

Characteristics of Euphony in Direct and Indirect Mucosal Wave Imaging Techniques

*Paulina Krasnodębska, *†Agata Szkiełkowska, *Beata Miaśkiewicz, and *†Henryk Skarżyński, *‡Warsaw, Poland

Summary: Objectives. There is a necessity to include objective methods to the study protocol of voice. Such procedure will help not only in diagnosing and monitoring the course of treatment, but also in comparing the results of studies between research centers.

Methods. Vocal fold mucosal wave characteristics of 70 healthy people were made using videostrobokymographic open quotient (VSK_{OO}) and electroglottographic quasi-open quotient (EGG_{QOQ}).

Results. Statistically significant differences were achieved regarding gender for the averaged values of VSK_{OO} as well as for values calculated from the posterior part of the vocal folds. A statistically significant correlation between the value of VSK_{OO} and age was observed for the posterior part of the glottis. Differences between gender and the value of EGG_{QOQ} were observed. No statistically significant correlation between EGG_{QOQ} and age was obtained.

Conclusions. VSK_{OO} and EGG_{QOQ} are parameters characterizing glottal function in a coherent manner. These parameters can be included easily in phoniatic examination and help to objectify glottal function.

Key Words: Vocal cords–Stroboscopy–Videostrobokymography–Electroglottography–Open quotient.

INTRODUCTION

Most of the tools used in phoniatic examination are subjective and depend on the researcher's experience. In accordance with the recommendations of the International Association of Logopedics and Phoniatrics,¹ relying only on examiner's visual and auditory assessment is insufficient. It is necessary to include simple and widely available objective methods to the study protocol of voice. Most visualizing techniques are dependent on the competence and experience of the researcher.² The procedure will help not only in diagnosing and monitoring the course of treatment but also in comparing the results of studies between research centers. In everyday otolaryngologic and phoniatic practice, laryngovideostroboscopy (LVS) plays a key role. A combination of this method with noninvasive electroglottography (EGG) is the concept of this work. The aim of this research was to develop the normative parameters of glottal function, using the mentioned direct and indirect methods of mucosal wave imaging. The second aim was to correlate parameters in terms of gender and age because there is a lack of precise data in the literature concerning normative parameters of the vocal folds' mucosal wave.

MATERIAL AND METHODS

The material of the work included healthy volunteers who gave written permission to participate in the research. The subjects were nonsmokers, nonprofessional voice users without vocal complaints. The study design was approved by the Bioethics Committee at the Institute of Physiology and Pathology of Hearing in Warsaw

(IFPS:/KB/07/2013). Only people with euphonia were included in the study. Euphonia is defined as voice with good sound quality that is produced without effort or discomfort.³ Volunteers were subjected to auditory-perceptual assessment of voice independently by the three authors. The assessment included the evaluation of average speaking pitch, voice onset and offset, the ability to enhance the voice, presence of hoarseness, and GRBAS (Grade, Roughness, Breathiness, Asthenia, Strain) scale.⁴ A total of 70 people, assessed as having normal voice quality, were included in this study. All patients within the study group had only 0 values in the GRBAS scale, first three authors independently assessed the voices as G0R0B0A0S0. The group was balanced in terms of gender and age.

In the study, each patient had undergone otolaryngologic and phoniatic examinations. From the methods imaging mucosal wave of the vocal folds the following were chosen: LVS as a direct and EGG as an indirect method.⁵ The examinations allow to obtain objective numerical values of the glottal cycle. The parameters are open quotient (OQ), measured from kymograms based on LVS recordings (videostrobokymography [VSK]) and quasi-open quotient (QOQ), measured from EGG.

LVS and EGG were conducted, recorded, and archived using an EndoSTROB DX (Xion Medical GmbH, Berlin, Germany) device with *DIVAS Software* (Xion Medical GmbH, Berlin, Germany). Individuals were recorded during prolonged, comfortable phonation of [e:]. Kymograms were made from LVS recordings, from the anterior, middle, and posterior third of the membranous portion of the glottis (Figure 1 and Figure 2). *DIVAS Software* calculated VSK_{OO} from a selected cycle on a kymogram. From the recorded electroglottogram, *DIVAS Software* calculated EGG_{QOQ} and sound pressure level decibel (SPL dB) for each cycle of the glottis (Figure 3). Middle fragment of the most regular-shaped EGG recording was analyzed. The values of EGG_{QOQ} and the values of SPL dB were averaged from 20 consecutive cycles, from the middle of the EGG recording.⁶ There are no reports in the literature, concerning vocal fold mucosal wave characteristics using videostrobokymographic open quotient (VSK_{OO}) and electroglottographic quasi-open quotient (EGG_{QOQ}).

Accepted for publication August 31, 2016.

The work was done in the Audiology and Phoniatrics Clinic of the Institute of Physiology and Pathology of Hearing, Warsaw, Poland. The Institute of Physiology and Pathology of Hearing covered all expenses incurred during the study.

From the *Audiology and Phoniatrics Clinic, Institute of Physiology and Pathology of Hearing, Warsaw, Poland; and the †Audiology and Phoniatrics Faculty, Fryderyk Chopin University of Music, Warsaw, Poland.

Address correspondence and reprint requests to Paulina Krasnodębska, Audiology and Phoniatrics Clinic, Institute of Physiology and Pathology of Hearing, 05-830 Kajetany, Mokra str. 17, Warsaw, Poland. E-mail: p.krasnodębska@ifps.org.pl

Journal of Voice, Vol. 31, No. 3, pp. 383.e13–383.e18

0892-1997

© 2017 The Voice Foundation. Published by Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jvoice.2016.08.021>

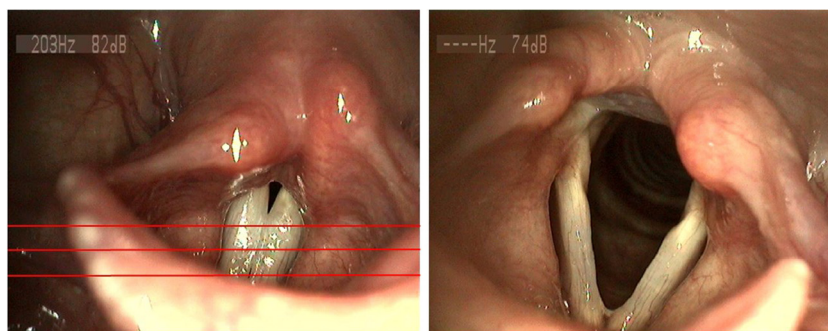


FIGURE 1. LVS view of a fully closed and open glottis of a 37-year-old woman. From the material of the Institute of Physiology and Pathology of Hearing.

For statistical analysis of parameters obtained in the work, the following tests were used:

- (a) Chi-square test, to examine relations between gender and irregularities in LVS.
- (b) Mann-Whitney test, to examine the relations between gender and values of the parameters and age, irregularities in LVS and age or fundamental frequency (F_0).
- (c) Significance test, Pearson correlation and Spearman correlation, to examine the relation between values of

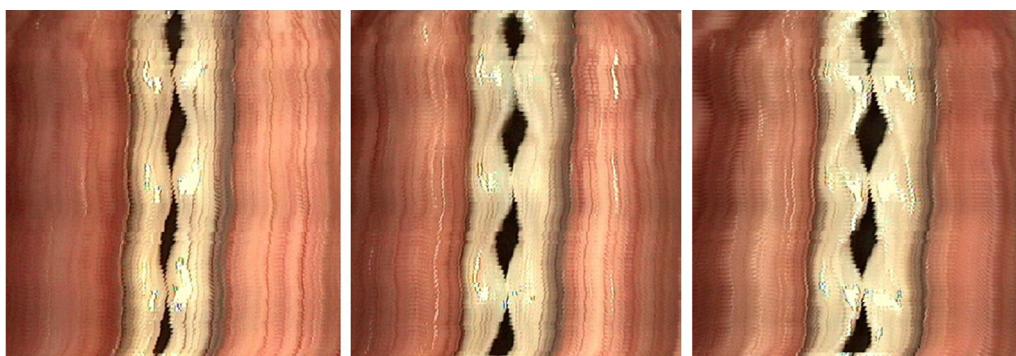


FIGURE 2. Kimograms made from laryngovideostroboscopic recording of a 37-year-old woman. VSK_{OQ} calculated from the anterior part of vocal folds was 0.62, from the middle part 0.55, and from the posterior part 0.64. From the material of the Institute of Physiology and Pathology of Hearing.

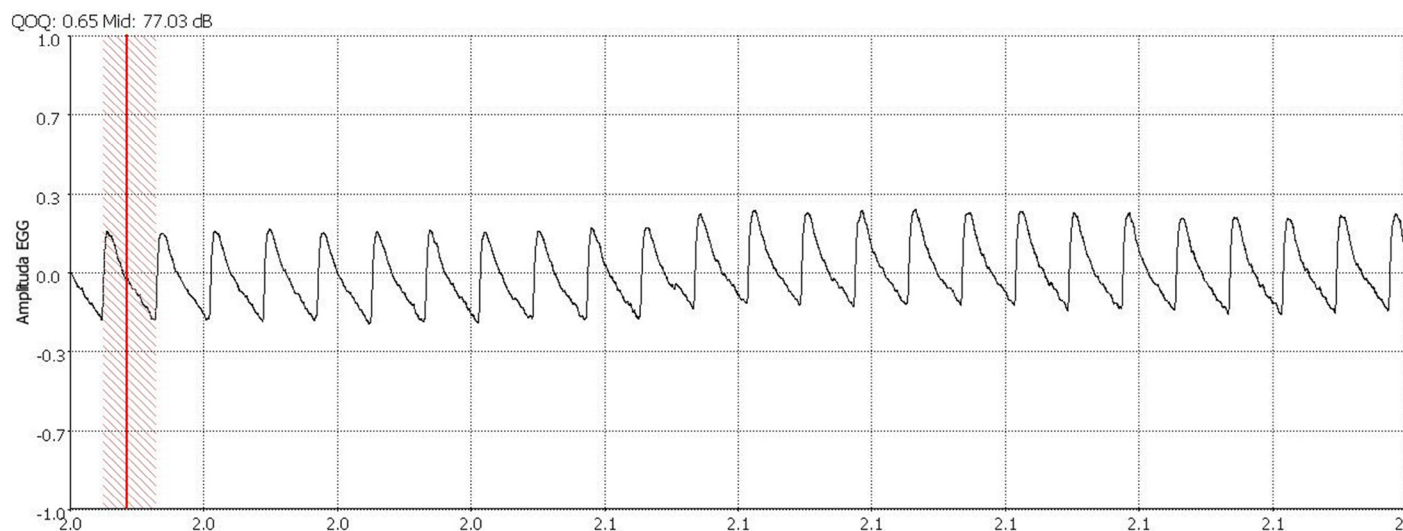


FIGURE 3. Electroglottogram of a 37-year-old woman. EGG_{QQQ} and SPL dB were calculated for each single glottal cycle. From the material of the Institute of Physiology and Pathology of Hearing.

Download English Version:

<https://daneshyari.com/en/article/5124260>

Download Persian Version:

<https://daneshyari.com/article/5124260>

[Daneshyari.com](https://daneshyari.com)