness, and/or vocal quality, which are the results of dysfunction of the larynx, the respiratory, and/or the vocal tract.¹ Hoarseness is a universally accepted sign of a voice disorder and a very frequent problem in school-aged children.

The incidence of voice disorders in school-aged children was reported as 2–23%.^{2,3} Kılıç et al³ revealed the voice pathology rate in school-aged children as 30%. In 17% of school-aged children, they could diagnose a pathology in the larynx by laryngoscopic and acoustic voice analyses.^{3–5}

Kahane and Mayo⁶ concluded that many children with voice disorders had never seen by a speech-language pathologist (SLP). They estimated that 2–4% of children with voice disorders had never seen by an SLP. School SLPs in the United States reported that 2–4% of their caseloads were constituted by children with voice disorders.^{7–9} Leeper¹⁰ stated that 38% of elementary school children had presented with chronic hoarseness. Numbers vary so widely because of lack of consistent

measurement techniques and variability in listener perceptual judgment.

In literature, there are limited studies on the voice therapy of school-aged voice disorders.^{2,3,7} The assessment and treatment of hoarseness in children are very important for physical, emotional, and psychosocial progress of children.^{3,7,8}

In the longitudinal study of prevalence of voice disorders, which was conducted by Powell et al, many school-aged children continued to present a voice disorder for 5 years after initial screening. More than half of those subjects showed voice severity ratings that were more severe than mild. Of 31 school-aged children in voice therapy for vocal nodules, 68% had reduced nodule size and 23% had normal larynges after 2 months of therapy. At the end of the fourth month, 84% had reduced nodule size and 65% had normal larynges.¹¹ Hoarseness in children must be treated during childhood. The therapeutic approach to hoarseness in children depends on the etiology and can be either medical, surgical, speech therapeutic, or combined.¹² A commonly held belief is that children are not aware of or not bothered by their voice disorder. This view is, however, challenged by the findings of Connor et al’s study. They made interviews with children with ages ranging between 5 and 18 years and revealed that dysphonic children were aware of and able to express their voice-related concerns.¹³ However, to refine the vocal assessment in children, parental view of hoarseness in children must be added to assessment procedure.

Parental questionnaires may help to understand vocal habits of children. The questionnaires have also been proven sensitive to posttherapy changes and are an additional and valuable tool in

Accepted for publication October 28, 2014.

This study was approved by Baskent University Institutional Review Board and Ethics Committee and supported by Baskent University Research Fund and received a grant (KA13/28) from Research Fund of Baskent University.

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Journal of Voice, Vol. 29, No. 5, pp. 618–623

0892-1997/\$36.00

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<http://dx.doi.org/10.1016/j.jvoice.2014.10.018>

the determination of therapeutic efficacy.¹⁴ The study of Connors et al was addressing the attitudes of children with dysphonia (5 to 18 years) and showed that children's complaints about their voice were not in full concordance with their parents' complaints (concordance varied between 33.3% and 100%)¹³ and that it was possible for children, already at a young age, to express themselves about the impact of their vocal disorder. These results indicate that children are a potential source for clinicians during evaluation of subjective impact of a dysphonia, and a combined child and parental questionnaires could also be of interest in the assessment of dysphonic children. Verduykt et al¹² replicated the study of Connor et al and found more emotional complaints in parents and more physical complaints in children.

Nevertheless, assessing a school-aged child with hoarseness together with subjective voice examination and the complaints of parents is thought to increase the success of therapy in school-aged children. Voice therapy programs for children must include an adult whether a parent, peer, teacher, or other significant listener in the child's life. To find an appropriate therapy method, a detailed history should be taken to evaluate child's voice previous to voice therapy.

To date, no study has been made with a large scale investigation of efficacy of any given therapy program in school-aged children.^{8,12} Also, none of the studies in the literature have detailed the voice therapy approaches that were used in school-aged children.

The voice therapy approaches are divided into three main categories¹⁵:

1. Hygienic voice therapy techniques: these therapy techniques are designed to improve behaviors that can lead to injury of the vocal folds.
2. Symptomatic voice therapy techniques: these therapy techniques are designed to treat abnormal voice quality.
3. Physiological voice therapy techniques: these therapy techniques are designed to optimize voice production.

In literature, the success or lack of success of a voice therapy has determined by different assessments of voice of the patients. Perceptual assessment of voice is performed by describing the voice of the patient solely by listening. Multiple systems of perceptual classification have been suggested by different authors such as the Buffalo Voice Profile, the Vocal Profile, and GRBAS scale (grade, roughness, breathiness, asthenia, and strain).^{16,17} There is no universally accepted method of perceptual evaluation. In fact, there are many protocols each with own strengths and weaknesses.¹⁶ A popular scheme, which has been adopted by the UK Royal College of Speech and Language Therapists for therapists working with voice difficulties, is the GRBAS Scale. It is not a complete perceptual evaluation protocol but specifically evaluates voice quality. It assesses: grade (the overall degree of voice abnormality), roughness, breathiness, asthenia (voice weakness), and strain. Each parameter is quantified on a four-point scale, where 0 = normal, 1 = mild, 2 = moderate, and 3 = severe. The GRBAS scale is a useful tool in monitoring voice therapy efficacy in pediatric population.¹⁸

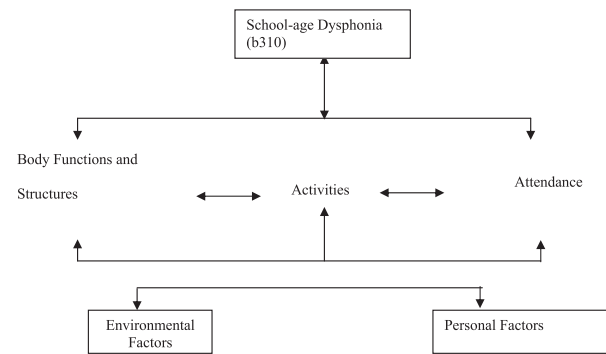


FIGURE 1. ICF's conceptual frame.

The use of s/z ratio as an indicator of laryngeal pathology was first proposed by Eckel and Boone in 1981. In this procedure, the length of time that a person can sustain the sound "sss" and the length of time that a person can sustain the sound "zzz" were measured. Then, results were divided to obtain a numerical ratio. The higher the ratios, the greater the possibility of a patient is experiencing difficulty with phonation (eg, vibrating the vocal folds to produce so-called voiced speech sounds such as vowels and voiced consonants such as "b", "d," and "g").^{18,19}

MPT (maximum phonation time) is the maximum time (in seconds) that a person can sustain a vowel sound, which was produced in one deep breath at a relatively comfortable pitch and loudness. Best of three attempts at sustaining a vowel is used as the person's MPT.¹⁹ Like the s/z ratio, this is a quick and simple aerodynamic measurement. Because it is noninvasive and requires no special equipment, it can be readily used in a variety of settings. To date, many researchers have used this measurement with a variety of vowel sounds, the most commonly being "ah," "ee," and "oo."¹⁹

Several instruments have been used in literature to measure voice quality in children.²⁰ The International Classification of Functioning (ICF) compose a common and standard language to evaluate and understand situations about health (Figure 1).²¹ ICF belongs to international classification family and was developed by World Health Organization in many aspects of medicine. It uses a standard and common language in worldwide communications between different disciplines and health.²¹ ICF may also be used in school-aged children who have voice problem.

The aim of this study was to determine increasing factors of hoarseness in school-aged children by parental interview and to know preferable voice therapy in school-aged children within the frame of ICF.

TABLE 1.
Demographics of School-Aged Children

Gender	Quantity (n)	%	Age (year)
Girl	14	26.4	10.5
Boy	39	73.6	11
Total	53	100	10.86

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