

Ref#: BS10

Heterozygous Abnormalities of the Elastin Gene (ELN) Effect Vocal Fold Structure

The purpose of this study was to investigate the effects of a heterozygous elastin gene (ELN) abnormality on the structural characteristics of the vocal fold lamina propria using a mouse model of human disease. Six mice, four with heterozygous ELN deletions (ELN +/-) serving as an animal model for the human disease Supravalvular Aortic Stenosis (SVAS), and two normal wild type controls (ELN +++) were utilized for this study. Vocal folds were obtained from each animal and stained for the protein elastin using histochemical methods. Qualitative visual inspection of the vocal fold lamina propria revealed greater staining density (e.g., a greater quantity) for elastic fibers in the ELN +/+ animals, and marked differences in the overall thickness of the lamina propria (thicker in ELN +/+). Quantitative measurements using digital pixel analysis of staining density confirmed these findings, suggesting that ELN requires two functioning alleles for normal structural development of the vocal fold lamina propria. This evidence supports the hypothesis of a structural etiology causing altered vocal function in humans with a similar genotype.

Christopher R. Watts, Ph.D., Chair & Associate Professor, Dept. of Communication Sciences & Disorder, Texas Christian University, 3305 West Cantey, Fort Worth, TX, 76129, (817) 257-7620, c.watts@tcu.edu

Just a Moment: A Study of the Characteristics of Spectral Moments in Normal Speakers

The moments of the spectral distribution have been reported to describe changes in the acoustic spectral of persons with voice disorder. There are few data reported about the characteristics of these moments in normal speakers. The purpose of this study was to investigate the changes, if any, that occur when normal speakers produce different kinds of phonation, i.e., vowels or sentences and what changes may occur when speakers vary the pitch and loudness of their phonations.

15 females and 15 males produced four vowels (/ɒ/. /æ/, /i/ and /u/), two sentences at their most comfortable pitch and loudness levels. In addition, a smaller sample of speakers (5 M and 5F) produced the vowel /ɒ/ at a low and high pitch level relative to their comfortable pitch and at soft and loud levels at their most comfortable pitch level.

The phonation were recorded and edited using Praat (Ver 5.1.18). Using an automated script, the first four moments (mean, standard deviation, skewness and kurtosis) of the LTAS frequency spectra of each phonation were analyzed.

The data were analyzed using a Repeated Measures ANOVA design. The results suggest that there are no statistically significant differences between males and females, but significant differences among the various phonation types. We will also report on the analysis of the phonations produced at different pitches or loudnesses.

Raymond H Colton, Ph.D., Professor Emeritus, Syracuse University, 805 S. Crouse Ave.,
Syracuse, NY, (315) 637-3883, rcolton1@twcny.rr.com

Soren Lowell, Ph.D., Assistant Professor, Syracuse University, 805 S. Crouse Ave., Syracuse,
NY, (315) 443-9648, slowell@syr.edu

Richard Kelly, M.D., Assistant Professor, SUNY Upstate Medical University, 750 E. Adams St.
Syracuse, NY, (315) 464-7336, kellyr@upstate.edu

What About the “Actor’s Formant” In Actresses Voices?

Master S., Madureira S.

The aim of this research was to compare, thorough acoustic analysis, the voices of actresses and non-actresses, to verify the existence of the "actor's formant" and / or the strategies used to produce the stage voice. In this study, 30 actresses and 30 non-actresses read a text in habitual and loud levels. The programs used for acoustic analysis were the CSL 4500 and the Praat 5.0. The measured variables were the mean sound pressure level (SPL) and fundamental frequency (F0) and, at the long- term average spectrum (LTAS), the alpha ratio, the difference L1 - L0, the frequency and amplitude of the actor's formant, and the SPL of 30 points over the frequency range 0 - 5 kHz. The results showed significant differences between groups for F0, that was lower for the actress in both normal and loud levels loudness, and the difference L1-L0 in loud level, when actresses showed lower values. Comparing the LTAS in both levels, we found no evidence of an "actor's formant" in the spectrum of actresses, or significant differences between the SPL of the measured frequency points. Still, no significant differences between groups were find for the mean SPL and for the alpha ratio. Thus, it is likely that the projection of voice in this group of actresses, at least in loud level, is characterized by a laryngeal setting where a low F0 provides low muscular tension and weakly glottal adduction evidenced by the difference L1-L0, for the same SPL and alpha ratio.

Suely Master, PhD, Phonoaudiology (Speech Therapist), Arts Institute – UNESP, Rua Dr Bento Teobaldo Ferraz, 271. 01140-070, São Paulo - SP. Brasil, (5511)83398589,
suely.master@uol.com.br

Sandra Madureira, PhD, Linguistic, Pontifícia Universidade Católica de São Paulo - PUC SP
R. Monte Alegre 984. 05014-001, São Paulo, SP – Brasil, (5511) 36708374, madusali@pucsp.br

No Title Submitted

Animal research in dogs, rabbits, and rats has provided insights into vocal fold healing and response to treatments for vocal scar. The porcine larynx is very similar in size and structure to that of humans, with very loose connective tissue in the superficial layer of the lamina propria. To assess the pig as a model for studying vocal scar, we compared the plane of surgical dissection in the mucosa of 4 porcine vocal folds to that in 8 human cadaver larynges, by excising a 1cm² section of epithelium, using microscissors. In half the vocal folds, the tips of the scissors were directed upwards, to dissect as superficially as possible. In others, the intent was to elevate a section as thick as possible. Excised epithelium was sectioned and stained for histologic examination. The plane of dissection was quite similar porcine and human larynges, in both dissection groups, occurring within the loose layer of the superficial lamina propria. We also compared healing of porcine vocal folds after elevation and replacement of an epithelial flap, versus excision of epithelium. After six weeks, larynges were harvested for histologic examination. There was no significant difference between the mucosa of the normal vocal fold and that of the healed microflap. However, after healing of epithelial excision, the average thickness of lamina propria was 302 micrometers, versus 864 micrometers for the normal fold ($p<.05$). We propose to use the porcine model to test novel treatments for vocal fold scar.

Amit Data, MD, Resident, Southern Illinois University School of Medicine, PO BOX 19662, Springfield, Illinois, 62794-9662, (217) 545-3833, adate@siumed.edu

Gayle Woodson, MD, Professor and Chair of Otolaryngology, Southern Illinois University School of Medicine, PO BOX 19662, Springfield, IL 62794-9662, (217) 545-3833, gwoodson@siumed.edu

Ref#: BS14

Whistle Voice in Humans and Rocky Mountain Elk

Ingo R. Titze, National Center for Voice and Speech, University of Utah and University of Iowa

There has been much wonderment and speculation about mammals (including humans) who produce a whistle-like voice well above their normal vocalization range. Stress-strain analysis on human and Rocky Mountain elk ligament tissue in the vocal folds suggests that extremely high F0 is possible and that self-sustained oscillation of the vocal folds can be maintained with vocal tract interaction. The interaction is favorable when fundamental frequency F0 is near the formant frequency F3. This produces impressive whistle voice around in the range of 2000-4000 Hz for humans and in the range of 600-1500 Hz for elk bugle. Some examples of live calls and simulated sounds will be given. (Work supported by NIDCD)

Ingo R. Titze, Ph.D., Director, National Center for Voice and Speech, University of Utah, University of Iowa, (720) 217-6512, ingo.titze@utah.edu

*Oral presentation for the Voice Foundation's 39th Annual Symposium:
Care of the Professional Voice, 2010*

Guidelines for Selecting Microphones for Human Voice Production Research

Jan G. Švec & Svante Granqvist

There has not been enough information published on which microphones are and which are not suitable for voice measurements. In this study we address the most basic parameters the frequency response, dynamic range, and directional characteristics of the microphones. We argue that the frequency response of the microphones shall be flat (i.e., less than 2 dB variation) within the frequency range between the lowest expected fundamental frequency of voice and the highest component of the voice spectrum of interest. The equivalent noise level of the microphones is recommended to be at least 15 dB lower than the sound level of the softest phonations produced. As the softest voice level is approximately 40 dB(A) re 20 micropascals at 30 cm, the noise level of the microphones is expected to be below 25 dB(A) when used at the distance of 30 cm. The upper limit of the dynamic range of the microphone shall be the same or higher as the sound level of the loudest phonations. In shouting and in operatic singing these levels can reach approximately 130 dB at 30 cm from the mouth. When head-mounted microphones are used, levels up to c. 145 dB can be expected at 5 cm from the mouth. In case of directional microphones, their placement shall be at the distance that corresponds to maximally flat response of the microphone in order to avoid the proximity effect. If this distance is not known, a directional microphone is considered unsuitable for SPL and spectral measurements.

The study was supported by the Grant Agency of the Czech Republic, project GACR 101/08/1155 and by the Wenner-Gren Foundation in Sweden. The research was supported also by the COST Action 2103 „Advanced Voice Function Assessment“.

Addresses:

Jan G. Švec, PhD, Palacky University Olomouc, Faculty of Science, Department of Experimental Physics, Laboratory of Biophysics, tr. 17. listopadu 12, 771 46 Olomouc, the Czech Republic, +420 585 63 4171, svecjan@vol.cz or jan.svec@upol.cz

Svante Granqvist, PhD, Royal Institute of Technology, Speech, Music and Hearing, Lindstedtsvägen 24, S-100 44 Stockholm, Sweden, +46-8-790 75 61, svante@speech.kth.se

Analysis of Laryngeal Deformation Properties of Excised Human Vocal Folds

B. Huettner, D. A. Berry, C. Bohr, M. Doellinger

Introduction

Dynamics of the human vocal folds during phonation are often simulated by artificial silicon models. To enhance their potential clinical significance, the material parameters and geometries of these artificial vocal folds must be similar to their human counterparts. In this work, we propose a static tensile test to measure local elasticity properties of human vocal fold tissues.

Method

Three excised human hemi-larynges (sagittal-cut) are investigated. Via sutures and attached weights, the vocal fold is exerted vertically upwards. To detect the deformations, 30 position markers are sewn along the vocal fold surface. The markers of the most upper row serve as working points for forces and were either sewn into the epithelium or muscle. A rectangular prism and a camera simulate stereoscopic imaging. The 3d-marker coordinates are obtained through triangulation. Thereto, their respective 2d-coordinates in the two images are extracted. For calibration, a brass cube is glued to the prism.

Results

All vocal folds showed identical deformation characteristics: a linear range for small forces (<0.2N), ultimately followed by saturation (~0.5N). We observed a decrease in elasticity from posterior to anterior down to 45% of maximal displacement. We measured a maximal deformation of approximately 6mm when applying a mass of 100g.

Conclusion

The presented method shows local varieties in elasticity of human vocal folds. The data is used to create artificial vocal folds with more realistic material and geometric properties. For further improvements the setup is dismantled to allow vertical pulling.

Björn Hüttner, MSc, Post Graduate Assistant, University Hospital Erlangen, Dept of Phoniatrics and Pediatric Audiology , Bohlenplatz 21, 91054, Erlangen, Germany, +49-9131-85-32603,
bjoern.huettner@uk-erlangen.de

David A. Berry, Ph.D., Professor and Director, Laryngeal Dynamics Laboratory, UCLA Division of Head & Neck Surgery, 1000 Veteran Ave., Suite 31-24, Los Angeles, CA 90095-1794, (310) 206-5043,
daberry@ucla.edu

Christopher Bohr, MD, ENT Physician, University Hospital Erlangen, Hospital for ENT Medicine, Waldstrasse 1, 91054, Erlangen, Germany, +49-9131-85-33156, christopher.bohr@uk-erlangen.de

Michael Doellinger, PhD, Professor, Department for Phoniatrics and Pediatric Audiology, University Hospital Erlangen, Bohlenplatz 21, Erlangen, Germany, +4991318533814, michael.doellinger@uk-erlangen.de

Pitch Strength of Normal and Dysphonic Voices

Rahul Shrivastav, David Eddins, Supraja Anand

Background: Two sounds with equal pitch may still vary in the saliency of their pitch sensation. This perceptual attribute is called “pitch strength.” For example, a 500-Hz pure tone and a narrow band noise centered around 500 Hz have the same pitch, but the noise evokes a weaker pitch sensation and thus has a lower pitch strength. It has been speculated that pitch strength may play a role in the perception of voice quality. However, no empirical data on pitch strength for normal or dysphonic voices exists.

Purpose: This study attempted to determine how pitch strength varies across normal and dysphonic voices.

Methods: A set of voices (vowel /a/) varying their voice quality were selected from the Kay Elemetric Disordered Voice Database. Ten listeners were recruited to participate in a listening test and were asked to estimate the pitch strength of these stimuli in an anchored magnitude estimation task. On a given trial listeners heard three different stimuli. The first stimulus represented very low pitch strength (wide-band noise), the second stimulus consisted of the target voice and the third stimulus represented very high pitch strength (pure tone). Listeners assigned the target voice a pitch strength score by assigning a number by positioning a continuous slider labeled with values between 0 and 1, reflecting the two anchor stimuli.

Results: Results show how pitch strength varies as a function of voice quality. Data will be considered in terms of talker characteristics and will be compared to pitch strength of other complex sounds.

Rahul Shrivastav, Ph.D., Assoc. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3710, rahul@ufl.edu

David A. Eddins, Ph.D., Associate Professor, University of Rochester, 2365 S. Clinton Avenue, Suite 200, (585) 758-5628 (ext. 283), David_Eddins@URMC.Rochester.edu

Supraja Anand, M.Sc., Doctoral Student, University of Florida, Dauer Hall, PO Box 117420, Gainesville FL 32611, (352) 273-3711, savoice@ufl.edu

Predictions of Rough Voice Quality with a Temporal Modulation Filter Bank Model

David A. Eddins, Rahul Shrivastav, Savyasachi Singh

Background: It is desirable to have precise quantitative methods for estimating the nature and degree of dysphonia in pathological voices. Recent work has focused on the development of psychophysical methods that minimize the biases and maximize reliability and agreement of listener judgments of the roughness of dysphonic voices. Psychophysical matching techniques coupled with an acoustically relevant reference stimulus achieve these goals and provide ratio-level data required for detailed evaluation of the predictive methods to be developed.

Purpose: To develop and implement a computational framework for quantifying roughness in dysphonic voices that provides valid and reliable predictions of roughness from acoustic samples. Benchmark measures are based on a “fixed matching” psychophysical design that yields a psychometric function for each voice sample relating temporal modulation depth (amplitude in dB) to perceived roughness.

Methods: Quantification of roughness was achieved by adapting a biophysically-based temporal modulation filter bank (TMFB) model used extensively to model the perception of temporal features of speech and non-speech sounds. Model structure includes a cochlear filterbank, followed by a TMFB consisting of adjacent filters tuned to successively higher temporal modulation frequencies. Subsequent stages represent cochlear non-linearities and internal noise. Parameters of the decision stage were adjusted to predict the psychometric data collected from ten participants.

Results: The ability of the model to accurately predict mean data as well as variability among listeners will be discussed. Model predictions will be compared to psychophysical data and accuracy will be estimated in terms of magnitude of error and correlation.

David A. Eddins, Ph.D., Associate Professor, University of Rochester, 2365 S. Clinton Avenue, Suite 200, (585) 758-5628 (ext. 283), David_Eddins@URMC.Rochester.edu

Rahul Shrivastav, Ph.D., Assoc. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3710, rahul@ufl.edu

Savyasachi Singh, M.S., Doctoral Student, University of Florida, Dauer Hall, PO Box 117420, Gainesville, FL, 32611, (352) 273-3711, savya2u@ufl.edu

The Effect of Training on Passaggio Transition Gestures

Richard J. Morris, David Okerlund & Donald G. Miller

Two trained female singers in a study by Miller and Schutte (2005) used different techniques to sing through the passaggio as detected via electrogottography (EGG) and spectral output. The passaggio of one was characterized by an abrupt shift in the EGG signal and a relatively constant output spectrum indicating vocal tract adjustments. The passaggio of the other was characterized by gradual changes in the EGG signal and a more varying output spectrum. The pattern used to sing through the passaggio by developing singers is not known. The purpose of this study is to use EGG and power spectra to evaluate the effect of vocal training on singing through the passaggio.

The participants included three groups of four female singers each: undergraduate, graduate, and faculty/professional. Each participant was directed to sing ascending to descending scales of the vowels [a:] and [o:] at a comfortable *mezzoforte* level. Scales of each vowel were sung three times beginning at the pitch A3 and ending at the pitch A4. After singing the scales, the participant was directed to sustain an [æ:] vowel at a comfortable *mezzoforte* level for 10 seconds. The pitch used for the sustained was a pitch within the frequency range of her passaggio. Each participant was directed to sing the first five seconds in chest register and then shift to the middle register for the last five seconds. Results will be discussed in terms of laryngeal and vocal tract contributions to passaggio changes.

Richard J. Morris, Ph.D., Professor, Florida State University, 127 Honors Way, Tallahassee, FL 32306-1200, (850) 644-8459, rmorris@fsu.edu

David Okerlund, B.M., M.M. Voice Performance, Director of Graduate Vocal Pedagogy, Assistant Professor of Voice, Florida State University, 132 N. Copeland Ave, (850) 645-6821, dokerlund@fsu.edu

Donald G. Miller, Ph.D., Professor, Groningen Voice Research Laboratory, University Medical Center Groningen, Antonius Deusinglaan 1, NL-9713 AV, Groningen, The Netherlands, +31 50 363 2688, d.g.miller@vocevista.com

**Acoustic Properties of the Vocal Source and the Vocal Tract: Are They
Perceptually Orthogonal?**

Complex perceptual phenomenon can often be decomposed into multiple perceptually separable dimensions, in the case of visual stimuli, one example is color and shape. However, theoretical dimensions are not always perceptually separable. Hue, for example, consists of color and gray shading, however these two dimensions are not perceptually separable, but rather integral. Because speech has long been considered a linear system with two major components, voice sound source and vocal tract filter, researchers often assume that the acoustic dimensions associated with the source are perceptually separable from the acoustics dimensions associated with the filter. This may not be the case in any or all situations and may partially explain the difficulty in correlating some acoustic dimensions with perceptual findings. This study tests the perceptual separability of two dimensions of voice quality, voice source slope and vocal tract filter resonance frequencies, using synthetic stimuli on the vowel “ah” that systematically vary source slope from -10 dB/octave to -18 dB/octave and vocal tract resonances from those typically seen in female voices with longer vocal tracts to those typically seen in female voices with shorter vocal tracts (i.e., mezzo-sopranos versus sopranos) at the following pitches: A3, C4, B4, and F5. Listeners are being asked to rate all possible pairs of stimuli for degree of dissimilarity. Separate multidimensional scalings will be performed to determine the degree of orthogonality of the two dimensions at each pitch.

Molly Erickson, MM, MA, Ph.D., Associate Professor, Dept of Audiology and Speech Pathology, University of Tennessee, Health Sciences Center, 578 S. Stadium Hall, (865) 974-9895, merickso@utk.edu

Acoustic Parameters Critical for an Appropriate Vibrato

Supraja Anand, Rahul Shrivastav, Judith Wingate, Brenda Smith

Background: A plethora of studies have investigated the acoustic characteristics of vibrato including the rate of fundamental frequency (f0) modulation, extent of f0 modulation, onset (Time from initiation of phonation until the first peak of vibrato). An f0 modulation rate of 4.5 Hz to 7.5 Hz is generally considered acceptable. Perceptual studies reveal that periodicity and onset had higher correlation to appropriate vibrato quality than rate and extent (Eklohm et al., 1998; Diaz & Rothman, 2003). Despite extensive research on vibrato parameters, there is not a clear cut definition on what features constitute an ideal vibrato due to methodological differences between these studies.

Purpose: The present study determined the psychophysical functions that relate mean f0, f0 modulation frequency and f0 modulation depth to the quality of vibrato.

Method: Phonation samples of 8 music majors singing in their comfortable low, middle and high pitches were obtained. A high fidelity vocoder (STRAIGHT; Kawahara, 1997) was used to manipulate the f0 modulation frequency and the f0 modulation depth for these contours, resulting in 600 stimuli (8 singers x 3 pitches x 5 modulation frequencies x 5 modulation depths). Ten listeners (5 experts and 5 students) classified the samples as “Appropriate” or “Inappropriate” based on their perception vibrato for the opera singers of today.

Results: Perceptual tests are ongoing and results will show how the perceived quality of vibrato varies with changes in mean f0, f0 modulation frequency and f0 modulation depth.

Supraja Anand, M.Sc., Doctoral Student, University of Florida, Dauer Hall, PO Box 117420, Gainesville FL 32611, (352) 273-3711, savoice@ufl.edu

Rahul Shrivastav, Ph.D., Assoc. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3710, rahul@ufl.edu

Judith M. Wingate, PhD, Clinical Associate Professor, University of Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3737, wingate@ufl.edu

Brenda Smith, BM, MM, DMA, Associate Professor of Music, University of Florida, P.O. Box 117900 Gainesville, FL 32611-7900, (352) 374-4855, gesang@ufl.edu

Singing Voice during and After Pregnancy - A Longitudinal Case Study

Filipa M. Lã, Department of Communication and Arts, INET-MD, University of Aveiro, Portugal
Johan Sundberg, Department of Speech, Music and Hearing, School of Computer Science and Communication,
KTH, Stockholm, Sweden

Abstract

Previous research found a relation between hormones and voice quality; however, the degree and type of this relationship is poorly understood, particularly regarding singing. Singers' performances can be affected by contraceptive pills and by changes in concentrations of sex steroid hormones during the menstrual cycle (Lã *et al.*, 2007). Pregnancy shows greater variation in concentrations of these sex hormones and more significant tissue modifications (e.g. cervix) than the menstrual cycle. According to previous studies, a significant correlation between cervical and vocal fold smears exists (Abitbol *et al.*, 1999, 2000); hence, the singing voice can also be affected during pregnancy. Changes in the mechanical properties of the cervical tissue during pregnancy might also occur in laryngeal tissues, affecting conditions for phonation with respect to vocal fold motility and voice timbre.

Twenty-four weekly recordings of audio, electrolaryngograph, oral pressure and air flow signals were made of a classical singer, before birth (*Prae*), 48 hours after birth (*At*), and during 11 subsequent weeks (*Post*). A Lied and a diminuendo sequence of the syllable [pa] were performed. LTAS alpha ratio was analysed of the Lied; phonation and collision threshold pressures (PTP and CTP) were determined from the oral pressure (Enflo and Sundberg, 2009); the flow signal was inverse filtered to compute normalised amplitude quotient (NAQ).

Pregnancy was associated with greater week-to-week variation and higher alpha; higher PTP and CTP; and lower NAQ. This suggests that pregnancy affects both biomechanical vocal fold properties and voice production conditions.

Filipa Lã, PhD, Lecturer, Department of Communication and Arts, INET-MD, University of Aveiro, Campus Universitario de Santiago, Aveiro, Portugal, filipa.la@ua.pt

Johan Sundberg, PhD, Professor, Speech Music Hearing, School of Computer Science and Communication, TMH/KTH, SE-10044, Stockholm, pjohan@speech.kth.se

How Many Frames per Second are Necessary when Using High-Speed Videoendoscopy in Voice Assessment?

**Dimitar D. Deliyski, Terri Treman Gerlach, Habib J. Moukalled,
Kimberly S. Hufnagel, Shannon R. Batson**

Abstract

The lack of practical guidelines is one of the main factors delaying the clinical implementation of high-speed videoendoscopy (HSV) for voice assessment. In particular, the insufficient frame rates of current HSV systems have been shown to bias clinically-relevant features. The purpose of this study was to investigate how the HSV frame rates relate to visually-observed degradation in clinically-relevant vocal-fold vibratory characteristics.

Fourteen patients and fourteen vocally-normal speakers were recorded using HSV at 16,000 frames per second (fps) as they produced the vowel /i/ sustained at habitual pitch and loudness, and at higher pitch. The following vocal-fold vibratory features with known vulnerability to the camera speed were studied: mucosal wave magnitude and extent; amplitude and phase asymmetry; glottal area aperiodicity; glottal edge roughness; realization and loss of vocal-fold contact; and mucus bridges breaking at opening. One habitual- and one high-pitch sample were taken from two male and two female subjects selected from the dataset that best represented each vibratory feature. The selected 16,000 fps samples were then downsampled fully emulating the characteristics of the camera at sixteen lower-rate denominations. Using custom-designed software, four raters visually reported for each feature (total 4,608 ratings) the frame rates at which: (1) a difference between the original and degraded samples was first noticed; and (2) the feature disappeared or became hard to visually rate.

The results elucidate on the optimal and minimum recommendations for HSV technology in the clinical settings, relating the frame rate requirements to the clinical protocol, in particular to the pitch produced.

Dimitar D. Deliyski, Ph.D., Associate Professor, Director Voice and Speech Lab, University of South Carolina, Communication Sciences and Disorders, 1621 Greene Street, 6th floor, Columbia, SC 29208, (803)777-2245, ddeliyski@sc.edu

Terri Treman Gerlach, Ph.D. CCC-SLP, Director Voice & Swallowing, Charlotte Eye Ear Nose and Throat Associates, 6035 Fairview Road, Charlotte, NC 28210, (704)295-3348, tgerlach@ceenta.com

Habib J. Moukalled, M.S., Doctoral Student, University of South Carolina, Computer Science and Engineering, 315 Main Street, Columbia, SC 29208, (864)201-7511, chronofurb@gmail.com

Kimberly S. Hufnagel, B.S., Master Student, University of South Carolina, Communication Sciences and Disorders, 1621 Greene Street, 6th floor, Columbia, SC 29208, (586)524-9498, kim.hufnagel@gmail.com

Shannon R. Batson, B.S., Master Student, University of South Carolina, Communication Sciences and Disorders, 1621 Greene Street, 6th floor, Columbia, SC 29208, (864)386-0783, shannon.batson@gmail.com

Phonetic and Linguistic Features Adaptation during Voice Imitation

J Revis, J Abitbol, A Giovanni

Voice imitation of a famous character results in detection and reproduction of some vocal features, including not only spectral characteristics but also prosody, speech flow or articulatory patterns.

In the frame of our works on perceptual analysis, we decided to study several French impersonators performance during an imitation of the former president Jacques Chirac whose speech flow and prosodic characteristics seemed to be the more recognizable. 3 impersonators tried to reproduce as exactly as possible a speech really given by Jacques Chirac in 1998. Our study focused on the impersonators adequation with the target speaker in terms of voice quality, pitch register, prosody (intonation and phrasing) and speech style (tempo, rhythm and articulation). We used the Adoreva software which is a Praat freeware plug-in. Results will be presented.

Assuming that perception cannot be considered as independent from production, we believe that this experimental paradigm of phonetic and linguistic features will open to wide perspectives in perceptual analysis.

Joana Revis, PhD, Speech Pathologist, Laboratoire Parole et Langage, LAPEC - Fédération ORL CHU, Timone 264, rue Saint Pierre , MARSEILLE Cedex 5 France, +33 6 81 13 98 03,
joana.revis@univmed.fr

Jean Abitbol, MD, j.abitbol@gmail.com

Antoine Giovanni, MD, PhD, Laboratoire Parole et Langage, LAPEC - Fédération ORL CHU Timone, 264 rue Saint Pierre, MARSEILLE Cedex 5 France, +33 4 91 38 60 69,
antoine.giovanni@mail.ap-hm.fr

Interpreting vs. Describing: The Validity of Perceptual Measures of Voice Quality to Predict Laryngeal Function

C.Madill, C.Sheard & R.Heard
The University of Sydney

Perceptual analysis of voice quality is a routine part of clinical voice practice and is often considered to be the gold standard in voice assessment. Ratings are generally descriptive, however, without necessarily being interpretive or informative of the specific laryngeal functions that produce such perceptions. Oates (2009) recent critique of the reliability and validity of auditory-perceptual judgments noted that the extent to which auditory-perceptual features of voice quality reflect underlying vocal tract functioning requires further investigation.

This experimental study sought evidence of the validity of making relative voice quality judgments in ideal conditions that linked them with specified laryngeal postures. Nine speakers were trained to manipulate three vocal parameters implicated in functional voice disorders; *ventricular vocal fold constriction*, *vocal fold mass* and *larynx height* whilst reading a standard passage. Experienced judges rated these standard passages in terms of the widely-used perceptual voice qualities Breathiness, Roughness, Strain, Glottal Fry, Tone Onset, Tone Colour, Loudness and Pitch. If the perceptual measures are valid then combinations of the vocal postures should strongly predict scores on the perceptual measures. Multiple regression analysis and discriminant function analysis revealed strong correlations between perceptual judgements and specific vocal postures were found for ratings of Breathiness ($\text{Eta}^2 = 0.14$), Glottal Fry ($\text{Eta}^2 = 0.63$), Roughness ($\text{Eta}^2 = 0.59$) and Strain ($\text{Eta}^2 = 0.73$). This suggests that perceptual judgments can be valid and reliable methods of reflecting underlying laryngeal muscle activity in some conditions.

Catherine Madill, PhD, BA (Hons), BAppSc (HonsM1), Lecturer, University of Sydney, Speech Pathology C43, PO Box 170, Lidcombe NSW 1825, +6129351 9692, c.madill@usyd.edu.au

Christine Sheard, MSc,BAppSc, Lecturer, Speech Pathologist, University of Sydney, C42 - Cumberland Campus, c.sheard@usyd.edu.au

Robert Heard, Senior Lecturer, University of Sydney, PO Box 170, Lidcombe NSW 1825, +6129351 9498, r.heard@usyd.edu.au

MRI Study of the Voiced Bilabial Fricative [β:] As a Vocal Exercise

Abstract

The voiced bilabial fricative [β:] is a well-known vocal exercise. The effects of this exercise on the vocal tract configuration were studied using magnetic-resonance imaging (MRI). A female subject with extensive experience in voice training phonated in supine position twice on vowel [a:], twice on [β:] and then again twice on [a:]. Acoustic recordings were made in a well-damped studio.

During [β:] (compared to [a:] before it) the size of the front part of the oral cavity decreased up to 28.6%, while the other parts of the vocal tract increased in diameter up to 625% the greatest change taking place in the lower pharynx. The epiglottis adopted a more upright position. The changes seem to be due to a more frontal position of the tongue and increased intraoral air pressure.

In [a:] after the exercise (compared to [a:] before it) the front part of the oral cavity increased up to 50% while the distance between the posterior part of the tongue body and the back wall of the pharynx decreased 25%. The tongue position became more frontal and the epiglottis got a more upright position.

The frequency of F1 and F2 increased (12.9% and 5% respectively) and that of F3-F6 decreased (1.3-4.4%). SPL increased 5.9 dB and the speaker's formant gained 12 dB in amplitude.

The results suggest that some characteristics of the exercise were transferred to vowel phonation after it. The changes increase sound energy transfer from the vocal tract and strengthen the speaker's formant cluster that increases loudness.

Key Words: vocal exercises – semi-occlusions – vocal tract setting

Anne-Maria Laukkanen, Ph.D., Professor, Dept. of Speech Communication and Voice Research, University of Tampere, Finland, +358503635152, Anne-Maria.Laukkanen@uta.fi

Jaromir Horacek, Dr.Sc. Eng., Director, Department, Deputy Director, Institute, Dept. of Dynamics and Vibration, Institute of Thermomechanics, The Academy of Sciences of Czech Republic, Prague, Czech Republic, +420266053125, jaromirh@it.cas.cz

Petr Krupa, MD, Ph.D., Director of Department, Department of Medical Imaging, St. Anne's Faculty Hospital, Masaryk University, Brno, Czech Republic, +420543183019, krupap@seznam.cz

Jan G. Švec, PhD, Palacky University Olomouc, Faculty of Science, Department of Experimental Physics, Laboratory of Biophysics, tr. 17. listopadu 12, 771 46 Olomouc, the Czech Republic, +420 585 63 4171, svecjan@vol.cz or jan.svec@upol.cz

Laryngopharyngeal Reflux – A Randomized Controlled Trial

Introduction:

There is some discussion whether or not laryngopharyngeal reflux does exist. When looking at high speed films, it is clearly seen that the mucus from the oesophagus comes up to the arytenoids, and disappears again within 0.2 – 0.3 seconds. The problem is which measures to use, in order to show treatment effect.

Material / Methods:

235 patients with complaints that the larynx did not function were calculated at entrance into the study, two weeks after treatment and at follow-up, after a three month period.

The patients were randomized into three groups of 1) lifestyle correction, 2) lifestyle correction and proton pump inhibitor, 3) lifestyle correction, proton pump inhibitor and alginate. The lifestyle treatment included correction of reflux related habits, especially intake of specific food, allergies, infections and environmental provocation.

High speed films were used to validate the throat function, supplemented with the MDVP programme by Laryngograph Ltd., measuring frequency and intensity variation on a sustained tone and on reading of a standard text together with electroglottographic measures.

Results / Conclusion:

There was a significant reduction of the oedema located at the arytenoids region as well as of the laryngeal complaints. The acoustical measures could not be used for documenting effect of treatment. There was no difference between the three treatment approaches.

Mette Pedersen, M.D., Ph.D., Ear Nose Throat Specialist, Guest Lecturer, University of Copenhagen, Ear Nose Throat Unit, The Medical Center, Oestergade 18, 1100, Copenhagen, Denmark, +45 33159600, m.f.pedersen@dadlnet.dk

Daniel Feddersen, B.Sc., IT Manager, Copenhagen Business School, Solbjerg Plads 3, 2000, Frederiksberg, Denmark, +45 33159600, m.f.pedersen@dadlnet.dk

Shahzleen Rajan, Medical Student, Research Assistant, University of Copenhagen, Blegdamsvej 3B, Copenhagen, Denmark, +45 29711165, shahzleen@gmail.com

Kasper Munck, M.Sc., Consultant, SAS Institute A/S, Købmagergade 7-9, Copenhagen, Denmark, +45 70282870, kasper.munck@sdk.sas.com

Dysphonia Associated with Vascular Endothelial Growth Factor Inhibitors

Yael Oestreicher-Kedem, MD; Sanjay Morzaria, MD; Hussein Samji, MD; Edward J. Damrose, MD, FACS

Objectives: 1. To describe the laryngeal findings in patients undergoing chemotherapy treatment with vascular endothelial growth factor (VEGF) inhibitor drugs. 2. To describe possible mechanisms of their effect on vocal fold function.

Methods: A retrospective case series conducted in a tertiary referral medical center between July 2008 and January 2009. Cancer patients developing voice change while undergoing chemotherapy with VEGF inhibitor drugs underwent indirect video laryngostroboscopy and evaluation for signs of mucositis, vocal fold lesions, mucosal wave function and glottic closure.

Results: The study included three patients, two females and one male, treated for breast, lung or poorly differentiated unknown primary cancer. All developed hoarseness and breathiness after initiating treatment with the VEGF inhibitor drugs Aflibercept (n=1) or Bevacizumab(n=2). On video laryngostroboscopy all patients demonstrated vocal fold bowing, pronounced glottic insufficiency, decreased mean phonation times, and no signs of mucositis.

Conclusions: VEGF is a key angiogenic factor. It has also been implicated in neuroprotection. VEGF inhibitors are recently combined in chemotherapy protocols to inhibit tumor angiogenesis. Voice change has been reported as an adverse effect of chemotherapy treatment protocols with VEGF inhibitor drugs, but to our knowledge this is the first clinical description of their effect on vocal fold function. The underlying pathophysiology, whether neuropathy, myopathy, or a loss of the lamina propria, is yet unclear.

Edward Damrose, MD, Assistant Professor, Stanford University Medical Center, 801 Welch Road, Stanford, CA 94305, (650) 725-6500, edamrose@stanford.edu

A Closer Look at Phonation Threshold Detection

Peter Pabon

The phonation threshold level that is characterized in the bottom line of the VRP contour represents an important aspect in the overall assessment of the quality of the voice. For VRP recording a 30 cm microphone distance is standard. When the feeble voice signal is picked up at this distance, ambient noise can be a real problem. Normally, background noise reduction (silent booth) and A-weighting are applied to alleviate this. An alternative novel approach is to use a dual microphone headset for VRP recording. It combines a far (30 cm reference) microphone for loud phonation and a close microphone for phonation threshold detection, plus an automatic procedure to calibrate continuously the close microphone to the level of far reference microphone. The improved signal to (environmental) noise ratio of a close microphone, combined with a fast measurement response, can in practice show traces of voiced sound at below 40 dB SPL, a value that was before considered unrealistic. A modern recording device can report on voiced sounds produced by the recorded subject that are inaudible to the instructors standing next to them.

This presentation discusses the factors and conditions that play a role in the accurate detection of the phonation threshold. Suggestions are made for the control of these factors. The headset mechanism is demonstrated and examples of the resulting signals are given. The ultimate goal is the modeling of the detection process and the suggestion of an effective threshold criterion.

Peter Pabon, Voice Scientist, Institute of Sonology, Royal Conservatory, Juliana van Stolberglaan 1, 2595CA The Hague, The Netherlands, +31-651760298, pabon@koncon.nl

Ref#: BS4

“Artistic Whistling”

In order to understand the acoustic nature and physiology of whistling we carried out MRI, endoscopic, aerodynamic and spectral studies.

The air flowing out of the lung is the energy source. The articulatory organ serves as resonator. The oscillation of the air, the transformation of aerodynamical energy into acoustical energy occurs in two narrow spaces formed by the articulatory organs. An anterior space is the constricted opening between the protruded lips or (in case of the „palatal technique“) the interstice between the tip of the tongue and the middle of the upper alveolar ridge. The posterior space, the volume between the tongue and the palate, is strongly varied to affect the size of the resonance space and therefore the pitch.

Intensity change occurs by increasing air pressure and flow; this also has the effect of raising the pitch. The whistler must include this factor in his sound production. An increased air flow has to be compensated by increasing the size of the resonance cavity in the case of a crescendo during constant pitch.

The larynx also plays an important role in forming the sound. Generally it controls the airstream, especially in the case of staccato and the amplitude type of vibrato.

The spectrum of palatal whistling shows more vocal formants than the sound produced by rounding the lips. This enhancement of the spectral characteristics gives the sound of palatal whistling a more “living” quality.

Artistic whistling is a highly complex task that includes most of the organs at play during singing.

Tamas Hacki, M.D, Ph.D., Head of Phoniatrics, University Regensburg, +49 941 789411,
tamas.hacki@klinik.uni-regensburg.de

Nebulized Isotonic Saline versus Water in Classical Sopranos Following Laryngeal Desiccation

Purpose: This investigation examined the effects of nebulized isotonic saline (IS) versus sterile water (SW) on self-perceived phonatory effort (PPE) and phonation threshold pressure (PTP) following a surface laryngeal dehydration challenge in classical sopranos.

Method: Using a double-blind, within-subjects crossover design, 34 classical sopranos nebulized 3 mL of IS, SW, or underwent a control condition on 3 consecutive weeks after breathing dry air transorally for 15 min (RH<1%). PPE and PTP were measured at baseline and every 15 min for 2 hours following the desiccation challenge.

Results: PPE increased significantly following the laryngeal desiccation challenge for the IS, SW and control conditions ($p<0.01$). After nebulization, PPE returned to baseline for the IS condition. For the control conditions, PPE remained above baseline 2 hours after desiccation. No statistically significant changes in PTP following laryngeal desiccation were observed, although values for the IS condition remained below baseline for nearly 2 hours after nebulization. PPE and PTP were not significantly correlated.

Conclusions: Following surface tissue laryngeal dehydration, classical sopranos experience increased vocal effort that persists for at least 2 hours. Nebulized SW is insufficient to reverse this effect. Nebulized IS shows promise as an effective treatment for reversing laryngeal desiccation. PPE may be more sensitive to vocal effort in trained singers due to increased self-awareness regarding voice production.

Kristine Tanner, Ph.D., Adjunct Assistant Professor, University of Utah, 729 Arapeen Drive, Salt Lake City, UT 84108, (801) 585-7946, kristine.tanner@hsc.utah.edu

Nelson Roy, Ph.D., Associate Professor, University of Utah, 390 S 1530 E, Rm. 1219, Salt Lake City, UT 84112, (801) 585-0428, nelson.roy@health.utah.edu

Ray M. Merrill, Ph.D., M.P.H., Professor, Brigham Young University, 229A RB, Provo, UT 84604, (801) 422-9788, ray_merrill@byu.edu

Faye Muntz, M.M., Singing Voice Specialist, University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 587-3548, faye.muntz@hsc.utah.edu

Daniel R. Houtz, M.A., Speech-Language Pathologist, The University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 581-4956, dan.houtz@hsc.utah.edu

Cara Sauder, M.A., Speech-Language Pathologist, University of New Mexico Hospitals, 221 Lomas Blvd. NE, Albuquerque, NM 87106, (505) 272-2111, carasaudervoice@gmail.com

Mark Elstad, M.D., Professor, University of Utah, 50 N. Medical Drive, Salt Lake City, UT 84132, (801) 581-7806, mark.elstad@hsc.utah.edu

Julie Wright-Costa, M.M., Professor, University of Utah, DGH 424, Salt Lake City, UT 84112, (801) 581-7812, JulWC@aol.com

Male Altos's Vocal Tract Configurations in Register Functions

Abstract

Objective: Professional male altos (counter tenors) mostly use a register function which is considered to be derived from the falsetto. However, the sound produced differs in professional altos compared to modal register or falsetto of untrained voices. The aim of this study was to analyse the influence of the vocal tract in male altos' register functions. **Material and Methods:** Dynamic real time MRI of 8 frames per second was used to analyze the vocal tract profile in 7 professional male altos, who sang on the vowel /a/ an ascending and descending scale between G3 (196Hz) to E4 (330Hz). The scale included their register transition from modal register to tensioned (counter) falsetto and untensioned falsetto. **Results:** Register transitions from modal register to tensioned falsetto were associated with increased lip opening, jaw retraction, elevation and back positioning of the tongue, pharynx narrowing, uvula elevation, drop of larynx height and tilting of the larynx. Differences between tensioned and untensioned falsetto were found mostly with regard to lip opening and pharynx width. **Conclusions:** The differences of the vocal tract configurations might have an impact on the acoustic differences observed in professional male altos' register functions.

Matthias Echternach, M.D., Otolaryngologist, Institut of Musicians Medicine, Freiburg University Medical Center, Breisacher Str. 60, 79106, Freiburg, Germany, +49-761-270-6161,
matthias.echternach@uniklinik-freiburg.de

Louisa Traser, Student, Charite Berlin, louisa.traser@charite.de

Bernhard Richter, M.D., Phoniatrician, Otolaryngologist, Institut of Musicians Medicine, Freiburg University Medical Center, Breisacher Str. 60, 79106, Freiburg, Germany, +49-761-270-6161,
bernhard.richter@uniklinik-freiburg.de

Pepsin as a Causal Agent of Inflammation during Nonacidic Reflux

Objective: To investigate the contribution of pepsin to inflammation attributed to nonacidic gastric reflux via analysis of inflammatory cytokine and cytokine receptor gene expression in pepsin-treated human hypopharyngeal epithelial cells *in vitro*.

Study Design: Translational Research

Setting: This study was performed in an academic research laboratory.

Subjects and Methods: Human hypopharyngeal epithelial cells were incubated with or without pepsin (0.1mg/ml) at pH7.4, 37°C, overnight. Expression of 84 inflammatory cytokines and cytokine receptors was analyzed via RT² qPCR array.

Results: Expression of a number of inflammatory cytokines and receptors was altered in human hypopharyngeal epithelial cells following overnight treatment with pepsin at neutral pH. >1.5-fold change in gene expression was detected for CCL20, CCL26, IL8, IL1F10, IL1A, IL5, BCL6, CCR6 and CXCL14 ($p<0.05$).

Conclusion: Exposure of hypopharyngeal cells to pepsin in a nonacidic environment induces the expression of several pro-inflammatory cytokines and receptors, including those known to be involved in inflammation of esophageal epithelium in response to reflux and which contribute to the pathophysiology of reflux esophagitis. These data indicate that refluxed pepsin may contribute to laryngeal inflammation associated with nonacidic gastric reflux including that experienced by patients despite maximal acid suppression therapy.

Key Words: pepsin, larynx, hypopharynx, laryngopharyngeal reflux, nonacidic reflux, inflammation

****Please note; this study was presented in poster format at the AAO-HNS meeting. Dr. Sataloff kindly asked me to submit the abstract for consideration for presentation at the Voice Foundation's Annual Symposium. Nikki Johnston*

Nikki Johnston, PhD, Assistant Professor, Department of Otolaryngology and Communication Sciences, Medical College of Wisconsin, 9200 West Wisconsin Avenue, Milwaukee, WI, 53226, (414) 805-8307, njohnsto@mcw.edu

Tina L. Samuels, MS, Research Associate, Department of Otolaryngology and Communication Sciences, Medical College of Wisconsin, 9200 West Wisconsin Avenue, Milwaukee, WI, 53226, (414) 805-1543, tsamuels@mcw.edu

Modeling the Vibration of False Vocal Folds

The vibration of false vocal folds (FVF) is modeled with a finite element method to understand the detrimental effects of this supraglottic structure on phonatory functions. The false vocal folds have historically been linked to closure of the laryngeal lumen during deglutition and other primitive reflexes such as coughing, gagging, etc. They have been observed to move during continuous speech in either static or dynamic conditions. The static component might be considered the typical or dominant laryngeal configuration for voice production while the dynamic component involves short duration adductory FVF gestures. While some investigators focus on the FVF role in normal voice production, the majority consider the FVF activity contributes to disordered voice production. Thus, the understanding of aerodynamic and biomechanical conditions that cause FVF to oscillate in synchrony or different frequency and phase from the true vocal folds (TVF) can reveal the detrimental effects of this supraglottic structure. An existing biophysical model of phonation (finite-element model) that includes tissue mechanics, glottal aerodynamics, and acoustics of the vocal tract was modified to include the false vocal folds. The newly designed mesh included 20 triangular elements for the FVF in addition to 84 elements for the TVF in each of the 15 layers in each side. The FVF gap was added as a new control parameter. The preliminary results indicate that FVF gap and mechanical properties of FVF have major effects on the glottal flow and oscillations of both true and false vocal folds. Work supported by NIDCD grant # DC009567-01.

Fariborz Alipour, Ph.D., Research Scientist, University of Iowa, 334 WJSHC, (319) 335-8694,
alipour@iowa.uiowa.edu

Ref#: M1

Reflux Symptoms in Patients with Paradoxical Vocal Fold Motion

Paradoxical vocal fold motion (PVFM) is a laryngeal disorder characterized by shortness of breath, chest tightness, cough and choking.. Previous studies have suggested that there is a significant incidence of gastroesophageal reflux and/or laryngopharyngeal reflux in patients with PVFM. However, previous studies have also shown that treatment of the reflux alone does not always resolve the symptoms of PVFM.

The purpose of the present study was to examine reflux related findings in patients with PVFM and to compare those findings to a non PVFM group using the Reflux Symptom Index (RSI). Forty patients with a history and medical findings of PVFM and 40 patients with a history of gastroesophageal and/or laryngopharyngeal reflux were entered into the study. All subjects completed the RSI prior to and following treatment. The PVFM group was treated with a series of behavioral exercises and a proton pump inhibitor. The non-PVFM group was treated with a proton pump inhibitor. The results suggest that both groups identified hoarseness as a symptom of their problem; however, the scale value on the RSI for PVFM group was significantly higher than the non-PVFM group. In addition, the PVFM group had higher scale values on three of the nine items on the RSI. Following treatment period of approximately 10 weeks, the PVFM group showed a reduction in hoarseness, excess mucous and cough. The results suggest that treatment of cough by proton pump inhibitor alone does not significantly reduce the symptoms of cough, hoarseness and excess mucous in patients with PVFM.

Francesca DiDomenico, The Peabody Conservatory, Baltimore, MD,
fdidomenico91@gmail.com

Scott M Rickert, MD, Fellow, Children's Hospital of Philadelphia, Philadelphia, PA,
srickert@gmail.com

Thomas Murry, PhD, Professor of Speech Pathology in Otolaryngology, Weill-Cornell Medical College, Cornell University, New York, NY, tm2103@msn.com, 347 419 5745

Concentration of Hyaluronic Acid in Human Vocal Folds in Young and Old Subjects

Objective/Hypothesis: to compare and evaluate hyaluronic acid (HA) concentration in normal vocal folds, in young and elderly men and women. Study design: Experimental study. Methods: ELISA plates coated with adsorbed binding protein were sequentially incubated with samples from the middle portion of the cover, vocal ligament, and vocal muscle of 19 young subjects and 20 elderly ones, of both genders; biotin-conjugated binding protein; and streptavidin-europium conjugate. After europium release in an enhancement solution, final fluorescence was measured in a fluorometer. Results: Statistically significant comparisons: (1) Higher HA concentration in the cover and ligament when compared to muscle, in the whole sample; (2) Higher HA concentration in ligament when compared to muscle in young subjects of both genders, considering each group separately. Statistically non-significant data: (3) Higher HA concentration in ligament when compared to the remaining portions; (4) Higher HA concentration in the cover of young women and lower concentration in ligament when compared to young men; (5) HA value fall with aging, more prominent in the cover of women and in all portions of male subjects; (6) Lower HA concentration in elderly men, in all portions, keeping the difference between genders in the cover. Conclusion: HA concentration is higher in the cover and ligament when compared to muscle, in the whole sample; a higher HA concentration in ligament when compared to muscle in young subjects of both genders, considering each group separately; there was no statistically significant difference among the other comparisons, considering gender and age range.

Gustavo Polacow Korn, MD, Physician (Korn, GP), Dept of Otorhinolaryngology Head and Neck Surgery, Universidade Federal de São Paulo, Av. Brigadeiro Faria Lima, 1811 cj 907-908 Jd. Paulistano, São Paulo - SP - Brasil 01452001, 55 11 55752552,
gustavokorn@gustavokorn.com.br

João Roberto Maciel Martins, MD, PhD, Physician (Martins, JRM), Department of Medicine, Discipline of Endocrinology and Metabolism, Federal University of São Paulo, Rua Três de Maio, 100 - 4o andar Vila Clementino, São Paulo, SP, Brasil 04044020, 55-11-5576-4438,
jrmacmartins@yahoo.com.br

Elsa Yoko Kobayashi, MSc, Biochemistry (Kobayashi, EY), Dept of Biochemistry, Discipline of Molecular Biology, Federal University of São Paulo, Rua Três de Maio, 100 - 4o andar. Vila Clementino, São Paulo, SP, Brasil 04044020, 55-11-5576-4438, ekobayashi.bioq@epm.br

Aline Mendes, MSc, Biochemistry (Mendes, A), Department of Biochemistry, Discipline of Molecular Biology, Federal University of São Paulo, Rua Três de Maio, 100 - 4o andar. Vila Clementino, São Paulo, SP, Brasil 04044020, 55-11-5576-4438, alia.mendess@gmail.com

Sung Woo Park, MD, Physician (Park, SH), Dept of Otorhinolaryngology Head and Neck Surgery, Universidade Federal de São Paulo, Rua dos Otonis, 700 . Vila Clementino, São Paulo, SP, Brasil 04025002, 55 11 55752552, sungwp@lampanni.com.br

Noemi Grigoletto De Biase, MD, PhD, Physician (De Biase, NG), Dept of Otorhinolaryngology Head and Neck Surgery, Universidade Federal de São Paulo, Rua dos Otonis, 700. Vila Clementino, São Paulo, SP, Brasil 04025002, 55 11 55752552, ngdebiase@gmail.com

Frame by Frame Analysis of Glottal Insufficiency using Laryngovideostroboscopy

Thomas L. Carroll, MD, Yi-Hsuan E Wu, MD, Marissa McRay, MA, CCC-SLP and Shirley Gherson, MA, CCC-SLP

Introduction

Studies demonstrate that true vocal folds (TVF) with complete closure spend approximately 50% of the glottal cycle (GC) in contact (closed) on Laryngovideostroboscopy (LVS). Glottal insufficiency (GI) is demonstrated when there is incomplete closure or complete but ‘short’ closure of TVFs during the GC. We employed the frame by frame analysis (FBFA) technique to evaluate its effectiveness at confirming GI in atrophic and/or paretic patients.

Procedures

A retrospective review of our database was performed on 44 subjects with a prior clinical diagnosis of TVF atrophy and/or paresis. Using the FBFA technique to evaluate the GC, each subject’s percentage of closed frames out of the total number of frames was recorded.

Results

Subjects with atrophy (25/44) spent 32.4% of the frames of the GC in the closed phase. Subjects with paresis (19/44) spent 38.9% of the frames closed.

Conclusions

FBFA appears to be an effective tool to objectively confirm suspected GI using LVS. Because of the inherent physical properties by which LVS gives an “illusory” representation of the GC, the FBFA technique remains a theoretical tool to diagnose even subtle GI; however further high speed digital imaging studies are needed to validate this technique.

Thomas L Carroll, MD, Assistant Professor, Tufts Medical Center, 800 Washington St, Box 850, (617) 636-2887, tcarroll@tuftsmedicalcenter.org

Yi-Hsuan E Wu, MD, Resident Physician, Tufts Medical Center, 800 Washington St, Box 850, (617) 636-2887, YWu@tuftsmedicalcenter.org

Shirley Gherson, MA, CCC-SLP , Speech and Language Pathologist, Tufts Medical Center, 800 Washington St, Box 850, (617) 636-2887, sgherson@tuftsmedicalcenter.org

Marissa McRay, MA, CCC-SLP, Speech and Language Pathologist, Tufts Medical Center, 800 Washington St, Box 850, (617) 636-2887, MMcray@tuftsmedicalcenter.org

Voice Acoustic Analyses of Commercial Airline Pilots and Cabin Crewmembers

Long-term exposure to infrasound and low frequency noise (ILFN, <500 Hz, including infrasound) can lead to the development of Vibroacoustic Disease (VAD) which is a systemic pathology characterized by the abnormal growth of extra-cellular matrices, namely collagen and elastin, both of which are abundant in the basement membrane zone of the vocal folds. Bronchoscopic examinations of VAD patients revealed pink lesions in respiratory tract, vocal folds and epiglottis. Mendes et al. (2006 and 2008) revealed that ILFN exposed males and females presented increased fundamental frequency (F0), jitter %, and maximum phonation frequency range, when compared with normative data. Temporal measures of maximum phonation time and s/z ratio were generally reduced.

The present study aims to: 1) compare voice acoustic analysis of two ILFN exposed male groups: 37 pilots and 12 cabin crewmembers and 2) analyse the effects of age and yrs of ILFN exposure in voice acoustic parameters of these groups. Pilots and cabin crewmembers' age was [25-60] and [29-60] yrs, respectively. The number of ILFN exposure was 3-36 and 7-35 yrs, for pilots' and crewmembers, respectively.

Both groups performed standardized phonatory tasks which were acoustically analysed with KayPENTAX CSL and MDVP to obtain spectrographic and temporal measures. One-way ANOVA revealed no differences in voice acoustic parameters between the two groups ($p>.05$), therefore they were studied together ($N=49$). For all four vowels, F0 was significantly increasing with the number of ILFN exposure ($p<.05$). This pattern can be indicative of histological changes within the laryngeal system, specifically the vocal folds.

Andreia Graça, B.Sc., Speech-Language Pathologist, Colegios as Joaninhos – Amora, Rua MFA, 20, 1C, Paivas, 2845-380, Seixal, Portugal, 011-351-936163278, andreia.graca@gmail.com

Ana P. Mendes, PhD, Professor, Escola Superior de Saúde do Instituto Politécnico de Setúbal, Qta Lombos, Rua das Orquídeas, Lt 4, 3º Esq, 2775-675, Carcavelos, Portugal, 011-351-918487292, ana.mendes@ess.ips.pt

Ana Jorge, M.S, Assistant Professor, Instituto Superior de Administração e Contabilidade de Lisboa Qta Lombos, Rua das Orquideas, Lote 4, 3º Esq, 2775-675, Carcavelos, Portugal, 011-351-914603211, any.jorge@gmail.com

Mariana Alves-Pereira, PhD, Assistant Professor, Escola Superior de Saude Ribeiro Sanches - ERISA, Universidade Lusofona, Qta Lombos, Rua das Orquideas, Lote 4, 3º Esq, 2775-675 , Carcavelos, Portugal, 011-351-938267783, mariana.pereira@oninet.pt

Nuno Castelo-Brando, MD, Physician, Centro da Performace Humana, Alverca, 011-351-937584261, mariana.pereira@oninet.pt

Carolina Santos, B.Sc., Speech-Language Pathologist, Colegio as Joaninhos, Amora, Rua MFA 20, 1º C, Paivas, 2845-380, Seixal, Portugal, 011-351-966746617, carolinapaulasantos@gmail.com

Comparison of Single versus Multiple Treatments in Vocal Fold Paresis

Abstract

In our cadre of treated patients with vocal fold paresis, 40% received multiple treatments: injection then surgery (39%); surgery then injection (30%); revisions (22%); voice therapy then surgery (13%); surgery/injection then voice therapy (11%); or multiple injections (4%). Injection may be offered first if neural recovery is anticipated or to determine if more invasive surgery might be beneficial. Surgery may be offered first if little evidence of recovery is observed, or if the individual needs a strong voice for their livelihood. Voice therapy may improve voice quality by introducing better technique to a compensating system. This retrospective study will examine factors that may influence when a second treatment may be necessary by comparing them to a control group who received a single treatment. A second treatment may be necessary if other ongoing processes as well as paralysis are occurring, such as aging. It may also be necessary in a system that is further out from the nine months usually assumed for neural recovery. It may also be necessary because of lack of tone or presence of signs of denervation after 3 months. These two groups will also be compared using outcome measures such as degree of glottal closure, extent of ab/adduction of arytenoids, maximum phonation time and airflow. Preliminary results suggest that poor tone is associated with requiring a second treatment, and not age or time post onset. The multiply treated demonstrated little change in flow across time, while those receiving a single treatment demonstrated flows returning towards normal limits.

Sheila V. Stager, Ph. D., Research Voice Scientist, Voice Treatment Center, Medical Faculty Associates, 2150 Pennsylvania Ave NW, Suite 6-301, Washington, DC 20037, (202) 741-3265,
sstager@mfa.gwu.edu

Steven A. Bielamowicz, M.D., Director, Program Chair, Voice Treatment Center, Medical Faculty Associates, 2150 Pennsylvania Ave NW, Suite 6-301, Washington, DC 20037, (202) 741-3261,
sbielamowicz@mfa.gwu.edu

Ref#: M15

CO₂ Laser Assisted Endoscopic Cricopharyngeal Myotomy (ECPM) with Primary Closure of the Mucosal Defect

CO₂ laser-assisted endoscopic cricopharyngeal myotomy (ECPM) has emerged as a viable therapy for dysphagia. Critics of the procedure cite the risk of mediastinitis. The purpose of this study is to review our outcomes following CO₂ laser-assisted ECPM with primary closure of the mucosal defect in the treatment of dysphagia. A retrospective case-series was performed. Swallowing outcome was assessed using the MD Anderson Dysphagia Index (MDADI) and Functional Outcome Swallowing Scale (FOSS). There were two patients with Zenker's diverticulum and five with cricopharyngeal spasm. There were no postoperative complications. There was an improvement in both the MDADI and FOSS from 51.29 to 77.71 (p<0.0006) and 3.71 to 1.29 (p<0.0005) respectively. In conclusion, ECPM can be a useful adjunct in the treatment of dysphagia secondary to cricopharyngeal spasm or Zenker's diverticulum. Closure of the mucosal defect is easily accomplished and may decrease the incidence of postoperative cervical emphysema and risk of mediastinitis.

Sanjay Morzaria, MD, MHSc, FRCSC, Laryngology Fellow, Stanford University, Stanford University Medical Center, 801 Welch Road, Stanford, CA 94305, (650) 725-6500, morzaria@yahoo.com

Allen S. Ho, MD, Resident, Stanford University, Stanford University Medical Center, 801 Welch Road Stanford, CA 94305, (650) 725-6500, aho@stanford.edu

Edward J. Damrose, MD, FACS, Chief, Division of Laryngology, Stanford University, Stanford University Medical Center, 801 Welch Road, Stanford, CA 94305, (650) 725-6500, edamrose@stanford.edu

The Predictors of Post-Operative Vocal Fold Paresis in Patients Undergoing Thyroid Surgery

Objectives/Hypothesis: The objective of this study is to evaluate the factors predictive of post-operative vocal fold paresis (VFP) in patients undergoing thyroid surgery. We also assess the implications of pre-operative VFP on post-operative vocal fold status.

Study Design: Case series with chart review

Methods: Charts of 17 patients who underwent thyroid surgery and had pre- and post-operative laryngeal electromyography were reviewed. We collected data relating to pre-operative and post-operative laryngeal and thyroid evaluations as well as the details of the surgical procedure. We analyzed the incidence of pre-operative VFP as well as the relationship of thyroid diagnoses, type of surgery performed, and size of thyroid mass with respect to the outcome of the VFP.

Results: All 17 patients had a mild to moderate degree of unilateral or bilateral VFP pre-operatively, however, only seven (41.2%) had vocal symptoms. After surgery, only five of these patients had voice complaints and there were no new cases. Thyroid diagnoses included ten cases of benign disease (58%) in which VFP improved in two, worsened in five, and remained the same in three; and seven cases of malignant disease (41.2%) in which VFP improved in none, worsened in one, and remained the same in six.

Conclusions: Based on our results, the strongest predictor of post-operative vocal fold paresis is the existence of pre-operative paresis. Additionally, 100% of patients had pre-operative paresis which supports the results of other groups who have suggested an intrinsic relationship between malignant and benign thyroid disease and vocal fold paresis.

Malka Caroline, Medical Student, Temple University, Philadelphia, PA, (215) 380-0560,
malka.caroline@gmail.com

Shruti S. Joglekar, MD, Instructor, Dept of Otolaryngology-Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (612) 232-9099, drshrutisj@gmail.com

Yolanda Heman-Ackah, MD, Associate Prof, Dept of Otolaryngology Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (610) 864-3624, phillyvoicemd@aol.com

Robert T. Sataloff, MD, DMA, FACS, Chairman, Department of Otolaryngology Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (215) 790-5165, rtsataloff@phillyent.com

A Double-Blind, Placebo-Controlled Study on the Effectiveness of Chinese Medicine Decoction in Treating Phonotraumatic Lesions

Phonotrauma is one of the common causes leading to voice disorders and contributes to the formation of benign vocal fold lesions. There is sufficient evidence which showed contemporary treatment (e.g. anti-inflammatory medications and surgery) and voice rest are effective in the management of phonotraumatic lesions. Traditional Chinese medicine (TCM) has also been used as a therapeutic measure in treating dysphonia.

A number of herbal medicine decoctions or formulae have been reported to be effective in treating dysphonia. Fluid nourishment decoction is a popular ancestral formula used to treat chronic pharyngeal and laryngeal inflammatory diseases. It consists of eight individual herbs, *Rehmannia glutinosa* (*Shou di huang*), *Ophiopogon japonicus* (*Mai men dong*), *Scrophularia ningpoensis* (*Xuan shen*), *Paeonia suffruticosa* (*Mu dan pi*), *Fritillariae Cirrhosae* (*Bei Mu*), *Glycyrrhiza uralensis* (fresh) (*Gan cao*), *Mentha haplocalyx* (*Bo he*) and *Paeonia lactiflora* (*Bai Shao*). There is however relatively little specific information on how the decoction brings about the improvement. Indeed, there exists virtually no study that employed a randomized control design with objective outcome measures to investigate efficacy of this decoction in treating phonotraumatic lesions.

This study employed a randomized-control style to investigate the effectiveness of the fluid nourishment decoction in treating dysphonia with phonotraumatic lesions. Those eligible subjects were randomly allocated into one of the two groups:

(a) experimental group (herbal medicine); and (b) placebo group. The outcome measures used included (a) voice range profile (phonetogram), (b) voice activity and participation profile (VAPP, Ma & Yiu, 2001) (c) sentence recording for perceptual voice evaluation, (d) stroboscopy, and (e) voice symptom scale (VoiSS).

Preliminary results showed that the group that received the herbal medicine decoction improved better in their vocal function than the placebo group of subjects.

Olivia Chung, BSc (TCM), PhD candidate, Voice Research Laboratory, The University of Hong Kong, 5/F, Prince Philip Dental Hospital, 34, Hospital Road, Sai Ying Pun, Hong Kong, (852) 2859-0572, olieggegg@yahoo.com.hk

Edwin Yiu, Ph.D., Professor, The University of Hong Kong, 5/F Prince Philip Dental Hospital, 34 Hospital Road, Hong Kong, +852-28590583, eyiu@hku.hk

Dr Steve Xue, PhD, Associate Professor, University of Hong Kong, 5/F, Prince Philip Dental Hospital, 34, Hospital Road, Sai Ying Pun, Hong Kong, (852)2859-0581

Acoustic Characteristics of Voice Before and After Narrow-Margin Endoscopic Hemilaryngectomy in Early Glottic Carcinoma

Objectives: To evaluate the voice changes after narrow-margin endoscopic hemilaryngectomy in subjects with T1N0M0 glottic cancer.

Study Design: Uncontrolled, retrospective comparison of pre-op and post-op mean phonation time, F0, jitter and shimmer and noise to harmonic ratio, and voice related quality of life survey scores.

Methods: 17 adults diagnosed with T1N0M0 glottic cancer who underwent narrow-margin endoscopic hemilaryngectomy were included. All subjects had pre- and post-op acoustic evaluation and VRQL scores. Subjects were separated into 3 groups based on age and depth of resection. Group A (mean age 52 years) consisted of 7 subjects who underwent superficial resection (superficial layer of lamina propria) and were younger than 60 years of age. Group B (mean age 76) was older than 60 years and underwent superficial resection (6 subjects). The four subjects in Group C were older than 60 years and underwent deep resection (into ligament and thyroarytenoid muscle).

Results: There was a statistically significant improvement in voice related quality of life in the Group A with non-significant improvement in group B. The acoustic measures did not change after surgery (no P<0.05). The values for all parameters improved for Group A, with all values declining in Group C.

Three of 5 acoustic values and the VRQL scores improved for the Group B subjects.

Conclusion: For early stage cancer patients, age younger than 60 years of age and superficial resection of cancer are predictive for better voice outcomes.

Chanticha Chotigavanich, MD, Research Fellow, Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston, Ma 02114, (617) 573-3958, nancy_donovan@meei.harvard.edu

Jayne Dowdall, MD, Resident, Wayne State University, 4743 Cass Avenue, Detroit, MI 48201, (617) 461-7303, jdowdall@med.wayne.edu

Ramon Franco Jr., MD, Director, Division of Laryngology, Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston, Ma 02114, (617) 573-3958, ramon_franco@meei.harvard.edu

Stomach Esophageal Reflux Disease – Partnership between Gastroenterologist and Otorhinolaryngologist

B. Vladimirov, D. Doskov, Sp. Todorov
Queen Giovanna University Hospital

The authors share their three years experience with a hundred patients having laryngitis reflux and Jackson's contact ulcer as a result of the gastroesophageal reflux illness. The first meeting of the patient with the otorhinolaryngologist (dysphonia, chronic cough, laryngeal, paresthesias) has an important role on the clinical thinking and in the same time pointing the patient towards the gastroenterologist.

As results of three month anti production therapy (Sopral 2 x 20 mg), 80% of the patients with the disease have improved drastically, this includes complete disappearance of the symptoms or a big improvement, verified by videolaryngostroboscopy, fibrogastroscoopy and 24 hours monitoring of the pH levels.

Borislav Vladimirov, Asst. Professor, Gastroenterologist

Dosio Doskov, Professor, Head of Phoniatic Dept, General Secretary, Bulgarian ENT Association, Postal Code 1040, Sofia, Bulgaria, Bialo more 8, +359-888-378-942, doskov@abv.bg

Spiridon Todorov, PhD, ENT Specialist

Tenorina, Who is She?

Classification of the professional singer voice is very sensitive and long- term process. There are many factors that influence this and that can lead to wrong result, because of the absence of the standardized protocol.

Endovideolaryngostroboscopic finding and multidimensional computer analysis of so called tenorina voices are presented, with objective comparison to well defined voice classes.

Only multidisciplinary team approach can give the standard in this field of professional voice care.

Milan Vukasinovic, MD/ENT Spec/Phoniatriician, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 11 176 26 58, vukasmd@gmail.com

Vojko Djukic, Professor, MD/ENT Spec, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 11 345 96 75, vojkod@yahoo.com

Predrag Stankovic, Professor, MD/ENT Spec, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, Bulevar oslobojenja 160, premist@eunet.rs

Sanja Krejovic-Trivic, MD/ENT Spec, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 64 113 5951, drole@sbb.co.rs

Ljiljana Nikolic, Voice Speech Therapist, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 2394 327

Milena Stojanovic, Voice Speech Therapist, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 11 2665 401, jovicastojanovic@sbb.co.rs

Mira Ajadukovic, Health Psychology Spec, Clinical Center of Serbia, Paster st No 2, 11000 Belgrade, 381 64 265 69 69, mirajduk@sezampro.rs

Objective Multidimensional Voice Analysis in Healthy and Disordered Subjects Applying High-Speed Digital Imaging

Michael Döllinger, Lisa Inwald, Maria Schuster, Ulrich Eysholdt

Introduction: We investigated vocal fold vibrations of healthy and pathologic subjects (functional dysphonia and paralysis) by means of high-speed digital imaging (HSI). As there exist no commonly accepted clinically HSI-parameters, we applied clinical acoustical measures to HSI. The aim of this study was to look for parameters being suitable for separating voice pathologies and to distinguish healthy from pathologic voices.

Methods: Totally, data of 496 patients were evaluated (women: 315; men: 181). The videos were recorded with a sampling rate of 4000 fps with a pixel resolution of 256 x 256. All recordings were performed during sustained phonation at a comfortable pitch and loudness with a rigid 90° endoscope. Following segmentation of the data, closed/open-quotient, glottis area perturbation measures (shimmer, Jitter, HNR, SNR), and left-right symmetry parameters were computed.

Results: Parameters – such as closed-quotient and area perturbation values presented statistically significant differences between normal and pathological vocal fold dynamics as well as in between different pathologies. Additionally, Linear Discriminant Analysis showed correct group classification rates of up to 82.3%. The results approve HSI to be a powerful tool for investigating vocal fold dynamics.

Summary: The presented objective parameters are useful for the identification of healthy subjects as well as for assisting diagnoses of voice pathologies. Nevertheless, the parameters were restricted to basic ones emphasizing the everyday practical clinical applicability. However, further research is needed to broaden our understanding of the variability within and across healthy and pathologic vocal fold vibrations and their diagnosis for the enhancement of voice evaluation.

Michael Doellinger, PhD, Professor, Department for Phoniatrics and Pediatric Audiology, University Hospital Erlangen, Bohlenplatz 21, Erlangen, Germany, +4991318533814, michael.doellinger@uk-erlangen.de

Lisa Inwald, Postgraduate Medical Candidate, Department for Phoniatrics and Pediatric Audiology, University Hospital Erlangen, Bohlenplatz 21, 91054, Erlangen, Germany, +49-91318532782, elisabeth.inwald@o2online.de

Maria Schuster, MD, Associate Professor, EUROMED Fuerth, Europaallee 1, 90763, Fuerth, Germany, +49-91318532782, hno@euromed.de

Ulrich Eysholdt, PhD , MD, Professor, Department for Phoniatrics and Pediatric Audiology, University Hospital Erlangen, Bohlenplatz 21, 91054, Erlangen, Germany, +49-91318532782, ulrich.eysholdt@uk-erlangen.de

Toward Improved Recognition of Unilateral External Superior Laryngeal Nerve Paralysis

Nelson Roy, Michael Barton, Marshall Smith, Christopher Dromey, Cara Sauder, Dan Houtz, Kristine Tanner.

The external branch of the superior laryngeal nerve (ESLN) innervates the cricothyroid (CT) muscle of the larynx, a vocal fold tensor primarily responsible for pitch elevation. For over 100 years, a controversy has existed regarding the laryngeal signs that should be considered pathognomonic of unilateral ESLN paralysis. Regrettably, little progress has been made in resolving this controversy, as the extant clinical literature is characterized by contradiction and inconsistency. In an earlier study, we modeled unilateral CT paralysis *in vivo* using lidocaine blockade of the ESLN, and identified epiglottic deviation of the petiole to the side of weakness during a glissando up maneuver as a possible diagnostic marker of acute CT paralysis. This presentation extends this work to the clinical domain, wherein we will present a series of patients with unilateral ESLN paralysis who present with ipsilateral epiglottic deviation during an upward glissando maneuver. These preliminary clinical findings suggest that this diagnostic sign deserves further attention as a possible, robust diagnostic marker of unilateral ESLN paralysis.

Nelson Roy, Ph.D., Associate Professor, The University of Utah, Dept. of Communication Sciences and Disorders, 390 South 1530 East, Salt Lake City, UT 84112, (801) 585-0428, nelson.roy@health.utah.edu

Michael Barton, M.A., Speech-Language Pathologist, The University of Utah, Salt Lake City, UT, (801) 585-0428, nelson.roy@health.utah.edu

Marshall E. Smith, M.D., Professor, The University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 587-3548, marshall.smith@hsc.utah.edu

Christopher Dromey, Ph.D., Professor, Brigham Young University, Department of Communication Disorders, Provo, UT, (801) 422-6461, dromey@byu.edu

Cara Sauder, M.A., Speech-Language Pathologist, University of New Mexico Hospitals, 221 Lomas Blvd. NE, Albuquerque, NM 87106, (505) 272-2111, carasaudervoice@gmail.com

Daniel R. Houtz, M.A., Speech-Language Pathologist, The University of Utah, 729 Arapeen Dr. Salt Lake City, UT 84108, (801) 581-4956, dan.houtz@hsc.utah.edu

Kristine Tanner, Ph.D., Adjunct Assistant Professor, University of Utah, 729 Arapeen Drive, Salt Lake City, UT 84108, (801) 585-7946, kristine.tanner@hsc.utah.edu

Impact of Pharyngo Laryngeal Reflux on Voice Quality by Using the RFS and RSI on 96 Subjects

Authors: Morsomme D, Sugameli M, Verduyckt I.

Pharyngo Laryngeal Reflux (PLR) influences the voice quality: hoarseness, vocal fatigue and hypertonia (Shaw et al, Hopkins et al). Our goal is to measure the influence of the PLR on the voice of 96 subjects by using the Belafsky's reflux symptom index (RSI) and reflux finding score (RFS). 46 dysphonic patients (26M/24F) constitute the experimental group (EG) and 50 subjects (13 M/33F) without vocal or gastric complaint the control group (CG). All are evaluated by subjective measures (RSI), D-type scale (DS-16, Denollet et al) and objective measures (Video Laryngo Stroboscopy, RFS). The EG shows a RSI score significantly higher on test than on the retest ($p=0.002$). The specificity of the RSI calculated on the CG amounts to 98 % (χ^2 : $p < 0,05$, Cramer: 0,678). The EG scores are significantly higher than those of the CG ($p=0,000$) although the CG obtains scores significantly higher as for the eating risk habits ($p=0,001$). In the EG, we note a correlation between the coffee consumption, the item 9 (pyrosis) (ρ : 0,32; $p < 0,05$) and the global RSI score (ρ : 0,35; $p < 0,05$). In the CG, alcohol consumption influences significantly the item 9 (ρ : 0,47). The correlations between RSI and RFS are not significant ($p < 0,05$). The ENT evaluation is severe and probably influences the result. We observe no influence of the gender and of the D-type scale on the RSI scores ($p < 0,05$). The RSI scale is an interesting tool for the detection of RPL.

Dominique Morsomme, PhD, Speech Therapist, ULg, Boulevard du Rectorat, 5 B32 – 4000, Liège Belgium, 003243665176, dominique.morsomme@ulg.ac.be

Mélanie Sugameli, Master, Speech Therapist, ULg, Boulevard du Rectorat, 5 B32 – 4000, Liège Belgium, 003243665176, melanie_sugameli@hotmail.com

Ingrid Verduyckt, PhD Student, Speech Therapist, UCL, Centre d'audiophonologie Saint Luc., Clos Chapelle aux champs 30/3040 - 1200 B, ruxelles Belgium , 003227643267, ingrid.verduyckt@gmail.com

Arytenoid Granulomas: Phonomicsurgery, Botox, Steroids

Most granulomas occur in the arytenoid region or in other areas of traumatic glottic epithelial mucosal disruption arising in a laryngopharyngeal reflux environment of generalized mucositis. Post endotracheal intubation disruption of perarytenoid epithelium, vocal hyperfunction of the lateral cricoarytenoid musculature resulting in arytenoidal hyper-rotation with abnormal concussive, repetitive epithelial trauma and abusive vocal behavior are the common factors in dealing with recurrent, recalcitrant arytenoid granulomas. A bilobed configuration often reflects the conformation of the contralateral arytenoid from phonatory arytenoid closure. Low-dose botulinum toxin (BOTOX), up to 2.5 international units, is injected during phonomicsurgical resection of the granulomas, passing the needle via the ventricle along the anterior face of the arytenoid until the cricoid cartilage is palpated, directing the BOTOX toward the lateral cricoarytenoid muscle rather than the thyroarytenoid muscle, reducing hypophonia and glottal insufficiency, for which the patient should be prepared. This alters adductory biomechanics, in that the interarytenoid muscle becomes more dominant, lessening trauma to the medial arytenoid mucosa. A case which required phonomicsurgical resection because of airway obstruction from massive bilateral granulomas is illustrative of phonomicsurgical and BOTOX techniques with adjuvant therapy using a “designer” third generation inhaled corticosteroid, ciclesonide. Another patient, who adamantly refused BOTOX, received an older type of injection of the granuloma base with aqueous based steroid, depomedrol, with a lesser result. In other cases, inhaled ciclesonide appeared to be a useful adjuvant in treating arytenoid granulomas.

KEY WORDS: Arytenoid granulomas – laryngopharyngeal reflux – mucositis – vocal hyperfunction – phonomicsurgery – botulinum toxin (BOTOX) – lateral cricoarytenoid – thyroarytenoid – interarytenoid – depomedrol – ciclesonide

Gregory J. Gallivan, M.D., F.A.C.S., F.C.C.P., Thoracic Surgeon, Voice Care Specialist, Airway Surgeon, University of Massachusetts Medical School, Mercy Medical Center, Wing Memorial Hospital, 299 Carew Street, Suite 404, (413) 785-1667, singingsurgeon@comcast.net

Helen K. Gallivan, B.S., R.N., Nurse Practice Manager, Thoracic Surgery and Voice Care Center, 299 Carew Street, Suite 404, (413) 785-1667, voice@gaw.com

Main Principles of the Acoustic Voice Analysis among Singers

E.V. Osipenko, A.P. Meshcherkin

Nowadays the method of the estimation of the spectral voice structure is used for the objective description of the voice. Among singers this method of diagnostics is used during the regular medical check-up, in the presence of the changes in the voice not defined by ear; complaints at all stages of voice function rehabilitation, at the beginning and at the end of academic year for the ascertaining of the dynamics training, as screening on the revealing the forming of the phonation pathology.

In our opinion all requirements important for the sound recording must be followed during the recording of the singer's voice. The algorithm of the voice type definition by the means of acoustic voice analysis including the definition of the frequency range, transitive notes, the tessitura, distinguishing formants and their filling in overtones has been developed. Also during the recording of the vocalists' voices we carry out some different tests, including loading one.

Computer Acoustic voice analysis allows to diagnose objectively both rough and "delicate" changes in the voice and carry out the comparative analysis of these changes during treatment, training and to find ways of voice disorder correction taking into account the received acoustic parametres and work specification. It is very important for the investigator to possess the bases of acoustics' principles and vocal art. Understanding of the specificity of the singer's voice recording favours further correct recording and interpretation of the received data.

Ekaterina Osipenko, PhD, Chief, Laboratory of a Vocal and Scenic Voice, Federal Research Clinical Centre of ENT of the Russia , Leningradsky prospect 1-100, Moscow, +7-901-541-49-59,
nxhosipenko71@yandex.ru

Alexander Meshcherkin, PhD, Head of the Sound Engineering Department, Leningradsky prospect 1-100, Moscow, +7-901-541-49-59, osip77@mail.ru

A Simple Real-Time Method for Testing the Pressure during the Self-Retaining Laryngoscopic Surgery

Objective To introduce a simple real-time method for testing the pressure during self-retaining laryngoscopic surgery ,and evaluate the difficulty of the surgery objectively.

Method After general anesthesia, the patients took conventional supine sniffing position. A thin weigher was placed on the support rack. The laryngoscope was inserted. After the tip of the laryngoscope reach the larynx, the end of the arm was laid on the weigher. The knob was rotated gradually to expose the visual fields while the real-time pressure produced by the arm on the support rack was recorded.

Results We use this kind of method to test the real-time pressure for a total of 13 patients who received self-retaining laryngoscope surgery and find that the pressure range from 2kg to 10kg. If the pressure is more than 7kg and we still can not expose the anterior commissure, we give external counterpressure on the patient neck to get good visual. When the pressure is more than 10kg and the lesion is still hard to expose perfectly, we use GlideScope ® video laryngoscope and curved surgical instruments to complete the operation. All of the 13 patients had successful surgery, and none of them had complications associated with the laryngoscope.

Conclusions Compared with the VAS score which is marked by the operator, this kind of real-time pressure testing method can reflect the difficulty of the surgery more objectively and help the operator to avoid the complications due to excessive pressure.

Xuchenjie, Doctor, Shanghai Huashan Hospital of China, No.12 Wurumuqi Road, Shanghai, China, 13917855518, swanxcj@yahoo.com.cn

Laryngostroboscopic Evaluations of Patients with Rheumatoid Arthritis

Introduction: Laryngeal involvement by rheumatoid arthritis (RA) is a common finding, but there have been no studies of laryngeal function in RA patients. Besides hoarseness and vocal fatigue, disturbances or airway difficulties may be found. Cricoarytenoid joint ankylosis is commoner than supposed. The laryngeal examination can reveal no significant findings.

However, it should be performed in order to determine if there is laryngeal changes due to RA.

Objective: To evaluate the laryngeal manifestations of the rheumatoid arthritis according to the videolaryngostroboscopic findings. **Methods:** A retrospective study was conducted in order to evaluate 12 patients with rheumatoid arthritis in the period from March to September, 2008. A laryngostroboscopic protocol was applied. Two observers analyzed the recorded data. **Results:** Six patients were clinically asymptomatic; throat clearing was the main clinical finding (5 patients). No changes were found among the asymptomatic patients in the laryngoscopic evaluation. Among the symptomatic patients, laryngoscopic changes were found in 5 patients; the most frequent change was arytenoid deformity (4 patients). The vibratory pattern was normal or slightly diminished under the stroboscopic evaluation.

Mario Augusto F. Castro, MD, School of Medical Sciences, Fundacao Lusiada, Santos, Rua Olinto Rodrigues Dantas , 343 cj. 92 - 11050-220 , Santos SP, Brazil, 55-13-3223-5550, mafc@uol.com.br

Rogerio A. Dedivitis, MD, Full Professor, School of Medical Sciences, Fundacao Lusiada, Santos, Rua Olinto Rodrigues Dantas, 343 cj. 92 - 11050-220, Santos SP, Brazil, 55-13-3223-5550, dedivitis.hns@uol.com.br

Elio G. Pfuetzenreiter Jr., MD, Master, School of Medical Sciences, Fundacao Lusiada, Santos, Rua Olinto Rodrigues Dantas , 343 cj. 92 - 11050-220, Santos SP, Brazil, 55-13-3223-5550, elio_junior@yahoo.com

Debora S. Queija, SLP, Master, Dept of Speech and Language Rehabilitation, Hospital Ana Costa, Rua Olinto Rodrigues Dantas, 343 cj. 92 - 11050-220, Santos SP, Brazil, 55-13-3223-5550, dqueija@uol.com.br

Ana Paula B. Barros, SLP, PhD, Dept of Speech and Language Rehabilitation, Hospital Ana Costa, Rua Olinto Rodrigues Dantas, 343 cj. 92 - 11050-220, Santos SP, Brazil, 55-13-3223-5550, apbbarros@uol.com.br

Subglottal Pressure Events during Vocal Gestures

Johan Sundberg, Ronald Scherer, Markus Hess, Frank Mueller

Acoustic and aerodynamic properties of the voice source and vocal tract have been extensively analyzed during the last half century. Corresponding investigations of the subglottal system are rare, but can be assumed to play a crucial role in voice production.

Subglottal pressure (P_{sub}) was recorded by means of tracheal puncture together with audio and oral airflow in a male adult subject. These signals were analyzed for temporal and aerodynamic characteristics during various vocal gestures important to vocal health and communication, e.g., coughing, throat clearing, and laughing. Effects on the P_{sub} waveform due to registers, vowel, phonation type, ingressive and egressive phonation, and pressure-driven lip vibration were examined. The moment of zero glottal flow was synchronous with the positive peak of the tracheal pressure waveform. The lowest resonance frequency of the subglottal system, determined by inverse filtering P_{sub} , was about 500 Hz, irrespective of supraglottal variations and phonation type.

Analysis of a particular voluntary “two-sounded double cough” suggested the following sequence: 1: inhalation; 2: glottal adduction to full closure with marked P_{sub} increase aspiration; 3: adduction release causing vocal fold vibration; 4: open glottis with maximum airflow and low P_{sub} ; 5: secondary adduction with vocal fold vibration, decrease of airflow, and marked P_{sub} increase; 6: moderate further P_{sub} rise between the two-sounded coughs; 7: maximum pressure and full adduction (similar to 2); 8: adduction release causing vocal fold vibration (similar to 3); 9: final extended phonation. Similar analyses will be presented for a variety of other vocal gestures.

Acoustic and aerodynamic morphology (timing, amplitude) of phonatory/laryngeal gestures

We can indicate:

- relative timing (when events occur, duration of events) of audio, wide-band flow, raw subglottal pressure
- relative amplitude changes among the 3 signals
- absolute values of pressures, flows

The results shed light on the phonatory significance of supraglottal pressure variations.

Johan Sundberg, PhD, Professor, Speech Music Hearing, School of Computer Science and Communication, TMH/KTH, SE-10044, Stockholm, pjohan@speech.kth.se

Ronald C. Scherer, Ph.D., Professor, Dept. of Comm Disorders, Bowling Green State University, 200 Health Center, Bowling Green, OH 43403 U.S.A., (419) 372-7189, ronalds@bgnet.bgsu.edu

Markus M. Hess, M.D., Head, Department of Voice, Speech and Hearing Disorders, Univ. Medical Centre Hamburg—Eppendorf, Martinistraße 52, D-20246 Hamburg Germany, +49-(40)-42803-2865, hess@uke.de

Frank Müller, Department of Voice, Speech and Hearing Disorders, Univ. Med. Center Hamburg-Eppendorf, Martinistraße 52, D-20246 Hamburg Germany, +49-(40)-42803-2865, f.mueller@uke.uni-hamburg.de

Allograft (Alloderm) and Autograft (Temporalis Fascia) Implantation for Glottic Insufficiency: A Novel Approach.

Objective: Traditionally, glottic insufficiency due to scar, atrophy and sulcus has been treated by injection or medialization laryngoplasty. These procedures do not reestablish the vertical height of the vocal fold during phonation. We propose soft tissue augmentation laryngoplasty with allograft (sheet alloderm) or autograft (temporalis fascia) via a minithyrotomy or a transoral approach.

Study Design: A retrospective analysis of twenty-one patients treated by sheet alloderm or temporalis fascia for correction of glottic insufficiency.

Methods: Twenty one patients with glottic insufficiency secondary to scar, atrophy, or sulcus were treated. Ten failed prior techniques. Seventeen had minithyrotomy by a small fenestration in the thyroid cartilage. Exploration of scar and adhesion through the fenestration allowed for the creation of a pocket for alloderm implantation within the deep or intermediate layer of the lamina propria. Four patients underwent a transoral approach with either alloderm or fascia implantation, which also allowed for exploration of scar but required incision repair using sutures. These implantation approaches allowed for both restoration of the layered structure as well as augmentation of the middle third of the musculomembranous vocal fold. Preoperative and postoperative videostroboscopic exams were reviewed with clinical reporting of voice.

Results: With a median follow up time of 6 months, patients demonstrated excellent long term vocal fold augmentation and minimal absorption of the implant in 19/21 patients. There is improved pliability of the vocal fold with good oscillation in scar patients.

Conclusion: Minithyrotomy with soft tissue augmentation is a novel approach for soft tissue augmentation of glottic insufficiency.

Melin Tan, M.D., Laryngology Fellow, Mount Sinai School of Medicine, 1 Gustave Levy Place Annenberg 10 Box 1189, New York, NY 10029, (646) 221-3162,
melintangeller@gmail.com

Peak Woo, M.D., Associate Professor, Mount Sinai School of Medicine, 1 Gustave Levy Place Annenberg 10 Box 1189, New York, NY 10029, (212) 580-1004,
peakwoo@peakwoo.com

Arytenoid Asymmetry in Relation to Vocal Symptoms in Singers

Objective: 1) To look at the prevalence of arytenoids asymmetry in singers **with or without vocal symptoms**, 2) to examine the correlation of arytenoid asymmetry with vocal symptoms.

Patients and Methods: A total of 110 medical records and video-recording of singers were evaluated for the presence or absence of arytenoids asymmetry, in relation to the position of the corniculate cartilages, cuneiform cartilages and the aryepiglottic angle.

Results: The male to female ratio was 2:1. The age range varied between 15 years to 39 years with a mean of 23.4 years + 4.21 years. Almost 17% had history of smoking.

The prevalence of arytenoids asymmetry during adduction in the overall sample was 53.6%. It was more common in males (74.6%) and on the right side (76.2%). The most common asymmetry was the cuneiform asymmetry accounting for 49.1% of the total sample and 91.6% of the total asymmetries. This was followed by aryepiglottic angle asymmetry in 31.9% and corniculate asymmetry in 27.3% of the total sample.

Almost 25 % of the total sample had vocal symptoms. The most common vocal symptom was vocal fatigue occurring in 22.7%, followed by hoarseness in 19% and contracted range in 10.9% of the cases. There was no correlation between any of the vocal symptoms with arytenoids asymmetry. All the p-values were greater than 0.05.

Conclusion: Arytenoid asymmetry during adduction is common in singers. There seem to be no correlation between arytenoids asymmetry and vocal symptoms.

Abdul-latif Hamdan, MD, Clinical Associate Professor, American University of Beirut Medical Center, Hamra, P.O.Box 110236, Beirut, Lebanon, 9611746660, ah77@aub.edu.lb

Sami Tambouzi Husseini, MD, Resident, American University of Beirut Medical Center, Hamra, P.O.Box 110236, Beirut, Lebanon, 9611350000, shusseini@aub.edu.lb

Akaber Halawi, MD, Resident, American University of Beirut Medical Center, Hamra, P.O.Box 110236, Beirut, Lebanon, 9611350000, ahalawi@aub.edu.lb

Abla Sibai, PhD, Associate Professor, American University of Beirut, Hamra, P.O.Box 110236, Beirut, Lebanon, 9611350000, ansibai@aub.edu.lb

Ref#: M31

The Patient Management Decision with the High Speed Video Laryngoscopy (HSVL) vs. Stroboscopy

To understand, to judge the patient management, the High Speed Video Laryngoscopy (HSVL) has completely change the understanding of the laryngeal biomechanics. We see the vibrations of the vocal folds but more than that, the “vocal attack” and the biomechanical assessment of all the laryngeal structures: every thing is vibrating. HSVL contributed significant management of the patient in 34%.

The importance of voice therapy is stressed. The efficiency of speech therapy is obvious. The Phonosurgery management is also approached with a different aspect: do we do both side or one side on Kissing nodules or Reinke’s oedema? How to perform a Sulcus vocalis compared to the vibrations of the false vocal folds?

Evaluation of vibratory features of the entire vocal folds, the glottal attack, the mucosal wave from the arytenoids to the anterior commissure, from the pharyngeal wall to the false cords, can be evaluated. On stroboscopic analysis, the severity of the vibrations chaos were noninterpretable, it was not the case with the HSVL.

The HSVL is a major tool to understand the biomechanical of the larynx and to understand the real glottal attack in voice professional who has lost the passagio or the pianissimo. Clinical findings, research findings will aloud a better patient management.

Patrick Abitbol, MD, Doctor ENT, Paris University, 1 Rue Largilliere, Paris, France F-75016, 00-33-1-46-47-91-89, jean.abitbol@gmail.com, abitbolj@noos.fr

Jean Abitbol, MD, Ancien Chef de Clinique, Faculte de Medicine de Paris, 1 Rue Largilliere, Paris, France F-75016, 00-33-1-46-47-91-89, jean.abitbol@gmail.com, abitbolj@noos.fr

Jean Jacques Maimaran, MD, ENT

The Female Voice and Tobacco: Hormonal Impact

Tobacco smoke contains compounds, the carcinogens, nicotine, carbon monoxide (CO) and other gases. Nicotine causes stimulation and sedation of the central nervous system depending upon the dose. CO in tobacco smoke has a higher affinity for haemoglobin. It reduces the oxygen-carrying capacity of the blood. The aim of this review is to describe the effects of smoking on the sexual hormones with its clinical consequences. Smoking affects pituitary, thyroid, adrenal, testicular and ovarian function, calcium metabolism and the action of insulin. The major relevant clinical effects on female voice professional are the increased risk of hoarse voice, or and a deep voice, and pathological vocal folds lesion particular to female smokers (beside the malignant tumour).

The female smokers are often associated with a “male voice like” through a mechanism involving androgen levels, progesterone levels, sex hormone-binding globulin levels, or the ratio of androgens to estrogens.

Cigarette smoking stimulates the production of androstenedione from the adrenal gland. Although androstenedione levels are increased and progesterone levels are decreased in smokers compared with nonsmokers, hormone levels may be involved in the association between cigarette smoking and Reinke’s space oedema. Women with and without Polypoïde cords were recruited. Women were between 35 and 54 years of age, with at least three menstrual periods in the previous 12 months, and were not postmenopausal. Study participants completed a questionnaire and gave a blood sample for hormone measurements. Current smokers had significantly lower progesterone levels, higher androstenedione levels and a higher androgen-to-estrogens ratio than never smokers.

Patrick Abitbol, MD, Doctor ENT, Paris University, 1 Rue Largilliere, Paris, France F-75016, 00-33-1-46-47-91-89, jean.abitbol@gmail.com, abitbolj@noos.fr

Jean Abitbol, MD, Ancien Chef de Clinique, Faculte de Medicine de Paris, 1 Rue Largilliere, Paris, France F-75016, 00-33-1-46-47-91-89, jean.abitbol@gmail.com, abitbolj@noos.fr

Risk and Protective Factors for Spasmodic Dysphonia: A Case-Control investigation

ABSTRACT

Objectives: Spasmodic dysphonia (SD) is a chronic, incurable and often disabling voice disorder of unknown pathogenesis. The purpose of this study was to identify possible endogenous and exogenous risk and protective factors uniquely associated with SD. **Study Design:** Prospective, exploratory, case-control investigation. **Methods:** One hundred and fifty (150) patients with SD and 150 medical controls (MC) were interviewed regarding their personal and family histories, environmental exposures, illnesses, injuries, voice use patterns, and general health using a previously-vetted, validated epidemiologic questionnaire. **Results:** Odds ratios and multiple logistic regression analyses ($\alpha<0.15$) identified several factors which significantly increased the likelihood of having SD. These factors included: 1) a personal history (PH) of mumps, blepharospasm, tremor, intense occupational and avocational voice use, and a family history of voice disorders, 2) an immediate family history (IFH) of meningitis, tremor, tics, cancer, and compulsive behaviors, and 3) an extended family history (EFH) of tremor and cancer.

Conclusions: SD is likely multifactorial in etiology, involving both genetic and environmental factors. Viral infections/exposures, along with intense voice use may trigger the onset of SD in genetically predisposed individuals. Future studies should examine the interaction among genetic and environmental factors to determine the pathogenesis of SD.

Kristine Tanner, Ph.D., Adjunct Assistant Professor, University of Utah, 729 Arapeen Drive, Salt Lake City, UT 84108, (801) 585-7946, kristine.tanner@hsc.utah.edu

Nelson Roy, Ph.D., Associate Professor, University of Utah, 390 S 1530 E, Rm. 1219, Salt Lake City, UT 84112, (801) 585-0428, nelson.roy@health.utah.edu

Ray M. Merrill, Ph.D., M.P.H., Professor, Brigham Young University, 229A RB, Provo, UT 84604, (801) 422-9788, ray_merrill@byu.edu

Kamille Kimber, M.S., Graduate Student, University of Utah, 390 S 1530 E, Rm. 1201, Salt Lake City, UT 84112, (801) 581-6725, kamille.kimber@utah.edu

Cara Sauder, M.A., Speech-Language Pathologist, University of New Mexico Hospitals, 221 Lomas Blvd. NE, Albuquerque, NM 87106, (505) 272-2111, carasaudervoice@gmail.com

Daniel R. Houtz, M.A., Speech-Language Pathologist, The University of Utah, 729 Arapeen Dr. Salt Lake City, UT 84108, (801) 581-4956, dan.houtz@hsc.utah.edu

Darrin Doman, M.S., Speech-Language Pathologist, The University of Utah, 50 N Medical Drive 1R73 SOM, Salt Lake City, UT 84132, (801) 585-5989, darrin.doman@hsc.utah.edu

Marshall E. Smith, M.D., Professor, The University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 587-3548, marshall.smith@hsc.utah.edu

Investigation of a Screening Protocol for Laryngeal/Pharyngeal Cancer in the Veterans Health Administration

OBJECTIVES

An integrated health care system provides a unique opportunity to increase the quality and speed of care provided to its patients. Such a model exists in the Veteran's Administration Health Care System, where a flexible, single database and quick referral processes allow screening, diagnoses, and treatments to be provided rapidly, with all information and images immediately available for each step in the process. The purpose of this study is to investigate the usefulness of such a protocol for the screening of laryngeal / pharyngeal carcinomas.

RESEARCH DESIGN

This is a retrospective cohort study with two control groups (historical and contemporary). All patients referred for laryngeal/pharyngeal cancer screening and all laryngeal/pharyngeal cancer diagnoses within one Veteran's Administration Medical Center over the course of 106 months were reviewed.

METHODOLOGY

A sequential list of all patients seen for endoscopic evaluation of their dysphonia and/or dysphagia over a 53 month period was compiled. At the beginning of this time period, providers had initially been educated on the early clinical signs of laryngeal / pharyngeal cancer (dysphonia and dysphagia), and asked to refer those patients for endoscopic evaluation. A list of all laryngeal and pharyngeal cancer diagnoses among patients from this health care center during this 53 month period, and during the previous similar-length period of time (53 months) was also compiled for comparison of number and tumor staging at time of diagnosis. Outcomes included demographics, tobacco and alcohol consumption levels, AJCC staging, number and locations of tumors, and 2-year survival. Correlations and descriptive statistics were primarily used in the analysis of these data.

RESULTS

During the 53 months of the screening period, 16 laryngeal and 6 pharyngeal cancers were found through the use of the screening protocol. During the same period, 6 laryngeal and 8 pharyngeal cancers were diagnosed in patients who were not passed through the protocol. During a similar 53 month period immediately prior to this, 10 laryngeal and 12 pharyngeal cancers were diagnosed. The increase in total number of laryngeal cancers (10 to 22) between these two periods suggests a positive benefit from the screening protocol for the detection of this type of cancer. This benefit was also seen in a stage shift, with 25% of all laryngeal and pharyngeal cancers in the historical control group being early stage (AJCC Stage 0, I, or II) compared to 59% early stage (73% of the laryngeal cancers and 33% of the pharyngeal cancers) in the screened group. Significantly, only 20% of those laryngeal and 28% of those pharyngeal cancer patients who were *not* screened during the period that the screening protocol was in effect were early stage.

2-year survival rates also showed improvement for those who were found to have cancer through the screening protocol. 40% of those with laryngeal cancer and 8% of those with pharyngeal cancer in historical group (prior to screening protocol) survived 2 years; 33% of those who were found to have laryngeal cancer, and 43% of those with pharyngeal cancer during the protocol period but *without* the use of the protocol survived 2 years. Finally, 62% of those who were found to have laryngeal cancer, and 33% of those with pharyngeal cancer found through the screening protocol survived 2 years.

CONCLUSION

The use of a screening protocol for both laryngeal and pharyngeal cancers as described, results in earlier detection of both laryngeal and pharyngeal cancers, as evidenced by a significantly increased percentage of Stage 0, I, and II (early) laryngeal cancers, and a nominal increase in early stage pharyngeal cancers. Mortality outcomes for the screened group were also improved for those found to have laryngeal cancer as seen by significantly increased 2-year survival rates compared to unscreened controls and historical controls.

Daniel McCabe, DMA, MM, MA, CCC-SLP, Director, Speech & Audiology Department, Crystal Run Healthcare, 95 Crystal Run Rd. Middletown, NY 10941, (845) 703-3544, damccabe@crystalrunhealthcare.com

William Coughlin, PhD, Retired SLP, Syracuse VAMC

Precha Emko, M.D., Chief, Otolaryngology (ret), Syracuse VAMC

Microlaryngoscopy - Improving Surgical Competence

Laryngology for anything other than malignancy is still a minor specialty and many trainees admit that practical teaching on the subject can be sporadic at best. There are surgical skills courses available including laryngeal surgical techniques but most involve using an animal's larynx and the vocal cords do not have abnormal pathology or the correct tissue characteristics. There can be objections on religious grounds if a porcine larynx is used and the laryngeal anatomy of most animals is very different to the human. There is no assessment of choosing the correct laryngoscope and its insertion, microscope skills or positioning of the patient for surgery.

Over the last 4 years I have developed a laryngeal surgical mannequin where trainees can learn the fundamentals of microlaryngeal surgery, including using the CO₂ laser. The model assesses the surgical skills of the trainee and also their ability to insert and position a laryngoscope. It also allows them to learn laser techniques in a realistic training environment and safe laser practice in theatre.

The model has a removable larynx with vocal cords showing different pathologies including early T1A tumour, polyp and nodules. These can be removed using traditional cold steel techniques or laser.

There is a validated scoring system that has been used on the trainees in the South Thames area and the scores correlate with their length of time in training and number of previously completed laryngeal procedures

I believe this is a realistic model for training microlaryngeal surgery. The laryngeal inserts demonstrate pathology; they have the correct tissue characteristics and can be used with the CO₂ laser. The scoring system suggests a method of measuring surgical competence, microscope skills and instrumentations skills.

Meredydd Harries, F.R.C.S. M.Sc., Consultant Laryngologist, National Health Service UK, Brighton NHS Trust, 01903 873340 [UK], meredlolharries@hotmail.com

Ref#: M7

Paradoxical Vocal Fold Motion: Intense Respiratory Retraining to Manage Long Term Symptoms

Hatzelis, Victoria; Murry, Thomas

The current investigation is a case study of paradoxical vocal fold motion (PVFM), a laryngeal disorder characterized by shortness of breath and choking sensation. In PVFM, the vocal folds partially adduct during inspiration. The subject examined intermittently struggled with severe shortness of breath and choking sensation for more than ten years before a diagnosis of PVFM was made. She has no history of either gastroesophageal or laryngopharyngeal reflux based on previous examinations. Her medical records indicate that breathing problems were not caused by allergies or asthma, and were deemed a combination of habit and stress. Initial diagnosis was made via detailed case history, spirometry and nasal endoscopy. Treatment consisting of increasingly intensive daily respiratory retraining exercises for one month began immediately following diagnosis. The subject continued respiratory retraining exercises after the treatment period. Spirometry and endoscopy were performed immediately following treatment, as well as 1- and 3- months post-treatment. Immediately following treatment, abnormal vocal fold adduction was seen on endoscopy and subject was mildly symptomatic. One month post-treatment, there was no abnormal vocal fold adduction and subject was occasionally symptomatic. Three months post-treatment, there was no abnormal vocal fold adduction and subject was no longer symptomatic. The results suggest that respiratory retraining can effectively eliminate respiratory difficulties related to PVFM. Treatment may require several months to resolve the symptoms as well as the laryngeal adductory motion. The value of a comprehensive case history, medical documentation and continued treatment proved of value despite the long term history of the problem.

Victoria Hatzelis, BS, Teachers College, Columbia University, West 120th St., New York, NY 10027, vmh2106@columbia.edu

Thomas Murry, PhD, Professor of Otorhinolaryngology, Weill Cornell Medical College, 1305 York Avenue 5th Floor, New York, NY, (646) 963-5802, thm7001@med.cornell.edu

Surgical Cricothyroid Approximation for Pitch-Raising Voice: Our Experience and Results

INTRODUCTION: Voice is one of the principal features transgender subjects pretend to adapt to their desired gender role. In case of male-to-female individuals, a more feminine and so on acute voice is pretended. Thyroplasty type IV of Isshiki, aims to pitch-raise human voice, reaching a higher fundamental frequency (F_0) and represents one of the treatments ENT professionals may offer to gender dysphoria patients. The approximation between cricoid and thyroid cartilages leads to a higher tension of cricothyroid muscle that allows raising de voice pitch.

MATERIALS AND METHODS: we studied 20 patients from the Hospital Universitario Ramón y Cajal Gender Dysphoria Unit before and after surgical cricothyroid approximation, analyzing stroboscopic records and basic data from acoustic analysis in order to compare the pitch change due to surgery. Postoperative patient's satisfaction (rated with Voice Handicap Index) and dysphonia and also registered.

RESULTS: Before surgery, F_0 had minimum values between 98-132 Hz and maximum of 150-187 Hz. After surgery the average F_0 raising value was 32 Hz, with a statistical significant difference ($p<0,001$). Nearly 90% of the patients were satisfied with surgery results although 40% of them presented several grades of roughness at their first visit after surgery. Our longer term results actually regard 2 years.

CONCLUSION: There are many procedures described to pitch-raise the voice, conservative such as vocal rehabilitation, and surgical, such as Thyroplasty IV. We find that Thyroplasty IV is an effective technique to pitch-raise the voice. The patients identify themselves in a better way with their new voices and objectively a higher F_0 is reached. We analize here our experience in cricothyroid approximation, but further studies are necessary for long term results and for comparing conservative versus surgical treatment.

Elena Mora, Otolaryngologist, Hospital Universitario Ramón y Cajal, Ctra Colmenar Viejo Km. 9,100, +0034913368622, elenamorarivas@gmail.com

Ignacio Cobeta, Otolaryngologist, Chairman, Hospital Universitario Ramón y Cajal, Ctra Colmenar Viejo Km. 9,100, +0034913368062, icobeta@arrakis.es

Antonio Becerra, Endocrinologist, Coordinator Transgender Unit, Hospital Universitario Ramón y Cajal, Ctra Colmenar Viejo Km. 9,100, +0034913367920

Characteristics of the Lipoid Proteinosis

Wen Xu, Demin Han, Lei Wang, Li Zhang

Department of Otorhinolaryngology Head and Neck Surgery, Beijing Tongren Hospital, Capital Medical University, Key Laboratory of Otorhinolaryngology Head Neck Surgery, Ministry of Education, Beijing 100730, China

[Abstract] **Objective** To investigate the laryngeal and general characteristics of the lipoid proteinosis (LP). **Methods** Twenty cases of LP were analyzed. The multisystem manifestations , laryngeal behaviors, and characteristics of histopathology were evaluated. **Results** All the patients of LP presented with moderate-severity hoarseness as the first sign. The onset is in the newborn period in 12 cases (60%) (4 cases at birth). Videolaryngoscopy revealed thickening of the interarytenoid region and irregularities along the rims and the surface of the vocal folds due to yellowish papules, mucosal wave was apparently decreased. Oral tissues showed yellow-white infiltrates in 15 cases in the tongue, soft palate and lips, etc. Thickened frenulum leading to shorten of the tongue and restricted tongue movement. Whitish moniliform papules on the upper eyelids showed in all cases, 16 cases (80%) revealed after 7-8 years old. Pock-like or acneiform scars are particularly evident on the face and the limbs in 16 cases (80%). It is characterized by diffuse deposition of hyaline material of eyelid and larynx in the submucosal and dermis with periodic acid-Schiff (PAS)-positive, but Congo red stain-negative. Eight patients underwent microlaryngosurgery to excision of deposits of the vocal folds. The voice function is significantly improved after surgery. **Conclusion** Lipoid proteinosis is characterized by infiltration of hyaline material into the larynx, skin, oral cavity, and internal organs. Typical involvement (including hoarseness in infancy, beaded papules along eyelid margins) and histopathological characteristics help in the diagnosis of this rare disorder. Microlaryngosurgery excision of deposits could improve the voice.

Wen Xu, M.D., Associated Professor, Beijing Tongren Hospital, 1 Dongjiaominxiang Street, 86-10-58269133, xuwenlily@yahoo.com.cn

Demin Han, M.D., Professor, Beijing Tongren Hospital

Lei Wang, Beijing Tongren Hospital

Li Zhang, Beijing Tongren Hospital

Correlation of Findings of Multidimensional Voice Profile with Videostroboscopy in Patients with Unilateral Vocal Cord Paralysis before and after Voice Therapy

Authors: Ms. Priyanka Anakkathil, Dr. B. S. Premalatha

ABSTRACT

Aim: The present study was aimed to find a correlation in the findings of multidimensional voice profile with videostroboscopy in patients with unilateral vocal cord paralysis before and after voice therapy.

Method: 5 unilateral vocal cord paralysis and 20 normals age range 20 – 40 years) served as subjects. Voice samples such as the phonation of /a/ was recorded for 3 successive trials and the best of the sample was selected for the analysis. The recorded samples were analyzed using MDVP software for both pre and post voice therapy. These subjects were also subjected for videostroboscopy evaluation to observe the movement of the vocal cords and glottic closure. The parameters evaluated were glottic closure, vertical level of vocal fold approximation, periodicity, symmetry and movement of ventricular folds, symmetry and movement of arytenoids, phase closure, phase symmetry and hyperfunction for both pre and post therapy.

Results: There was a significant improvement in the individual's voice after rigorous voice therapy. Videostroboscopic findings revealed glottic chink of varying distance, restricted movement of the paralyzed vocal cords, poor phase closure and symmetry and poor periodicity was observed before the initiation of the therapy. This condition too showed variations in the parameters such as Soft Phonation Index (SPI), Perturbation parameters and degree of voiceless. Voice therapy resulted in good correlation between MDVP parameters and videostroboscopic findings.

Discussion: The present study concludes that there is a good correlation between videostroboscopy and multidimensional voice profile in individuals with unilateral vocal cord paralysis.

Priyanka Anakkathil, M.A., Clinical Supervisor, Dr.S.R.Chandrashekhar institute of speech and hearing , Bangalore UniversityHennur Road, Lingarajapuram, Bangalore-560 084, Karnataka, India, 09980040998, priyanka.anakkathil@gmail.com

B.S.Premalatha, Ph.D., Professor, Dept of Speech Pathology, Dr.S.R.Chandrashekhar institute of speech and hearing , Bangalore University, Hennur Road, Lingarajapuram, Bangalore-560 084, Karnataka, India, 09845276134 dr_premalatha@rediffmail.com

Acoustic and Temporal Analysis of Laryngectomee Speech

The process of voice production involves using the structures of larynx particularly the true vocal cords. Production of voice may get affected by internal or external factors. Laryngeal cancer is one such factor affect the quality of voice. In the Indian scenario there is a larger prevalence of laryngeal cancer. Voice parameters post laryngeal surgery has been studied extensively but the comparison between different surgical procedures and its outcome of speech has its limitations in the Indian scenario. The present study aims at studying the acoustic & temporal parameters of voice in different types of laryngectomees. Subjects included esophageal speakers (n=3), partial laryngectomy [PL] (n=5), near total laryngectomy [NTL] (n=5) and total laryngectomy with primary voice restoration surgery [TEP] (n=5). The voice of each laryngectomee was analyzed using the Praat software. Frequency and intensity related parameters along with temporal parameters were analyzed. Results indicated that there is a significant difference in the speech characteristics between the different types of laryngectomy. Esophageal speakers showed poor performance for both temporal and acoustic parameters. The NTL, TEP and the PL group where the source is the lung power showed better results. The result obtained would help in the decision making process concerning the usefulness and the expectations of each surgical procedure by the team involved in the management of laryngectomee. The analysis of voice after surgery will assist the speech language pathologist (SLP) to form a baseline for speech intervention.

Vijeta Sharma, Masters, Audiology and Speech Language Pathology, Senior Speech Language Pathologist, Dr S R Chandrashekhar Institute of Speech and Hearing , Hennur Main Road, Lingarajapuram, Bangalore, 560084, Karnataka, India, +91-9845750269, vijeta529@gmail.com

T A Subbarao, Phd, Professor & Principal, Dr.M V Shetty College of Speech and Hearing., Maladi Courts, Kavoor, Mangalore-575 015, Karnataka, India, +91 9448043096, subbaraota@yahoo.com

Impact of Thyroidectomy (Without Laryngeal Nerve Injury) on Vocal Quality: An Objective Multiparameter Approach

Abstract

Objectives/hypothesis: The main purpose of this study was to determine the impact of thyroidectomy on the subjective and objective vocal quality, using the Dysphonia Severity Index. It was hypothesized that objective measures of vocal function and other vocal characteristics would change (temporary or permanently) from the presurgical to the postsurgical conditions, even with the entire preservation of the laryngeal nerve, due to the surgical approach and other influencing factors.

Study Design: Prospective study in which 44 subjects were studied before (1 week) and three times postthyroidectomy.

Methods: Subjective (auditory perceptual evaluation and videolaryngostroboscopy) and objective (aerodynamic, vocal range, acoustic and Dysphonia Severity Index measurements) assessment techniques were used.

Results: Paired samples *t* test indicated a significant decrease of the highest frequency, the highest intensity, the fundamental frequency and the Dysphonia Severity Index in the first postoperative condition. When a repeated measures analysis of variance was performed with the pre-and all the postoperative moments of evaluation taken into account, no significant difference was noted for any of the objective voice characteristics.

Conclusion: After thyroidectomy subjects had a normal perceptual and objective vocal quality corresponding with a Dysphonia Severity Index of 66%, and there is no permanent change of the vocal performance. Moreover, there is no psychosocial handicapping effect of the vocal quality, but immediately post-thyroidectomy there are more vocal complaints. To what extent thyroidectomy causes (temporary or permanent) alterations of the singing voice in elite vocal performance is subject to further research.

Kristiane van Lierde, Ph.D, Professor, University Hospital Gent, De Pintelaan 185, 0032 9331 23 91, kristiane.vanlierde@ugent.be

Evelien Dhaeseleer, Ph.D., University Hospital Gent, De Pintelaan 185

Nele Baudonck, M.D., University Hospital Gent, De Pintelaan 185

Hubert Vermeersch, M.D., Ph.D., Professor, University Hospital Gent, De Pintelaan 185, hubert.vermeersch@ugent.be

Management of Abductor Vocal Fold Paralysis Co-existing with Spasmodic Dysphonia

Authors: MS Vidhi Sanghvi Dr. B.S. Premalatha

ABSTRACT:

Introduction: Voice pathologies affecting the vocal functions may include vocal fold paralysis, spasmodic dysphonia etc....each one having its own characteristics. Vocal fold paralysis results from abnormal nerve input to the laryngeal muscles where as Spasmodic dysphonia results in abnormal movements and spasms during speaking due to the inappropriate muscle contractions.

Aim: This study was designed to investigate and to critically diagnose a rare condition- co-existence of unilateral abductor vocal fold paralysis with adductor spasmodic dysphonia and to highlight the management of the same.

Methodology: Detailed evaluation of voice parameters was carried out on a subject who had complained of strained voice with mild stridor 3-4 years post thyroidectomy. Trismus of two finger width and restricted neck movement along with facial grimaces was observed. Dr Speech software was used to analyse the voice samples. Videostroboscopy evaluation was carried out to observe the movement of the vocal cords and glottic closure, vertical level of vocal fold approximation, periodicity, symmetry and hyperfunction. Assessment revealed that the subject has a rare condition of unilateral abductor vocal fold paralysis co-existing with mild adductor spasmodic dysphonia. Intensive counseling was done with regard to voice therapy and psychological counselling.

Results: Voice parameters improved satisfactorily as subject attended therapy and counseling sessions. Reduction in muscles tension and facial grimaces observed and could able to initiate speech with out effort.

Discussion and Conclusion. Objective and subjective findings were used to confirm the co-existence of vocal fold paralysis with spasmodic dysphonia and the significance of the management is cited.

Vidhi Sanghvi, MASLP Student, Dr S.R. Chsntra Sekhar Institute of Speech and Hearing, Hennur Road Lingaraja Puram, Bangalore-84, Karnataka, India, 09008713371, sanvidhi@gmail.com

B.S.Premalatha, Ph.D, Professor and HOD, Dr S.R. Chsntra Sekhar Institute of Speech and Hearing, Hennur Road Lingaraja Puram, Bangalore-84, Karnataka, India, 09845276134, dr_premalatha@rediffmail.com

Vocal Characteristics of Middle Aged Premenopausal Women

E. D'haeseleer, H. Depypere, S. Claeys, F.L. Wuyts, N. Baudonck, K.M. Van Lierde

Aging influences the laryngeal anatomy and physiology, leading to altered vocal quality. In middle aged women the voice is affected by a combination of aging and menopausal transition. In the literature the effect of aging on the voice has been widely described. However, in these studies of vocal aging the influence of the menopausal transition is not taken into account.

The purpose of this study was to measure and describe the effect of aging on the vocal characteristics by comparing 22 young women (between 20 and 24 years) and 22 middle aged premenopausal women (between 45 and 52 years). By excluding menopausal women (sex) hormonal influence was avoided and only the effect of aging in middle aged women was evaluated.

To determine the vocal characteristics in both groups objective (aerodynamic measurements, vocal performance measurements, acoustic analysis and a determination of the Dysphonia Severity Index) and subjective assessment techniques (perceptual evaluation, videostroboscopic evaluation, Voice Handicap Index) were used.

The middle aged premenopausal women showed a smaller frequency and intensity range, a lower habitual fundamental frequency and a higher soft phonation index compared to the young women.

The results of this study are important when studying the voices of middle aged women. Results of this study indicate that vocal changes in middle aged women are not only due to menopausal changes and already begin in the premenopausal period.

Evelien D'haeseleer, Msc, Speech Language Pathologist, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium, 0032 9 332 24 67, Evelien.Dhaeseleer@ugent.be

Herman Depypere, Phd, MD, Professor, Gynaecology, Ghent University, Dept of Uro-Gynaecology, De Pintelaan 185, P3; 9000 Gent, Belgium

Sofie Claeys, Phd, MD, Professor in the Otorhinolaryngology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 1P1; 9000 Gent, Belgium

Floris Wuyts, Phd, Professor, University of Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Nele Baudonck, Msc, Speech Language Pathologist, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium

Kristiane Van Lierde, Phd, Professor, Speech Language Pathology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium

Nasal Resonance in Middle-Aged Women: A Multiparameter Approach

E. D'haeseleer, H. Depypere, S.Claeys, K.M. Van Lierde

Little is known about the changes with aging in nasal resonance in normal developing women. For professional voice users the maintenance of an optimal speech production is important in the middle ages to practice their profession. Studies investigating the effect of aging on nasal resonance show conflicting results.

The purpose of this study was to investigate the effect of aging on the nasal resonance by comparing twenty-two young women (between 20-25 years old) with thirty-one middle aged women (between 45-55 years old). Menopausal women were excluded to avoid hormonal influences.

Objective and subjective assessment techniques were used to determine the nasalance (a measure of the relative amount of oral and nasal acoustic energy in a subject's speech), the nasality (auditory-perceptual evaluations), aerodynamic capacities and the Nasality Severity Index (NSI).

The results of this study showed a significant lower NSI in middle aged women (mean -1.49) compared to young women (mean +14.44). The lower the NSI the higher the presence of hypernasality.

It is hypothesized that the velopharynx becomes less competent with age which results in higher nasalance scores. Knowledge of the effect of aging on nasal resonance in normal developing women is important for speech therapists working with adults with nasal resonance disorders.

Evelien D'haeseleer, Msc, Speech Language Pathologist, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium, 0032 9 332 24 67, Evelien.Dhaeseleer@ugent.be

Herman Depypere, Phd, MD, Professor, Gynaecology, Ghent University, Dept of Uro-Gynaecology, De Pintelaan 185, P3; 9000 Gent, Belgium

Sofie Claeys, Phd, MD, Professor in the Otorhinolaryngology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 1P1; 9000 Gent, Belgium

Kristiane Van Lierde, Phd, Professor, Speech Language Pathology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium

The Impact of Hormone Replacement Therapy on the Voice in Menopausal Women

E. D'haeseleer, H. Depypere, S. Claeys, K.M. Van Lierde

During lifetime the female larynx is very sensitive to sex hormone fluctuations. The menopause forms a critical event in a women's life and also affects the laryngeal tissues. For the treatment of menopausal complaints hormone replacement therapy is often prescribed.

The purpose of this study was to determine the impact of hormone replacement therapy (HRT) on the vocal quality by comparing 27 (mean age: 58,3 years) postmenopausal women without HRT and 35 postmenopausal women with HRT (mean age: 57,6 years).

To determine the vocal characteristics in both groups objective (aerodynamic measurements, vocal performance measurements, acoustic analysis and a determination of the Dysphonia Severity Index) and subjective assessment techniques (perceptual evaluation, video-stroboscopic evaluation, Voice Handicap Index) were used. For the comparison of the parameters with a normal distribution an independent sample t-test (two-tailed) was performed. For nominal parameters and parameters deviating from a normal distribution respectively a Pearson Chi-Square test and a Mann-Whitney rank sum test was performed.

The women taking HRT showed a significantly higher fundamental frequency of continuous speech in comparison with the women not taking HRT ($p=0.015$). The study is still continuing until December 2009 to obtain more subjects in both groups.

The first results of this study point out a tendency towards a positive conserving effect of hormone replacement therapy on the vocal quality and more specific the habitual frequency of a women's voice.

Evelien D'haeseleer, Msc, Speech Language Pathologist, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium, 0032 9 332 24 67, Evelien.Dhaeseleer@ugent.be

Kristiane Van Lierde, Phd, Professor, Speech Language Pathology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 2P1; 9000 Gent, Belgium

Sofie Claeys, Phd, MD, Professor in the Otorhinolaryngology, Ghent University, Dept of Otorhinolaryngology, De Pintelaan 185, 1P1; 9000 Gent, Belgium

Herman Depypere, Phd, MD, Professor, Gynaecology, Ghent University, Dept of Uro-Gynaecology, De Pintelaan 185, P3; 9000 Gent, Belgium

Ref#: SLP17

Title: Vocal Symptoms, Voice Activity and Participation Profile (VAPP) and Professional Performance of Call Center Operators

Authors: Tatiana Piwowarczyk, Luciana Lourenço, Gisele Oliveira and Mara Behlau

Institution: CEV – “Centro de Estudos da Voz” (Center of Voice Studies), São Paulo, Brazil

Goal: To check the presence of phonatory and laryngopharyngeal symptoms reported by call center operators and the impact of these symptoms in their quality of life, as well as, to analyze the relationship between the occurrence of these symptoms with professional performance, number of monthly calls and number of missed work days. **Methods:** 157 call center operators from the charges section of a company filled in the Vocal Signs and Symptoms Questionnaire (Roy, Merrill, Thibeault, Gray, Smith, 2004) and the Brazilian validated version of the VAPP. The company provided data about the professional functioning assessment: professional performance level, average number of calls by month and number of missed work days. **Results:** The average number of current symptoms (6.8) was higher ($p<0.001$) than in the past (2.5) and much above the data for a general population (1.7). An average of 4.2 symptoms was attributed to be caused by their occupation. The average symptoms did not show correlation with professional performance (past symptoms $p=0.387$, present symptoms $p=0.571$), but with lower average amount of missed work days and a higher average number of monthly calls. The VAPP responses presented with reduced scores that indicates very little impact of voice difficulties in the participants’ quality of life. Cases with deviated VAPP scores were associated to low professional performance level. **Conclusions:** The presence of vocal symptoms does not necessarily relate to the professional performance, however there was an association between a higher vocal activity limitation and participation restriction and worse professional performance.

Address for correspondence:

Mara Behlau, PhD

CEV: Rua Machado Bittencourt 361

São Paulo, SP. 04044-001

Phonefax (+55 11) 5575-1710

mbehlau@uol.com.br

Tatiana Piwowarczyk, BSc, Associate Researcher, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, fonotatiana@hotmail.com

Luciana Lourenço, BSc, Associate Researcher, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, luciana.fonoaudio@micelli.com.br

Gisele Oliveira, PhD, Associate Professor, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-9886-7383, giseleoliveiracev@uol.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Perceptual and Auditory Analysis of Airline Pilots in Real Situations of Emergency Flight

Safety and protection are main issues of the civil and commercial aviation and communication plays a major role. **Purpose:** to describe vocal features of recorded samples from aircrafts' black boxes and air traffic control towers of real situations of flight emergency. **Methods:** 20 samples from 18 audio recordings were evaluated: 17 from the captain and 3 from the co-pilot. Perceptual analysis was performed focusing the voice and speech characteristics. The vocal psychodynamics of the confidence conveyed in the message was also assessed. **Results:** In the emergency situations the professionals presented with the following characteristics: deviated vocal quality (50%), high pitch (60%), loud voice (50%), precise articulation (60%), inadequate speech and respiratory coordination (48%), inadequate use of emphasis and rhythm (30%), phoneme prolongation (75%), hesitation (70%) and fast speech rate (60%). Regarding vocal deviation degree, 10% presented mild deviation, 60% moderate and 30% severe; 50% of recordings showed normal vocal quality even during a life threatening event. Psychodynamic analysis denoted moderate confidence in 60% of samples, even in the presence of normal voice. **Conclusions:** The findings of perceptual parameters and psychodynamics information showed an effort to control communication with no severe vocal disruption that is frequently seen in extremely emotional and risky events. Severe deviations were only found in fatal encounters, where the pilot foresees the accident by screaming and showing emotional disentanglement, with different expressions of vocal disruption. Even though there were pieces of vocal instability, they had little occurrence and did not compromise the message transmitted.

Lilian Paternostro, BSc, Associate Researcher, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, +5511-5575-1710, lilian_fono@hotmail.com

Gisele Oliveira, PhD, Associate Professor, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-9886-7383, giseleoliveiracev@uol.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Voice Disorders in Teachers and General Population in Brazil

Goal: To examine the frequency and adverse effects of possible voice disorders on job performance of teachers and general population in all 26 Brazilian states. Methods: A standardized questionnaire (Roy et al 2004) was used. The total number of individuals determined statistically was 3265, 1651 teachers and 1614 nonteachers. Results: Teachers reported a higher number of current (3.7) and past (3.6) voice symptoms when compared to nonteachers (1.7 present, 2.3 past) and attributed these to their occupation ($p<0.001$). 63% of teachers (1041) and 35.3% (569) of nonteachers reported to have suffered a voice problem at any time in their lives. There were differences between groups for all symptoms considering both present and past occurrence, except from throat clearing and bitter/acid taste in the mouth. Vocal problems affecting communication tasks were more frequent in teachers (1041-63.1%) than nonteachers (569-35.3%; $p<0.001$). Teachers missed more work days than nonteachers (4.9 days for voice problems). Teachers indicated the possibility of changing their occupation in the future because of their voice more than nonteachers (276-16.7% and 14-0.9%; $p<0.001$). Regional characteristics did not show to be relevant. The disturbing panorama was very consistent all over Brazil, which reveals the strength and uniformity of data. Conclusion: Teachers presented with higher and multiple vocal signs and symptoms related to occupation because of their voice. Teachers perceived the adverse effects of a vocal problem in the job performance, suffered from negative consequences of missing work days and estimated the possibility of having to change their occupation in the future.

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Fabiana Zambon, BSc, Associate Professor, CEV and SINPROSP, Rua Machado Bittencourt 361, São Paulo. 04044-001. Brazil, +5511-5575-1710, fabiana@sinprosp.org.br

Ana Cláudia Guerrieri, BSc, Associate Researcher, CEV: Rua Machado Bittencourt 361, São Paulo. 04044-001. Brazil, +5511-5575-1710, acguerrieri@ativox.com.br

Nelson Roy, PhD, Associate Professor, University of Utah, 390 South 1530 East, room 1219, Salt Lake City, Utah 84112, +801-585-0428, nelson.roy@health.utah.edu

ABSTRACT

THE EFFECT OF AUDITORY PERCEPTUAL TRAINING IN INEXPERIENCED LISTENERS TO EVALUATE DYSPHONIC VOICE

Authors: Mr. Sudhin Karuppali, Dr. B.S.Premalatha

Voice is the laryngeal modulation of the pulmonary air stream, which is then further modified by the configuration of the vocal tract. Perceptual analysis of voice quality depends upon the ear judgements to diagnose the voice disorders. The research in perceptual evaluation currently gives importance to training and experience.

The present study is aimed at establishing, the purpose of auditory perceptual training in inexperienced listeners to evaluate dysphonic voice.

Clinical samples of different voice qualities such as hoarseness, breathiness, high pitch, unstable voices along with normal voice of 70 samples were selected and played in a random order, to 30 undergraduate students. These 30 subjects were divided into Control and Experimental groups for identification of samples. Each samples selected consisted of MPD, Spontaneous Speech and Rainbow Passage. The study was conducted in 3 phases: Pre Training Phase; Training Phase during which the subjects were given training to analyse samples, and Post Training Phase in which the subjects were asked to analyse the Pre training samples again. Analysis was done to determine the effect of training in inexperienced listeners in identifying the dysphonic voice.

Results revealed no significant difference between the control and experimental groups in the Pre Training Phase. In Post Training Phase, the results revealed a significant difference between both the groups. By comparing both the groups of untrained and trained listeners respectively, one can comment that auditory perceptual training has helped undergraduate students to identify dysphonic voice more accurately and stresses the importance of auditory perceptual training.

Sudhin Karuppali, M.A., Clinical Supervisor, Dr.S.R.Chandra sekhar Institute of Speech and Hearing, Bangalore University, Hennur Road, Lingarajapuram, Bangalore-560 084, Karnataka, India, 09844807634 sudhin.karuppali@gmail.com

B.S.Premalatha, Ph.D., Professor, Dept of Speech Pathology, Dr.S.R.Chandrashekhar institute of speech and hearing , Bangalore University, Hennur Road, Lingarajapuram, Bangalore-560 084, Karnataka, India, 09845276134 dr_premalatha@rediffmail.com

Coping Strategies in Voice Disorders

Authors: Gisele Oliveira*, Shashivadan Hirani[†], Ruth Epstein[‡], Mara Behlau*

Institutions: *CEV and [†] University College London (UCL)

Purpose: to explore coping strategies of individuals with and without vocal complaint and to examine the relationship between the type of coping and vocal complaint, vocal symptoms, vocal self-assessment, perceptual analysis and situational traits: depression, self-esteem, anxiety, and locus of control. **Methods:** 178 subjects with and without vocal complaint completed the following analysis: identification and characterization questionnaire, vocal self-assessment, perceptual analysis, VDCQ Brazilian Version, Beck Depression Inventory, Rosenberg Self-esteem Scale, Spielberger State-Trait Anxiety Inventory and Health Locus of Control Scale. **Results:** the two groups showed to be statistically different in vocal complaints and symptoms, voice self-assessment and perceptual characteristics. Conversely, they did not differ on situational traits. Furthermore, men and women did not differ on the coping strategies reported ($p=0,750$), however, individuals with vocal complaint reported statistically more strategies than the individuals without vocal complaint ($p<0,001$). Problem-focused strategies were more frequently reported by individuals with vocal complaint (46,7%). Coping results correlated positively with vocal perceptual analysis ($p=0,036$), depression ($p=0,006$) and anxiety ($p=0,022$), and negatively with locus of control ($p=0,001$). No correlation was found between coping and the other variable studied. **Conclusions:** these initial findings show that people with vocal complaint use a variety of coping strategies, problem-focused in particular, to deal with their voice problems. Coping results appear to be associated with perceptual characteristics of voice and some situational traits, such as depression, anxiety and locus of control.

Gisele Oliveira, PhD, Associate Professor, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, giseleoliveiracev@uol.com.br

Shashivadan Hirani, PhD, Research Fellow, Royal National Throat Nose & Ear Hospital, Unit of Behavioural Medicine Royal Free, University College London Medical School, 330 Gray's Inn Road , London WC1X 8DA, 0044207679 9395, s.hirani@ucl.ac.uk

Ruth Epstein, PhD, Head of Speech & Language Therapy Services, Royal National Throat Nose & Ear Hospital, Director - MSc Voice Pathology UCL Ear Institute, 330 Gray's Inn Road, London WC1X 8DA, 00442079151545, ruth.epstein@royalfree.nhs.uk

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Phonatory Deviation Diagram in Voice Clinic

The phonatory deviation diagram (PDD) is based on four acoustic measurements, three of them related to signal irregularities and one related to a glottal to noise excitation ratio (GNE). The objective was to identify the discriminative characteristics of the phonatory deviation diagram in voices predominantly adapted, rough, breathy and tense. Voice samples of adult subjects were classified in two groups: dysphonic and normal. They were submitted to perceptual auditory evaluation, focused on identification of the predominant vocal quality and on the degree of deviation. Acoustic analysis was performed with the VoxMetria (CTS Informatica) and comprised the configuration of the voice distribution in the PDD. Results showed significant differences regarding normality area ($p<0.001$) between dysphonic and normal groups. Significant difference was also observed between breathy and rough ($p=0.044$) and breathy and tense voices ($p<0.001$). All normal voices were positioned in the inferior left quadrant, 45% of the rough voices were found at the inferior right quadrant, 52.6% of the breathy voices at the superior right quadrant and 54.3% of the tense voices at the inferior left quadrant of the PDD, with statistically significant differences. At the inferior left quadrant were located 93.8% voices grade 1 and 72.7% grade 2; samples voices grade 3 were distributed in the inferior right, and both superior quadrants, the latter ones containing the most deviant voices and 80% of voices grade 4. The PDD could discriminate normal from dysphonic voices and the distribution was related to the type and degree of voice alteration.

Glaucya Madazio, PhD, PhD Graduate Student, UNIFESP and Associated Professor, CEV, UNIFESP and CEV, Rua Machado Bittencourt 361, 10 andar, 04044-001, São Paulo, Brasil, (55 11) 5575 1710, glaumadazio@uol.com.br

Sylvia Leão, MsC, Master Graduate Student, UNIFESP, Rua Machado Bittencourt 361, 10 andar, 04044-001, São Paulo, Brasil, (55 11) 5575 1710, sylvialeao@yahoo.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Effect of Pitch and Vowels on the Quality of Resonant Voice Production

Chen, F., Ma, E.P.-M., & Yiu, E. M.-L.

Instrumentations have been popular used in investigating the physiology and acoustics of resonant voice that used in voice therapy. However, the factors may affect the quality of resonant voice were seldom controlled that it would reduce the reliability of the measurement. This study investigated the facial bone vibration with pitch and vowels controlled using quantitative measurement during resonant voice production and the perceptual quantification of resonance was used as the reference. It further confirmed the relationship between extent of facial bone vibration and the perceptual quantification of resonance. Fifteen females and 15 males aged from 20 to 30 years with normal voice were given a session of resonant voice training. Vibration measurements using vibro-detectors on the nasal bridge, upper lip and thyroid site were taken. Two speech pathologists with at least 2 years of experience in assessing voice were asked to rate the recorded voices independently using an 11-point equal-appearing interval scale to evaluate the degree of resonance. Results revealed that change of pitch and vowels could affect the measurement of facial bone vibration and proper choice of them could apparently increase the extent of facial bone vibration. Furthermore, with pitch and vowels controlled, the relationship between extent of facial bone vibration and degree of resonance was more regular and evident. These results suggested that proper choice of pitch and vowels would be necessary in resonant voice training and therapy.

Fei Chen, Student, The University of Hong Kong, 5/F Prince Philip Dental Hospital, 34 Hospital Road, Hong Kong, +852-69388674, carol12@hku.hk

Estella Ma, Ph.D., Assistant Professor, The University of Hong Kong, 5/F Prince Philip Dental Hospital, 34 Hospital Road, Hong Kong, +852-28590594, estella.ma@hku.hk

Edwin Yiu, Ph.D., Professor, The University of Hong Kong, 5/F Prince Philip Dental Hospital, 34 Hospital Road, Hong Kong, +852-28590583, eyiu@hku.hk

Spectral and Cepstral-Based Measures during Continuous Speech: Capacity to Distinguish Dysphonia and Consistency within a Speaker

Lowell, Soren Y¹, Colton, Raymond H¹, Kelley, Richard², Hahn, Youngmee C¹

¹Department of Communication Sciences and Disorders, Syracuse University, Syracuse, NY

²Department of Otolaryngology & Communication Sciences, Upstate Medical University
Syracuse, NY

Acoustic measures derived from spectral and cepstral analysis may be preferable to time-based measures when assessing voice from individuals with dysphonia whose cycle-to-cycle boundary determination is unreliable. Recent studies indicate that cepstral measures strongly predict dysphonia severity and multiple voice quality dimensions. Spectral moments from the LTAS may also be sensitive indicators of voice improvement following treatment. These measures can be applied to continuous speech, which more accurately reflects dysphonic speaking patterns. Although these measures show promising relationships to perceptual voice quality ratings, less is known regarding their ability to differentiate normal from dysphonic voice during continuous speech, and the consistency of these measures across multiple utterances by the same speaker. The purpose of this study was to determine whether spectral moments of the LTAS (spectral mean, standard deviation, skewness and kurtosis) and cepstral peak prominence measures (Hillenbrand & Houde, 1996) were significantly different for speakers with and without voice disorders when assessed during continuous speech, and the consistency of these measures within a speaker across utterances. Continuous speech samples from 30 subjects without voice disorders and 30 subjects with mixed voice disorders were acoustically analyzed. In addition, voice samples were perceptually rated for voice quality dimensions and overall severity. Acoustic analysis showed significant between-group differences in cepstral and LTAS measures ($p <.01$) for voiced portions of sentence-level stimuli. Furthermore, high degrees of within-speaker consistency (correlation coefficients $>.70$) across utterances were evidenced for both subject groups. Voice quality ratings and their relationship to the acoustic measures will also be discussed.

Soren Lowell, Ph.D., Assistant Professor, Syracuse University, 805 S. Crouse Ave., Syracuse, NY, (315) 443-9648, slowell@syr.edu

Raymond H Colton, Ph.D., Professor Emeritus, Syracuse University, 805 S. Crouse Ave., Syracuse, NY, (315) 637-3883, rcolton1@twcnny.rr.com

Richard Kelly, M.D., Assistant Professor, SUNY Upstate Medical University, 750 E. Adams St.
Syracuse, NY, (315) 464-7336, kellyr@upstate.edu

Youngmee C Hahn, B.A., Graduate Assistant, Syracuse University, 805 S. Crouse Ave, Hoople Bldg,
Syracuse, NY 13244, (315) 443-3448, ychahn@syr.edu

Development of the Cough Severity Index (CSI) and Dyspnea Severity Index (DSI)

Authors: Adrianna C. Shembel, M.A. CCC-SLP
Jackie L. Gartner-Schmidt, Ph.D, CCC-SLP
Chaya Devie, MS, CCC-SLP
Priya Krishna, MD
Clark A. Rosen, MD

Chronic Cough (CC) is a debilitating disorder that is refractory to medical treatment in approximately 10% of the cases (Vertigan et al., 2006). Paradoxical Vocal Fold Motion Disorder (PVFMD) is a condition in which the vocal folds adduct involuntarily during inspiration (Christopher et al., 1983) and more recently has been defined to include slight adduction during exhalation (Jamilla et al., 2000; Verdolini et al., 2007). To date, these diagnoses have mostly been regarded as discrete entities; however, some discussions allude to overlapping symptomatology (Vertigan et al., 2006). The purpose of this study was to develop a Dyspnea Severity Index and a Cough Severity Index that could be used as a clinical tool to: 1) estimate perceived severity; 2) examine possible coexistence or association between PVFMD and CC; and 3) evaluate possible treatment outcomes in patients with PVFMD and CC. A clinical consensus with laryngologists and speech-language pathologists was organized to develop a list of clinically significant questions to form two questionnaires. Two hundred consecutive patients who either had a complaint of cough and/or dyspnea filled out both questionnaires. Factor analysis and item analysis were obtained. Cronbach's alpha coefficient was run to test the internal reliability of each index. Another clinical consensus was arranged including representatives from pulmonology, psychology, digestive disorders and naso-sinus to further reduce the questions to design a practical, relevant and precise instrument. Results will be discussed.

Adrianna Shembel, M.A. CCC-SLP, Speech-Language Pathologist, University of Pittsburgh Voice Center, 1400 Locust Street, Pittsburgh PA 15219, (215) 817-4121,
adriannashembel@gmail.com

Jackie L. Gartner-Schmidt, PhD, CCC-SLP, Co-Director; Speech-language Pathologist, University of Pittsburgh Voice Center, 1400 Locust Street, Pittsburgh PA 15219,
gartnerschmidtjl@upmc.edu

Chaya Devie, M.S., CCC-SLP, PhD Candidate, University of Pittsburgh, 4033 Forbes Tower, Pittsburgh PA 15260, cdevie@yahoo.com

Priya Krishna, MD, Laryngology, University of Pittsburgh Voice Center, 1400 Locust Street, Pittsburgh PA 15219

Clark Rosen, MD, Co-Director, Laryngologist, University of Pittsburgh Voice Center, 1400 Locust Street, Pittsburgh PA 15219, RosenCA@upmc.edu

Analysis of Psychophysiological and Vocal Responses in Public Speaking Setting

Authors: Anna Alice Almeida ^{a,b}, Mara Behlau ^a, José Roberto Leite ^a

Institution: ^a Universidade Federal de São Paulo; ^b Universidade Federal da Paraíba

The present study analyzed whether anxiety generated by the Public Speaking Simulation (SFP) test would modify the responses of subjects concerning psychological, physiological and vocal parameters. The study comprised 24 healthy young adult subjects, 12 men and 12 women, aged 19-42 years. Participants were categorized according to Low anxiety level (LA) and High anxiety level (HA) using the IDATE-Trait score. A multidimensional assessment concerning physiological, psychological and vocal parameters was performed BEFORE, DURING and AFTER SFP test. Abnormal results were observed in psychological, physiological and vocal parameters, such as significant increase in anxiety state ($p=0.006$), heart rate ($p < 0.001$), and electrical conductance ($p < 0.001$) DURING the performance compared to BEFORE or AFTER it. Reduction of temperature at the extremities was noticed DURING the task compared to BEFORE and AFTER it ($p=0.01$). Subjects presented similar levels of salivary cortisol within the normal range at all moments. Subjects in group HA presented worsening of vocal self-assessment, vocal quality of life, and more vocal symptoms. Perceptual-auditory-visual analysis showed that the volunteers in group HA had more deviations than in LA in all communication tasks: vowel ($p=0.02$), connected speech ($p=0.02$) and regular discourse ($p=0.04$). Concerning deviations presented in the body, speech and voice, HA volunteers had more deviations than LA subjects. In conclusion, level of anxiety interfered in how the subjects expressed and communicated concerning their body, speech and/or voice.

Anna Alice Almeida, PhD, Universidade Federal da Paraíba, Universidade Federal de São Paulo, Centro de Ciências da Saúde, Campus I. Cidade Universitária, Campus I. Castelo Branco, 58051-900 - João Pessoa, PB, Brazil, (55 83) 87101617, anna_alice@uol.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

José Roberto Leite, PhD, Universidade Federal de São Paulo, Rua Botucatu, 862 - 1º, Andar, V.Clementino - 04023-062, São Paulo, SP, Brazil, (+55 11) 21490155, jrleite@terra.com.br

Subjective Evaluation of Voice by Children and Their Parents: Validation of a Two-Form Questionnaire in French

The aim of the study was to validate a questionnaire for subjective evaluation of voice by children and their parents. The questionnaire was developed by means of semi-structured interviews with a focus group, the detailed method have been accounted for in a former study.

168 children and 118 parents participated. The children were aged 5,5 – 12,7 (M:8,7, SD 1,8), there were 84 girls and 84 boys.

The subjects divide in three subgroups:

1: Dysphonics with a vocal complaint: N=27 (eg: children having consulted a clinic for a voice disorder). **2: Dysphonics without a vocal complaint:** N=22 (eg: perceptually dysphonic children having never consulted for a voice disorder and not planning to). **3: Normophonics without a vocal complaint:** N=73 (eg: perceptually normophonic children having never consulted for a voice disorder and not planning to).

Validity and reliability, internal coherence and group differences were assessed.

Reliability was confirmed by high Cronbach's alpha (>.85) for test and retest scores. Test-retest stability was confirmed by high correlations (Pearson's r : .68 for children and .84 for parents $p < .05$). Construct validity was confirmed by a good correlation between the answer to the question "do you/your children have a problem with your /his voice?" and the total score at the questionnaire (children: r : .54, parents: r : .64 $p < .05$). Discriminant validity was confirmed for the parent group by a significant difference between subgroup's mean scores (dysphonic groups > normophonic group), significant differences were observed on item level for the child group (dysphonic groups > normophonic group).

There were poor correlations between child mean scores and parent mean scores (test: r : .23, retest r : .21) and significant differences were observed between the scores (child > parent).

The present questionnaire is valid and reliable and is sensitive to the concerns of the dysphonic child and its parents; it can be considered a useful tool in the clinical evaluation of childhood dysphonia. The interest of a double form questionnaire is supported by the results.

Ingrid Verduyckt, PhD Student, Speech Therapist, UCL, Centre d'audiophonologie Saint Luc., Clos Chapelle aux champs 30/3040 - 1200 B, ruxelles Belgium , 0032472550610,
ingrid.verduyckt@uclouvain.be

Marc Remacle, MD, Professor, UCL, Cliniques Universitaires de Mont-Godinne, Brussels, Mont-Godine, Belgium, 003227643240, marc.remacle@uclouvain.be

Dominique Morsomme, PhD, Speech Therapist, ULg, Boulevard du Rectorat, 5 B32 – 4000, Liège Belgium, 003243665176, dominique.morsomme@ulg.ac.be

Voice Characteristics Associated with Laryngopathia Gravidarum

Abstract

Voice is a secondary sexual characteristic and is extremely sensitive to hormonal changes. The voice changes during pregnancy are known as Laryngopathia Gravidarum. Aim of the present study was to investigate and highlight the changes in vocal parameters during the course of pregnancy, at different stages, thereby identifying patterns of vocal changes. A total numbers of 30 subjects participated in this study. This consisted of 27(age range 20 -30 years) pregnant women with 3 women in each month of pregnancy and 3 women from post delivery period. The control group consisted of 10 females in the age range of 20 – 30 years. Subjects were instructed to phonate /a/, /i/ and /u/ in comfortable pitch and loudness levels. Doctor Speech software was used to measure parameters such as Habitual Fo, Jitter, Shimmer, Maximum Phonation Duration and also the quality of the voice. The results indicated that there was significant difference in the voice parameters like the habitual frequency, jitter, shimmer, maximum phonation duration and quality. The results of the present study indicate that voice is definitely affected during pregnancy by the influence of hormones on the larynx which is also reported by Greene & Matheison. The present study highlights the different parameters of voice which are affected in pregnant women due to the various morphological and functional changes seen in them which are mainly caused by the hormonal changes. These findings mainly applies to professionals who put their vocal health at risk during pregnancy.

Raksha R. Meti, Dr. M.V. Shetty College of Speech and Hearing, Panjimugaru, 9019022683,
rakshameti@yahoo.in

Ragini Talreja, J.S.S. Institute of Speech and Hearing, Ooty road, Mysore – 570025, 9886997134,
raginitalreja@yahoo.com

Kavya V., MSc. SLP, Research Assistant, All India Institute of Speech and Hearing,
Manasagangotri,Mysore., 9480629224, kavya.vijayan@gmail.com

Phonation Related Injury Patterns in Broadway Performers: Linking Choreography Demands to Singing Injuries

The ability of Broadway performers to sing while executing choreography is remarkable when one considers the nature of two tasks in possible competition. Though studies have examined injury patterns in dancers (Bronner et al, 2003; Gamboa et al, 2008; Henderson & MacIntyre, 2006; Motta-Valencia, 2006), little is known regarding injury patterns in Broadway performers. Only one study has examined the musculoskeletal complaints of Broadway level performers (Evans et al, 1996). From a vocal perspective, studies have examined phonation related injuries in professional singers (Sataloff, 2006; Vasilenko et al, 2000). The literature on exercise physiology and speech pathology indicates that physiologic and metabolic changes from a physiological stressor can interfere with the demands of speech, yet no studies have explored a connection between phonation related injuries and choreography demands. The purpose of this study is to quantify the physical demands of current Broadway productions and begin to explore potential risk factors for injuries and preventative strategies utilized by Broadway performers.

METHODS: In cooperation with Actor's Equity Association, an electronic survey is being distributed to performers of Broadway and First National Tour productions active during the last 12 months. The assurance of confidentiality and anonymity will encourage completion of the survey. The survey contains items in the following domains: personal demographic information, previous injuries, injuries during current production, career variables, prevention and treatment strategies, perceived demands of current role and production variables. **RESULTS:** This study is currently in the data collection stage, however, findings will be available for presentation if accepted.

Aaron Ziegler, MA, Speech Pathologist, Emory Voice Center, 550 Peachtree St., NE, 9th Floor, Suite 4400. Atlanta, GA 30308, (404) 686-5475, aaron.ziegler@emoryhealthcare.org, asziegler@gmail.com

Alison T. DeLeo, PT, DPT, Assistant Professor, The George Washington University, 900 23rd Street NW, Suite 6144, (202) 994-8177, hspaxd@gwumc.edu

A Comparison of Sung and Spoken Phonation Onset Gestures Using High-Speed Digital Imaging

Ena Freeman, Peak Woo, Thomas Murry, & John Saxman

Abstract

Phonation onset is important in the maintenance of healthy vocal production for speech and for singing. Recent studies of phonation onset using high-speed digital imaging are relatively few. The purpose of this preliminary study was to examine differences in vocal fold vibratory behavior between sung and spoken phonation onset gestures. Staccato and German (a modified glottal plosive, so named for its occurrence in German classical singing) onset gestures were compared to breathy, normal and hard onset gestures, using high-speed digital imaging. Samples were obtained from two subjects with no history of voice disorders (a female trained singer and a male non-singer). Simultaneous capture of acoustical data confirmed the distinction among gestures. Image data were compared for glottal area configurations, degree of adductory positioning, number of prephonatory small-amplitude oscillations, and timing of onset gesture events, the latter marked by maximum vocal fold abduction, maximum adduction, beginning of prephonatory oscillations, and beginning of steady-state oscillation. Results reveal closer adductory positioning of the vocal folds for the staccato and German gestures. The data also suggest a direct relationship between the degree of adductory positioning and the number of prephonatory oscillations. Results for the timing of onset gesture events suggest a relationship between discrete adductory positioning and more evenly spaced prephonatory oscillations. By contrast, the overlapping of prephonatory adductory positioning with vibration onset revealed more unevenly spaced prephonatory oscillations. This may support an existing hypothesis that less well-defined boundaries interfere with normal modes of vibration of the vocal fold tissue.

Ena Freeman, MM, MS/CCC-SLP, Speech-Language Pathologist, Singing Voice Specialist, Private Practice, New York, Doctoral Student, Speech-Language Pathology, Teachers College, Columbia University, New York, New York, (212) 316-4485, efreeman6@nyc.rr.com

Peak Woo, M.D., FACS, Associate Professor, Mount Sinai School of Medicine, 1 Gustave Levy Place Annenberg 10 Box 1189, New York, NY 10029, (212) 580-1004, peakwoo@peakwoo.com

Thomas Murry, PhD, Professor of Speech Pathology in Otolaryngology, Weill-Cornell Medical College, Cornell University, New York, NY, tm2103@msn.com

John H. Saxman, Ph.D., Professor and Chair, Department of Biobehavioral Sciences, Teachers College, Columbia University, New York, NY, (212) 678 -3892, saxman@tc.columbia.edu

Is Ignorance Always Bliss: Benefits of Improved Understanding of the Vocal Mechanism with Vocal Performance Majors

High vocal demands and contraindicated lifestyle choices influence vocal function and put singers at risk for vocal attrition (Sapir, 1993; Tepe et al., 2002). There is a push to incorporate coursework on the vocal mechanism into the curriculum of training programs with the goal of increasing singers' understanding of their mechanism and improving its management. Several studies demonstrate that while singers have an interest in learning about their mechanism they possess limited knowledge (Braun-Janzen & Zeine, 2009). The purpose of this study was to assess the effect of a 3-credit university seminar about the vocal mechanism on the knowledge and decision-making process of vocal performance majors. METHODS: A test was administered to three groups (vocal performance majors [V], non-voice music majors [M] and experts consisting of laryngologists and medical speech pathologists [E]). The V group completed a 3-credit seminar at Emory University. Then, the V group retook the test. RESULTS: Preliminary findings revealed a statistically significant difference on test scores among the groups before the seminar, $F(2, 32) = 29.579, p < .001, \eta^2 = .649$. Post-hoc pairwise comparisons using Bonferroni adjustment revealed that the E group had significantly higher test scores than both the V and M groups, but there was not a significant difference between V and M groups. A repeated measures t-test shows that there was a statistically significant increase in the V group's test scores from pre-seminar to post-seminar, $t(8) = -7.723, p < .001$. DISCUSSION: Vocal performance students increased their knowledge of the vocal mechanism to the level of voice care professionals. Data collection is underway to investigate the benefits of increased knowledge on the V group's caliber of vocal performance and decision-making skills.

Aaron Ziegler, MA, Speech Pathologist, Emory Voice Center, 550 Peachtree St., NE, 9th Floor, Suite 4400. Atlanta, GA 30308, (404) 686-5475, aaron.ziegler@emoryhealthcare.org

Laura Jane Miller, BA, Medical Student, Medical School, Emory University, (770) 487-2880, ljmill2@emory.edu

Teresa Hopkin, MM, Sr. Lecturer/Director, Vocal Studies, Emory College of Arts and Sciences, Emory University, Burlington Road Building, #230, 1804 North Decatur Road, Atlanta GA 30322, (404) 727-8401, thopkin@emory.edu

Marina Gilman, MA, MM, CCC-SLP, Speech Language Pathologist, Singing Voice Specialist, Emory Voice Center, 550 Peachtree Street, NE, 9th Floor, Suite 4400, Atlanta, GA 30308, (404) 686-6776, marina.gilman@emoryhealthcare.org

Michael Johns, MD, Assistant Professor, Emory Voice Center, 550 Peachtree St., NE, 9th Floor, Suite 4400, Atlanta, GA 30308, (404) 686-7797, michael.johns2@emory.edu

Perceptual Visual Spectrographic Acoustic Analysis of Rough, Breathy and Strained Voices

The purpose of the present study is to analyze the acoustic spectrographic parameters of 164 voices (sustained vowel /ɛ/) classified as predominantly rough, breathy and strained and to compare the acoustic data with the auditory analysis. Three SLP, voice specialists, performed a perceptual analysis by indicating the predominance of voice - rough (61), breathy (57) and strained (46). The intra and inter-listeners reliabilities were good with a significance level of $p<0,001$. The voice samples were submitted to spectrographic acoustic analysis (FonoView 1.0, CTS), using the following selected parameters: instability, frequency bifurcation (subharmonic), noise at high and low frequencies, series of harmonics, frequency tilt and voice break. The same three SLP made the perceptual visual spectrographic analysis with good levels of intra and inter-judges reliabilities. Results showed the most common spectrographic features of rough voices were frequency bifurcation and noise at low frequencies; of breathy voices were noise at high and low frequencies, that is throughout the spectrogram; and of the strained voices were instability and rich series of harmonics. Spectrographic results showed three moderate negative correlations: the lesser the harmonics, the greater the noise in high (-54%) and low (-56%) frequencies and the frequency breaks (-43%). There was also a moderate positive correlation between presence of noise in the high and low frequencies (48%). Data from the perceptual visual spectrographic analysis can be used in helping the categorization of the three types of voices.

Sylvia Helena de Souza Leao, Master in Science, SLP Research Assistant, The University of Auckland, Department of Psychology, Tamaki Campus, Bld 721, 261 Morrin Rd, Glenn Innes, Auckland, New Zealand. Private Bag 92019, +64 0210693389, s.leao@auckland.ac.nz

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

The Effect of Body Mass Index on Voice Outcome Measures Following Transcutaneous Electrical Stimulation

There is a vast need for research related to VitalStim® (Chatanooga Group, Chatanooga, TN) dysphasia therapy and little is known about the voice changes related to Transcutaneous Electrical Stimulation (TES). A possible factor that influences electrical stimulation transfer to the extrinsic and intrinsic laryngeal muscles is the amount of subcutaneous body fat in the submental area. Recent reports have shown a correlation between the thickness of the subcutaneous fat layer and the amount of electrical current signal loss from the skin. The objective of this study is to 1) examine the measureable differences in voice outcome measures following TES 2) to determine the relationship between subcutaneous body fat and patient-guided electrical current intensity. 15 subjects placed into three groups according to Body Mass Index (BMI) will complete a typical VitalStim® treatment session. Differences between the amplitudes of the first and second harmonics (H1, H2) and the amplitudes of the first, second, and third formant frequencies (A1, A2, A3) will be reported. Pre and post voice recordings of sustained vowel and "Rainbow Passage" reading will be used to calculate Fundamental Frequency (F_0) and Sound Pressure Level (SPL). Group differences between pre and post treatment voice outcome measures will be tested for significance using a repeated measure ANOVA. Results will be discussed in terms the relationships between electrical current intensity and BMI.

Archie Harmon, M.A., CCC-SLP, Doctoral Student, Florida State University, 401 Regional Rehabilitation Center, School of Communication Science & Disorders, Tallahassee, FL 32306-1200, 850-644-8459, abh06g@fsu.edu

Linda Fowler, Ph.D., Assistant Professor, Georgia State University, Communication Disorders Program, Dept. of Educational Psychology and Special Education, P.O. Box 3979, Atlanta, GA 30302-3979, (404) 413-8301, epelpf@langate.gsu.edu

Mary Gorham-Rowan, Ph.D., Associate Professor, Valdosta State University, Dept. of Communication Sciences and Disorders, 1500 N. Patterson Street, Valdosta, GA 31698, (229) 219-1321, mmgorhamrowan@valdosta.edu

Richard J. Morris, Ph.D., Professor, Florida State University, 127 Honors Way, Tallahassee, FL 32306-1200, (850) 644-8459, rmorris@fsu.edu

Edie Hapner, PhD, Assistant Professor, Emory Voice Center, Emory University School of Medicine, 550 Peachtree Street, NE, Atlanta, GA 30308, (404) 686-7798, ehapner@emory.edu

Vocal Unloading and Physiotherapy

Muscle Tension Dysphonia (MTD) is associated with impaired vocal quality and can have a considerable impact on quality of life. Patients may experience a breathy, hoarse or strained voice, often with associated vocal tract discomfort and perilyngeal muscular tension.

MTD may be a primary or secondary characteristic of vocal disorders and can occur with or without mucosal changes of the vocal folds. MTD occurs as a consequence of overactivity of the laryngeal and extralaryngeal musculature resulting in maladaptive muscular shortening and tension surrounding the laryngeal mechanism which prevents phonatory ease and decreases vocal efficiency.

Performers and singers also experience vocal and muscular symptoms as a result of performance demands that create muscle tension surrounding the laryngeal mechanism (performance load, choreography, costume). In addition to decreased vocal quality, vocal symptoms in singers may manifest themselves as a restriction in vocal range, diminished pitch control and an increase in perilyngeal muscular tension.

Laryngeal manual therapy as a beneficial treatment for MTD has been described in the literature and has been performed by speech pathologists and other disciplines such as osteopathy. "Vocal unloading" is a term that encompasses the physiotherapy treatment of the laryngeal mechanism to alleviate muscle tension and promote laryngeal mobility and thus "unload" the larynx. These physiotherapy treatments differ to speech pathology manual treatments as physiotherapy treatments have an intense muscular and joint focus highlighting and targeting trigger points with techniques predominantly to the sternocleidomastoid and suprathyroid muscles. Mobilisation techniques of the laryngeal mechanism itself including the hyoid and cricothyroid joint are also an integral part of treatment.

It is proposed that vocal unloading as performed by a physiotherapist may play an important role in the treatment of MTD and may offer immediate relief of muscular symptoms and improve perceptual vocal quality. However, to the knowledge of the author, perceptual vocal improvements after this type of physiotherapy vocal unloading treatment has yet to be quantified.

The purpose of this project is to assess the immediate effects of vocal unloading (perilyngeal muscular release and laryngeal mobilisations) as performed by a physiotherapist on auditory-perceptual voice quality in patients with a diagnosis of MTD. Additionally, vocal tract discomfort pre and post treatment will be documented.

Fifty patients were consecutively recruited from a voice analysis clinic after ENT and speech pathology assessment. Auditory-perceptual voice quality was assessed by two blinded, highly experienced speech pathologists with an intra and inter-rater reliability of 0.90.

Voice recordings to assess perceptual profile included, a) Reading aloud "Rainbow passage"; b) 30 seconds of connected speech (monologue); c) 'ee' through range "As high as you can and as low as you can"; d) Vowel prolongation 'ee' x 3.

Prior to treatment, non-singing patients were asked to fill out the Voice Activity and Participation Profile and singers were asked to fill out the Singing Voice Handicap Index (SVHI). Regarding symptoms of voice and vocal tract discomfort, pre and post treatment patients were asked to rate their discomfort using a questionnaire modified from the voice analysis centre and the Vocal Tract Discomfort (VTD) scale.

Palpatory findings relating to tenderness of the thyroid cartilage and hyoid were noted. Palpatory findings of the sternocleidomastoid muscles and supralaryngeal area were also noted and were rated by the patient utilising the Visual Rating Scale (VRS).

This paper proposes to present the findings highlighting the value of the role of physiotherapy in the management of MTD.

Vocal Function Exercises for Presbylaryngis: A Multidimensional Assessment of Treatment Outcomes

ABSTRACT

Objectives: Presbylaryngis, or aging of the larynx, can adversely affect vocal function and quality of life in the elderly. This preliminary investigation examined the effects of vocal function exercises, a physiologic voice therapy approach, as a primary treatment for presbylaryngis.

Study Design: Prospective, Pre-/Post-Treatment Design.

Methods: Nine consecutive elderly patients with presbylaryngis (2 females, 7 males) underwent a six-week course of voice therapy employing vocal function exercises. Self-ratings of voice handicap and phonatory effort level, as well as auditory-perceptual voice assessments, acoustic analyses, and visual-perceptual evaluations of laryngeal images were compared prior to and immediately following voice therapy.

Results: Following treatment, patients reported significant reductions on Voice Handicap Index scores, phonatory effort levels, and voice disorder severity. Blinded listeners rated post-treatment voices as significantly less breathy and strained. However, comparison of pre- and post-treatment maximum phonation times, acoustic measures, and laryngeal images did not reveal significant changes.

Conclusions: These preliminary data suggest that vocal function exercises produce significant functional and perceptual improvements in voice, and deserve further attention as a treatment for elderly patients with presbylaryngis.

Cara Sauder, MA, CCC-SLP, Speech-Language Pathologist, University of Utah Voice Disorders Center, 729 Arapeen Drive, Salt Lake City, Utah 84108, (801) 440-0375,
carasaudervoice@gmail.com

Nelson Roy, Ph.D., Associate Professor, University of Utah, 390 S 1530 E, Rm. 1219, Salt Lake City, UT 84112, (801) 585-0428, nelson.roy@health.utah.edu

Kristine Tanner, Ph.D., Adjunct Assistant Professor, University of Utah, 729 Arapeen Drive, Salt Lake City, UT 84108, (801) 585-7946, kristine.tanner@hsc.utah.edu

Daniel R. Houtz, M.A., Speech-Language Pathologist, The University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 581-4956, dan.houtz@hsc.utah.edu

Marshall E. Smith, M.D., Professor, The University of Utah, 729 Arapeen Dr., Salt Lake City, UT 84108, (801) 587-3548, marshall.smith@hsc.utah.edu

ABSTRACT

Mobil Voice Laboratory in the Operating Room

Marco Guzman, SPL¹; Crystal Coleman, DO²; Adam D. Rubin, MD,³ Cristina Jackson-Menaldi, PhD.⁴

The purpose of this presentation is to demonstrate the use of a mobile voice laboratory in the operating room during type I thyroplasty using Gore-Tex. An advantage of using Gore-Tex to medialize the paralyzed vocal fold is the ability for the surgeon to make fine adjustments without removing or needing to recarve a traditional silastic implant. Subtle improvements in voice may be made with millimeter adjustments in the amount or position of Gore-Tex placed. Although the surgeon's ear is the most important factor in determining optimal positioning of an implant, additional information provided by objective measures of voice quality can be useful. Voice samples were recorded immediately before the procedure and at the end of the procedure while in the operating room. Six-week postoperative samples were also taken.

Fundamental frequency (F0) and spectral analysis using a spectrogram with a narrow filter at real time were used for analysis. Spectrograms were evaluated by 4 blind judges on a 100 mm visual analogue scale. All three time points were compared and statistical analysis performed.

Marco Guzman, SLP, University of Chile (Santiago, Chile), Lakeshore Professional Voice Center, 21000 E. Twelve Mile Road, Suite 111, St. Clair Shores, MI 48081, (517) 355 9947, guzmanvoz@gmail.com

Crystal Coleman, D.O., POH Regional Medical Center, Pontiac, MI., 21000 E. Twelve Mile Road, Suite 111, St. Clair Shores, MI 48081, (586) 445-6214, osteofight25@yahoo.com

Adam Rubin, M.D., Adjunct Assistant Professor, Lakeshore Professional Voice Center, Department of Otolaryngology-HNS, University of Michigan Medical Center, 21000 E. Twelve Mile Road, Suite 111, St. Clair Shores, MI 48081, (586) 445-6214, rubinad@sbcglobal.net

Cristina Jackson-Menaldi, Ph.D., Adjunct Full Professor, Lakeshore Professional Voice Center, School of Medicine, Dept. Otolaryngology, Wayne State University, 21000 E. Twelve Mile Road, Suite 111, St. Clair Shores, MI 48081, (586) 445-6214, jmenaldi@wayne.edu

Acoustic Analysis of Thyroidectomy-Related Changes in Vowel Phonation

Nancy Pearl Solomon*

Shaheen N. Awan[#]

Leah B. Helou*,⁺

Alexander Stojadinovic*

Background. Dysphonia following thyroidectomy is a common complaint, especially within the first few post-operative weeks. Previous literature has focused on general voice outcomes and has not identified clear acoustic markers prognostic for short- and long-term voice outcomes of thyroidectomy.

Method. This prospective, longitudinal study included 70 subjects (36 women, 34 men) who produced the sustained vowels /a/ and /i/ using habitual vocal pitch, loudness, and quality. Voice was recorded before (baseline) and at three time points (0.5, 3, and 6 months) after thyroidectomy. Steady-state 2-second segments of the vowels were subjected to time-based and spectral/cepstral acoustic analyses.

Results. Of the time-based measures, harmonics-to-noise ratio (HNR) was significantly lower within a few weeks after surgery, and jitter and shimmer both tended to be greater at that time point. Spectral/cepstral analysis revealed a significant increase in cepstral peak prominence (CPP) from the first post-operative assessment to the 6-month follow-up assessment. The remaining measures, fundamental frequency (F_0), F_0 standard deviation (F_0 SD), CPP SD, low-to-high ratio of spectral energy (L/H), and L/H SD did not change systematically over time.

Conclusion. These results indicate that HNR and CPP were the most sensitive acoustic measures for detecting change in phonation over a 6-month time course of surgical treatment and recovery for thyroid disorders.

(Disclaimer: The views expressed are those of the authors and do not reflect official policy of the United States Army, Department of Defense, or US Government.)

Nancy Pearl Solomon, Ph.D., CCC-SLP, Research Speech Pathologist, Walter Reed Army Medical Center, Washington, DC, (202) 782-8597, nancy.p.solomon@us.army.mil

Shaheen N. Awan, Ph.D., CCC-SLP, Professor, Bloomsburg University of PA, Bloomsburg, PA, (570) 389-4443, sawan@bloomu.edu

Leah B. Helou, M.A., CCC-SLP, Doctoral Student, University of Pittsburgh, Pittsburgh, PA, (412) 363-5760, lbhorst@gmail.com

Alexander Stojadinovic, M.D., FACS, Chief, Division of Surgical Oncology, Walter Reed Army Medical Center, Washington, DC, (202) 782-9692, alexander.stojadinovic@us.army.mil

Videofiberoptic Laryngeal Data and Acoustic Analysis of the Ornamentations used in Mongolian Long Song

Pillot-Loiseau, Claire¹; Crevier-Buchman, Lise^{1,2}; Rialland, Annie¹; Narantuya³; Vincent, Coralie¹; Desjacques, Alain⁴

Objective. The paper presents the results of a multiparametrical analysis of "Mongolian Long song", a long and slow versified melody with multiple ornamentations.

Method. The study includes: (1) a physiological analysis (videofiberoptic laryngeal data of the 61 ornamentations of a song produced by a famous Mongolian singer, Narantuya, and video recordings of the singer); (2) an acoustical analysis (fundamental frequency and intensity curves of the ornamentations).

Results. The fiberoptic analysis showed two main laryngeal behaviour in producing ornamentations, with a leitmotiv: (1) "lyrical" vibratos mobilizing the entire laryngeal block; (2) "Mongolian" trills with essentially supraglottic movements, the arytenoids being mobilized independently of the rest of the laryngeal block. These movements contrasted with the absence of cervico-scapular movement of the singer.

The acoustic analysis showed: (1) for the "lyrical" vibrato: the fundamental frequency and the intensity were in-phase, with a moderate amplitude (1 to 3 semitones for the fundamental frequency, 4 to 6 dB for the intensity; 5 to 6 modulations/s); (2) for the "Mongolian" trill: the fundamental frequency and the intensity were in opposite phase, with an important amplitude (3.5 to 4.5 semitones for the fundamental frequency, 6 to 10 dB for the intensity; and 6 to 7 modulations/s) and acoustical indications of changes of laryngeal vibratory mechanisms.

Conclusion. In this multiparametrical study of Mongolian Long song with previously unpublished physiological data, we defined two ornamentations used by the singer in the same melody, corresponding to different laryngeal movements and different acoustic characteristics: "lyrical" vibrato and "Mongolian arytenoidian" trill.

Claire Pillot-Loiseau, PhD, Assistant Professor, Phonetics, Speech Therapist, Phonetics and Phonology Laboratory, UMR 7018, CNRS/Sorbonne-Nouvelle, 19 rue des Bernardins, 75005, Paris, France, +33 1 6 82 07 31 98, claire.pillot@univ-paris3.fr

Lise Crevier-Buchman, MD, PhD, CNRS Researcher, Phonetics, Phoniatrician, Phonetics and Phonology Laboratory, UMR 7018, CNRS/Sorbonne-Nouvelle, Pompidou's Hospital, 2 European Georges, 19 rue des Bernardins, 75005, Paris, France, + 33 1 56 09 34 53, lise.buchman@numericable.fr

Annie Rialland, PhD, CNRS Researcher, Phonetics, Phonetics and Phonology Laboratory, UMR 7018, CNRS/Sorbonne-Nouvelle, 19 rue des Bernardins, 75005, Paris, France, + 33 1 44 32 05 76, annie.rialland@univ-paris3.fr

Narantuya, Singer, Hohhot's Music Academy, Hohhot, Mongolia

Coralie Vincent, Engineer Sound's Diploma, Engineer, Phonetics and Phonology Laboratory, UMR 7018, CNRS/Sorbonne-Nouvelle, 19 rue des Bernardins, 75005, Paris, France, + 33 1 43 26 37 80, coralie.vincent@univ-paris3.fr

Alain Desjacques, PhD, Asst. Professor, Ethnomusicology, Lille 3 University, SELOEN Laboratory, BP 149, 59653, Villeneuve d'Ascq, France, + 33 3 20 41 60 00, alain.desjacques@univ-lille3.fr

Sensational Claims: Does DIY Voice Instruction Deliver as Promised?

To singers who have committed many years, lots of cash, and large doses of trust to a voice teacher, the notion that one could learn to sing at a professional level from a boxed set including a booklet, a DVD and 6 CDs costing \$60.00 inspires a certain level of incredulity and indignation. A substantial number of such self-tutoring resources, promising to guide a singer to proficiency in vocal styles from Hip Hop to opera, line shelves at music stores and fill pages at Amazon.com.

This study tests the validity of claims made by a commercially-packaged self-instruction system in singing that claims to extend vocal range, improve register transitions, and improve overall vocal timbre.

HYPOTHESIS: Commercially packaged voice instruction will produce no more technical improvement than random vocalization, and both will produce less improvement than lessons with a qualified professional.

METHOD: A study sample of 9 males and 9 females will be divided into 3 groups to compare the results of following the training regimen offered by the DIY product, having lessons with a qualified voice teacher, or having no organized instruction at all.

Evaluation of results is based on VRP and recorded vocalization of a familiar song for spectrographic and aural evaluation.

PREDICTED OUTCOME: No significant difference in improvement will be seen between singers who follow the commercial regimen and singers who attempt to achieve the expected outcomes with no instruction.

Robert Hansen, DMA, Professor of Voice, West Texas A&M University, Canyon TX 79016,
(806) 651-2850, rhansen@wtamu.edu

Sharon Grasha, BM, Graduate Student, West Texas A&M Univ, Canyon TX 79016, (806) 367-4199, slgrsha1@buffs.wtamu.edu

Ref#: VP15

Phonation Behaviors of Pre-Service Music Education Students

Jeremy Manternach

Research increasingly identifies school teachers as among the most at risk populations for voice problems (Titze, Lemke, & Montequin, 1997; Verdolini & Ramig, 2001). Music teachers (Sarfati, 1989) and choral music teachers especially (Daugherty et al, 2009), may be particularly vulnerable. Although some studies to date have explored voice use and voice health in pre-service and student teacher populations (Simberg, 2004), these investigations have been largely confined to single, one-time survey or acoustic measurement efforts. Moreover, little research to date has focused upon voice use behaviors of pre-service music education majors prior to student teaching.

The purpose of this investigation was to examine phonation monitor duration and distance doses acquired over contiguous 7-day periods by pre-service university music education majors ($N=8$) in concert with daily voice use surveys and a personality inventory. Participants comprised both male and female undergraduate students emphasizing in choral music education ($n=6$), as well as a comparison sample of students emphasizing in instrumental music education ($n=2$).

Results were discussed in terms of vocal demands on pre-service music educators, implications of the development of phonation behavior habits, limitations of the study, and suggestions for further research.

Jeremy Manternach, M.M.E., Student, Graduate Teaching Assistant, The University of Kansas, 1530 Naismith Dr. Room 448, Lawrence, KS 66045, (612) 423-1378, jmanter@ku.edu

The Status and Scope of Vocal Pedagogy Coursework Offered by Music Departments in USA Universities and Colleges

James F. Daugherty, Ph.D., The University of Kansas

Kathy K. Price, M.Mus., The University of Kansas

Matthew Schloneger, M.Mus., The University of Kansas

Tens of thousands of students graduate annually from universities and colleges in the United States with music degrees that either certify students, or afford them *prima facie* qualification, to teach singers in a wide variety of contexts, including private studios, choral singing ensembles, and music education classrooms. Scant research to date, however, addresses the prevalence, scope, and content of vocal pedagogy coursework offered by music departments nationwide.

The purpose of this investigation was to assess the status and scope of coursework in vocal pedagogy offered by music faculties in USA colleges and universities accredited by the National Association of Schools of Music ($N=630$) during the 2009-2010 academic year, as measured by survey responses, catalog descriptions, and course syllabi, with particular attention to (a) the prevalence of stand-alone courses in vocal pedagogy vs. incorporation of vocal pedagogy instruction into other courses; (b) whether vocal pedagogy coursework is elective or required for voice performance, vocal music education, and choral conducting students; (c) textbooks and other instructional materials used; (d) stated course objectives, experiences, and outcomes; (e) the extent to which coursework appears to devote attention to voice anatomy, physiology, acoustics, lifespan voice development, and vocal health; and (f) whether any of these factors vary significantly according to variables of school size, geographic location, instructor background, and type of degree pursued (B.A., B.Mus., B.M.E.; M.Mus., M.M.E.; D.M., D.M.A., Ph.D.) Implications for university music curricula designed for persons preparing to work with singers as choral conductors, voice teachers, and music educators were discussed.

James F. Daugherty, Ph.D., Associate Professor, The University of Kansas, 1201 Jana Drive, (785) 832-8059, jdaugher@ku.edu

Kathy K. Price, M.Mus., Ph.D. student, The University of Kansas, Lawrence, KS 66045, (785) 832-8059, price.kk@gmail.com

Matthew Schloneger, M.Mus., Ph.D. student, The University of Kansas, Lawrence, KS 66045, (785) 832-8059, mattschloneger@hotmail.com

Tuvan Throat Singing: Understanding Style, Formant, Pitch and Overtones

Objective: In Tuvan singing, multiple pitches are sung simultaneously and singers consciously emphasize certain overtones in the harmonic series. We sought to describe the styles of Tuvan throat singing, and their pedagogy from the perspectives of the tongue and laryngeal posture, as well as resulting formant and pitch analysis. **Methods:** A review of the three styles of Tuvan singing is presented, along with analysis using live demonstration, recorded digital laryngostroboscopy, and the computerized speech laboratory.

Results: Two styles of throat singing are xoomei (and its relative sygyt) and kargyraa. In xoomei, imaging and wavelength analysis suggest longer closing phases in the laryngeal opening-closing cycle, creating pronounced overtones (1,4). Singers change the shape of the supraglottal anatomy, altering the acoustic characteristics of the vocal tract, thereby modifying the pressure at nodes and antinodes in order to emphasize desired overtones (1,2,4). In sygyt style, an elevated tongue muffles the fundamental frequency (F0), leaving the overtones especially pronounced. In kargyraa, two prominent pitches are created: the fundamental (F0) and the subharmonic one octave below (5). Data suggest that during kargyraa, the false vocal folds are engaged similarly to the true folds but the open-close cycle is twice as long resulting in a 1:2 closing ratio (5). The effects on the sound wave caused by this "ventricular gating" are as yet undetermined (5). **Conclusions:** Tuvan throat singing differs from traditional Western styles in a number of important features related to formant, pedagogy and as demonstrated with pitch analysis.

Selected bibliography

1. Bloothoof, G., E. Bringmann, M. van Cappellen, J. B. van Luijen, and K. P. Thomassen. 1992. Acoustics and perception of overtone singing. *J Acoust Soc Am* 92:1827-36.
2. Echternach, M., J. Sundberg, S. Arndt, T. Breyer, M. Markl, M. Schumacher, and B. Richter. 2008. Vocal tract and register changes analysed by real - time MRI in male professional singers-a pilot study. *Logoped Phoniatr Vocol* 33:67-73.
3. Klingholz, F. 1993. Overtone singing: productive mechanisms and acoustic data. *J Voice* 7:118-22.
4. Levin, T. C., and M. E. Edgerton. 1999. The throat singers of Tuva. *Sci Am* 281:80-7.
5. Lindestad, P. A., M. Sodersten, B. Merker, and S. Granqvist. 2001. Voice source characteristics in Mongolian "throat singing" studied with high- speed imaging technique, acoustic spectra, and inverse filtering. *J Voice* 15:78-85.
6. Sataloff, R. T., Y. D. Heman-Ackah, and M. J. Hawkshaw. 2007. Clinical anatomy and physiology of the voice. *Otolaryngol Clin North Am* 40:909-29, v.
7. Titze, Ingo. "Tutorials --Voice Production." <http://www.ncvs.org/ncvs/tutorials/voiceprod/index.html>. 2005. National Center for Voice and Speech. 1 Sep 2009.
8. Palmer, John M. *Anatomy for Speech and Hearing*. New York: Williams and Wilkins. 1993

Jeremy S. Faust, MA, Medical Student, The Mount Sinai School of Medicine, Annenberg 10th Floor, One Gustave L. Levy Place, Box 1189, New York, NY 10029-3136, (530) 867-2263,
Jeremy.Faust@MSSM.edu

Linda M. Carroll, PhD, CCC-SLP, Speech Pathologist, Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, Pa. 19104, (215) 590-1000, lmcarrollphd@aol.com

Kenneth W. Altman, MD, PhD, FACS, Director, Division of Laryngology, Director, Grabscheid Voice Center, The Mount Sinai School of Medicine, Department of Otolaryngology, Annenberg 10th Floor, One Gustave L. Levy Place, Box 1189, New York, NY 10029-3136, (212) 241-5944,
Kenneth.Altman@m Mountsinai.org

The Effect of Singer Gesture on a Sung /u/ Vowel

Melissa C. Brunkan
The University of Kansas
Vocal/Choral Pedagogy Research Group
Abstract

Some voice educators historically have utilized body gestures and movement as a means to enhance student learning (e.g., Kodaly, Orff, Dalcroze). Choral methods literature, in particular, has traditionally contained anecdotal recommendations affirming use of singer gestures as a tool for evoking specific nuances in vocal sound production. Empirical research of such claims, however, has been limited.

The purpose of this investigation was to examine the effect of two singer gestures (a large, circular arm movement; and a smaller circular hand movement with the index finger pointing toward the mouth) on individual singers' (N=60) intonation and voice quality during a sung /u/ vowel, as gauged by standard acoustical measurements and perceptual ratings by a panel of experts (N=3). Results were disaggregated according to variables of singer sex, age, years of private voice study, and years of choral singing experience. Implications for the use of singer gesture in voice education settings were discussed. (151 words)

Melissa C. Brunkan, M.M., Graduate Research/Teaching Assistant, The University of Kansas, 1530 Naismith Dr. Room 448, Lawrence, KS 66045, (612) 963-1456, mbrunkan@ku.edu

Ref#: VP19

Acoustic and Perceptual Differences Between Pre-, Peri-, and Post-Menopausal Singing Voices: An Exploratory Study

Kathy Kessler Price, B.A., M.Mus.

Some vocal irregularities in the female voice have been attributed to hormonal fluctuations throughout the female lifespan, and can be exacerbated by menopause and aging (Schneider, Trotsenburg, Hanke, Bigenzahn & Huber, 2004; Abitbol, 1999; Boulet & Oddens, 1996; Linville, 1987). Though a considerable amount of literature is dedicated to examining differences between the speaking voices of young and older women, the female singing voice has enjoyed far less scrutiny. Particularly, singers in their fifties who are experiencing menopausal change have largely been ignored.

The purpose of this exploratory study was to assess female singers ($N=180$) relative to menopause (pre-menopausal; $n=60$, peri-menopausal, $n=60$; post-menopausal, $n=60$) in two age groups (20-29 years, $n=60$; 50-59 years, $n=120$) with respect to possible differences between selected acoustic (jitter, shimmer, noise to harmonic ratio, voice range and preferred tessitura, vibrato rate and extent while singing vocal exercises and a musical phrase) and descriptive (demographic and perceptual voice change survey, Singing Voice Handicap Index, listening panel) measurements of vocal function. Implications for aging female singers with respect to measured and self-reported/perceptual change, particularly during peri- and post-menopause, were discussed.

Kathy Kessler Price, B.A., M.Mus., Ph.D. student and GTA, University of Kansas, Lawrence, Kansas 66045, (816) 853-4882, price.kk@gmail.com

Are All Breathing Strategies Equal? An Aerodynamic Examination of “High” and “Low” Breathing Techniques for Singing

David Meyer, Barbara Mathers-Schmidt

Singing voice pedagogies universally stress the importance of proper breath management for healthy singing. Methodologies for teaching breathing differ: “low” (abdominal/diaphragmatic “down-and-out” breathing) vs. “high” (chest/intercostal “up-and-in” breathing). Titze and Hixon suggest that both strategies may be equally useful for the singing voice. Preliminary studies (Meyer 2009) showed statistically insignificant acoustic measures for each breathing strategy. In this follow-up study we will aerodynamically examine singing samples utilizing both breathing strategies in an attempt to determine their relative efficacies.

6 healthy male university vocal music majors (age 18-22) with no history of asthma were instructed in “low” (down-and-out) and “high” (up-and-in) breathing techniques. Subjects performed a sustained singing task in which pitch and dynamic levels were kept constant. Subjects were instructed to sing the task for “as long as they were able to phonate in a manner consistent with their classical training.”

20 samples sung with each breathing technique were examined aerodynamically and acoustically. Abdominal wall movement was monitored by the research assistant, and was correlated with the subjects’ acoustic and aerodynamic measures.

Independent variable: the subjects’ abdominal wall movement.

Dependant variables: Maximum phonation time (MPT), Mean sound pressure level, SPL to air pressure ratio (DBAP), Phonation quotient (PQ), Inspiratory/expiratory volume, Mean inspiratory/expiratory airflow, Inspiratory/expiratory airflow duration, and the subjects’ vital capacity.

Controlled variables: Subject sex, age, and negative asthma history.

David Meyer, D.M., Associate Professor of Music, Western Washington University, 516 High Street, Bellingham, WA 98225-9107, (360) 650-3787, david.meyer@wwu.edu

Barbara Mathers-Schmidt, Ph.D., Chair Dept of Communication Sciences and Disorders, Western Washington University, 516 High Street, Bellingham, WA 98225-9171, (360) 650-3172, Barbara.Mathers-Schmidt@wwu.edu

The Use of Visual Biofeedback in the Training of Vocal Vibrato

Vibrato is an essential component of the operatic/classical singing voice. Many beginning collegiate voice majors enter the university with little or no exposure to this method of singing, and consequently their vocal tone lacks the necessary modulation for vibrato. Teaching a healthy vibrato technique to ‘straight-tone’ singers remains a common challenge.

Traditional vocal exercises (Kirkpatrick, 2008) have been the primary tool for teaching vibrato in the singing studio. Other successful approaches use target-based audio cueing (King & Horii, 1993 and Hopkin et. al, 2003) to help singers modulate the rate and extent of their vibrato. This study examines the efficacy of training vibrato with visual, real-time biofeedback in the singing studio.

The current study proposes that real-time visual biofeedback:

- Increases subjects’ awareness of their vibrato
- Increases vibrato acquisition success
- Decreases vibrato acquisition time
- Increases vibrato periodicity
- Increases vibrato retention, as measured two weeks post-therapy

21 female undergraduate voice majors between 17-19 years of age with less than 2 years of prior voice study will be selected who report difficulty singing with operatic/classical vibrato. These subjects will be randomly divided into three therapeutic groups:

- 1) Vocal exercise based intervention
- 2) Vocal exercise intervention that incorporates visual biofeedback
- 3) Control group - a random imagery based exercise.

Subjects will be given four half-hour training sessions in their respective groups. 10 sustained singing tasks will be recorded at the conclusion of each training session. These samples will be examined acoustically to determine if the hypothesized effects of visual biofeedback on vibrato are supported by statistically significant data.

Independent variable: the subjects’ exposure to vibrato treatment strategies.

Dependant variables: subjects’ self-reported awareness of their vibrato, vibrato acquisition time, vibrato periodicity as measured in vibrato signal jitter and shimmer, and vibrato retention as measured 2 weeks post-therapy.

Controlled variables: Subject sex, age, and years of prior (solo) vocal training.

David Meyer, D.M., Associate Professor of Music, Western Washington University, 516 High Street, Bellingham, WA 98225-9107, (360) 650-3787, david.meyer@wwu.edu

Kimberly Gratland James, D.M., Assistant Professor of Music, The University of Montana, Music Building, 32 Campus Drive, Missoula, MT 59812, (406) 243-2182, kimberly.james@umontana.edu

The Upper Extension of the Male Singing Voice in a Non-classical Mode

B. Gill and D. G. Miller

In the world of singing there is a need to employ a healthy, communicative and sustainable technique that will meet the demands of all musical styles. These demands can be daunting at times with regard to range, tessitura and overall vocalism required, especially in the area of contemporary music. This article focuses on the demands found in the high range of the male voice in contemporary music. We examine specific ways to produce this style of singing while maintaining vocal health. Our areas of focus are: *resonance strategies*, *closed quotient*, and *laryngeal positioning*. Through acoustic analysis of long-time singer David Phelps, we have found consistent data suggesting that within the production of the male voice in the high range in contemporary music it is possible to attain the desired vocalism by simply delaying, not completely avoiding the resonance strategy one finds in more traditional classical singing; in essence, the passaggio is simply shifted to higher pitches. The ability to seamlessly transition into a more traditional “tuning” in the high range, i.e. F2 tracking H3, after having carried the F1/H2 tuning higher than found in classically-based singing indicates either a highly flexible laryngeal function, or more likely, based on video data, a laryngeal position that is not significantly different from that of a classical singer. Other files analyzed for this article include imitations of the David Phelps phenomenon. The same delay in traditional resonance strategy can be seen, as well as closed quotients that are less than that of many classical singers.

Brian P. Gill, DMA, Certificate in Vocology, Music Assistant Professor, New York University, 35 West 4th Street Suite 777, New York, NY 10012, (917) 232-5669, inthemask@aol.com

Donald Gray Miller, PhD, Researcher, Groningen Voice Research, Osloweg 95, 9723BK, Groningen, The Netherlands, +31(0)50 313 1965, d.g.miller@vocevista.com

Graduate Student Voice Use and Vocal Efficiency in an Opera Rehearsal Week: A Case Study

Matthew Schloneger, M. Mus., The University of Kansas

Few studies have obtained data on real-time voice use of classical singers or have measured vocal efficiency in conjunction with performance data. Kitch (1996) used pre and post acoustic and perceptual methods to measure the effects of performance on singers' voices. Austin & Hunter (2009) recently completed a week of real-time vocal dose monitoring with university voice majors using Ambulatory Phonation Monitors (APMs). Real-time data obtained through APM units, coupled with stroboscopic examinations and multiple acoustic and perceptual analyses of vocal health, could help develop a more complete picture of voice use and vocal efficiency in intensive periods of voice use.

The purpose of this case study was (a) to assess vocal doses acquired by N=2 graduate vocal performance majors during a 7 day period that included opera rehearsals in addition to normal daily activities including voice lessons, choral rehearsals, practice time, class time, work and social activities by means of Ambulatory Phonation Monitors. Vocal dose was measured in tandem with (b) pre- and post-Multi-Dimensional Voice Profile (MDVP) assessments and laryngoscopic examinations, and (c) daily surveys of self-perceived vocal health and efficiency. Results were discussed in terms of voice use (vocal dosage, mean F0 and mean SPL dB levels) in and out of rehearsals and any changes that occurred in vocal efficiency during this intensive period.

Matthew Schloneger, M. Music, GTA, Vocal Pedagogy, University of Kansas, The University of Kansas School of Music, 1530 Naismith Drive, Room 460, Lawrence, KS 66045-3102, (316) 772-0726, mattschloneger@ku.edu

Dysphonia in Teachers and Barriers to Care

Victor Da Costa, MD; Elizabeth Prada, DMD, MPH; Andrew Roberts, BA; Seth Cohen, MD, MPH

Introduction: Teachers have an increased incidence of voice disorders due to the nature of their work. Voice problems often result in reduced activities, missed work days and occupation changes. However, only a small fraction of these teachers have sought professional help for their disorders. The purpose of this study is to elucidate some of the barriers to care teachers may face.

Methods: One thousand teachers were randomly selected from a compilation of all grade school teachers in North Carolina. They were sent a survey querying information regarding basic demographics, personal voice health, and barriers to care using a five point Likert scale. Three mailings were sent to the same cohort spaced a month apart. Results were tabulated in an Excel spreadsheet. Statistical analysis was performed using Chi-squared test with variable significance $p<0.05$.

Results: 243 responses were received over three mailings, 237 were complete. 52 (22%) were currently hoarse 138 (52%) have been hoarse at one point. 54 (23%) have missed work for hoarseness. Only 47 (20%) have sought professional help. Female teachers and those older than 45 years were more likely to seek help ($p<0.01$ and $p<0.01$ respectively). Only 115 (49%) and 107 (49%) of teachers are aware of voice therapy and believe a doctor can help respectively. 71 (30%) believe hoarseness is normal in teaching.

Conclusions: There are multiple barriers to care for the dysphonic teacher with many due to unawareness of professional help. Further studies should be geared towards teacher education and at reducing barriers to care.

Victor Da Costa, MD, Resident Physician, Duke University Medical Center, Duke University Medical Center, Division of Otolaryngology, Box 3805, Durham, NC 27710, (949) 468-6797, victor.dacosta@duke.edu

Elizabeth Prada, DMD, MPH, Adjunct Associate Professor, UNC at Chapel Hill, Box 7450, UNC School of Dentistry, Chapel Hill, NC 27599, (248) 701-3793, dr.lizprada@gmail.com

Andrew S Roberts, BS, Medical Student, Duke University School of Medicine, Office of Student Affairs, Duke University School of Medicine, DUMC Box 3005 Durham, NC 27710, (606) 922-3365, andrew.roberts@duke.edu

Seth M. Cohen, MD, MPH, Assistant Professor, Duke University Medical Center, Duke University Medical Center, Division of Otolaryngology, Box 3805, Durham, NC 27710, (919) 681-7350, seth.cohen@duke.edu

Ref#: VP5

Vocal Dosimetry: A Graduate Level Vocal Pedagogy Course Experience
Christopher S. Gaskill, MM, PhD, CCC-SLP
Jennifer G. Cowgill, DM

Given the need for normative vocal dosimetry data and the need for improved vocal hygiene and voice conservation among singers in training, the purpose of this study is twofold: (1) to gather preliminary data regarding the typical vocal dose of graduate vocal performance majors, and (2) to document their impressions of their own vocal use patterns prior to and following vocal dosimetry. Eight graduate level vocal performance students will wear a vocal dosimeter for 5 days, for as many of their waking hours as possible. Prior to and following the data collection period, videostroboscopy of the larynx and basic acoustic and perceptual voice analyses will be performed. Vocal dosimetry data, including average percent phonation time, cycle dose, and distance dose will be captured and analyzed across singing and non-singing activities. The students will log their activities throughout the day, as well as perform periodic ratings of vocal quality, ease of phonation, and vocal fatigue. Each student will complete a Singers Voice Handicap Index and vocal use survey prior to data collection. The dosimetry results will be shared with each student, and they will complete additional survey questions regarding their reactions to the dosimetry experience and their individual data. Implications for the use of vocal dosimetry as a teaching tool for future vocal professionals and pedagogues will be discussed.

Christopher S. Gaskill, MM, PhD, Assistant Professor, The University of Alabama, Box 870242
Tuscaloosa AL 35487, (205) 348-9821, cgaskill@bama.ua.edu

Jennifer G. Cowgill, DM, Assistant Professor, The University of Alabama, Box 870366,
Tuscaloosa AL 35487, (205) 348-7110, jcowgill@bama.ua.edu

Ref#: VP6

Identifying Strategies for the Prevention of Vocal Problems among Potential Music Educators

Kathleen Crane, BM, Sarah Altman, MM, MA, Brenda Smith, DMA, and Judith Wingate, PhD
School of Music and Department of Communication Science and Disorders
University of Florida
Gainesville, FL

The voice is the greatest tool of the music educator, whose daily tasks require voice use including both speaking and singing. Those who teach instrumental or vocal music must use the singing voice to demonstrate phrasing, articulation, and good tone quality through a technique called “modeling.” In addition to communicating with the voice for singing, music educators use the speaking voice to instruct students both musically and otherwise. In fact, music educators are among those whom Dr. RT Sataloff termed “professional voice users” or individuals who require healthy voices for speaking and singing to be effective in their daily work. As such, it is vital that those who teach music preserve and protect their voices. The purpose of this research study, sponsored by the University Scholars Program at the University of Florida, is to measure and evaluate the vocal efficiency of music students preparing for their student teaching internships. Using Estill Voice Evaluation Suite (VES) software, ten students will be acoustically screened before and after a prescribed, video recorded teaching task with the intention of identifying positive vocal behaviors and preventing vocal injury. The participants will also be asked to fill out a questionnaire regarding their vocal health as it relates to their career in teaching through a series of subjective and objective questions. The data from the pre- and post-acoustical measurements with evidence from the video recording will be compiled for comparison and analysis. The paper will demonstrate the methods and report the findings from subjective and objective data.

Kathleen Crane, Bachelor of Music (Music Ed), University of Florida, P.O. Box 117900, Gainesville, FL 32611-7900, (407) 694-7955, kmcrane@ufl.edu

Sarah Altman, BM, M.M, M.A., Graduate Student, Dept. of Communication Science and Disorders, University of Florida, P.O. Box 117420, Gainesville, FL 32611-7420, (740) 350-8444, sarah.m.altman@gmail.com

Brenda Smith, BM, MM, DMA, Associate Professor of Music, University of Florida, P.O. Box 117900 Gainesville, FL 32611-7900, (352) 374-4855, gesang@ufl.edu

Judith Wingate, BS, MS, PhD, Clinical Assistant Professor, Dept of Communication Science and Disorders, University of Florida, P.O. Box 117420, Gainesville, FL 32611-7420, (352) 392-2113, wingate@ufl.edu

Ref#: VP9

Return to Singing: An Anecdotal Case Study of Retraining The Singing Voice Of A Professional Jazz Vocalist Over A Three-Year Period After Near-Total Voice Loss Following Thyroidectomy

Jeannette LoVetri and Barbara Lewin

Little has been written about those who have lost their ability to sing after throat surgery. Few studies have been conducted on professional vocalists of either CCM or classical styles who have recovered their singing voices subsequent to near-total loss after surgery. The vocalist in this study underwent a routine thyroidectomy, without notification that there was risk to the voice, and discovered after surgery that her ability to speak and sing had been seriously compromised. Her speaking voice was noisy, breathy, inconsistent and had a tremor. The singing in mid-range was gone and control over other parameters was minimal. The vocalist subsequently sought other medical and clinical opinions and all experts advised that the prognosis for a return to normal singing function was extremely doubtful. Determined to pursue vocal recovery, the vocalist began a slow return to stable speech through self-exploration. Then she found a Singing Voice Specialist who assisted her in returning to normalized singing over a three-year period of bi-monthly sessions. The paper presents an overview of the vocalist through audio clips made prior to surgery, during the retraining process and of a recent jazz CD recorded in 2009. It includes discussion of the vocal retraining protocol, the reasoning behind the protocol and the artist's point of view regarding this vocal journey.

Jeannette LoVetri, Director, The Voice Workshop, 317 West 93rd Street, New York, NY 10025,
(212) 662-9338, lovetri@thevoiceworkshop.com

Barbara Lewin, B.A., Vocalist, 29 Greenvale Avenue, Yonkers, NY 10703, (914) 966-3627,
barbaralewin@mac.com

Vocal Warm-Up Practices and Perceptions in Vocalists: A Pilot Survey

ABSTRACT

Vocal warm-up exercises are believed to contribute to the prevention of vocal fold injury in professional voice users. For professional singers and students of singing, a regular vocal warm-up regimen is considered essential. Despite the wide and longstanding use of vocal warm-up in the singing community, relatively little is known about how vocal warm-up impacts the components of voice production. Furthermore, there is conflicting information in the vocal pedagogy literature about the most effective and widely used vocal warm-up exercises and the optimal frequency and duration of vocal warm-up sessions. Given the wide variability of vocal warm-up regimens in singers, studies investigating the contribution of vocal warm-up to vocal fold health and injury prevention have yielded inconsistent results.

The goal of this current study is to investigate the characteristics of vocal warm-up regimens in the singing community using a survey. One hundred participants were recruited for the study. Participants included voice students from undergraduate, masters, and doctoral music programs and professional singers. Results are used to highlight the most frequently used vocal warm-up exercises and the average duration and frequency of vocal warm-up sessions. In addition, singers' perceptions of and rationale for vocal warm-up is determined. Preliminary data on the occurrence of vocal fold injury in singers who use vocal warm-up versus those who do not use a vocal warm-up is presented. Results of this study will be utilized in future studies investigating the effects of vocal warm-up on the components of voice production.

Allison Gish, B.M., Graduate Student, Department of Communication Sciences and Disorders, Louisiana State University, 64 Hatcher Hall, Baton Rouge, Louisiana 70803, (225) 205-4651, aholco1@lsu.edu

Melda Kunduk, Ph.D., Assistant Professor, Department of Comm. Sci. & Disorders, LSU, Dept. of Otolaryngology-Head & Neck Surgery, LSU HSC, Our Lady of the Lake Voice Center, 64 Hatcher Hall Baton Rouge, Louisiana 70803, 7777 Hennessy Blvd. Suite 408, Baton Rouge, LA 70808, (225) 578-3930, mkunduk@lsu.edu

Lorraine Sims, D.M.A., Associate Professor of Voice, Interim Coordinator of the Vocal Arts Area, School of Music, Louisiana State University, 102 New Music Building, Baton Rouge, LA 70803, (225) 578-2641, lsims@lsu.edu

Andrew McWhorter, M.D., Laryngologist, Dept of Otolaryngology - Head and Neck Surgery, Louisiana State University, Health Sciences Center, Our Lady of the Lake Voice Center, 7777 Hennessy Blvd. Suite 408, Baton Rouge, Louisiana 70808, (225) 765-5335, amcwhort@ololrmc.com

No Title Given

I am a singing voice specialist, whose specialty is teaching people who are blind or have vision loss. I would like to present a workshop in this area. I have been a voice instructor at the Filomen D'Agostino Greenberg Music School at Lighthouse International since 1995. (In addition, I have taught other areas at the Lighthouse since 1985) The definition of vision loss is as follows: people who, with the aid of glasses and/or contact lenses, cannot see visual images such as print from a book, newspaper or a crosswalk clearly. These images still appear distorted, blurred or incomplete. If the vision loss is total, it is called blindness.

The demonstration will begin with how does one introduce a student with vision loss to a new environment such as your studio.

In addition, conceptual differences between totally blind and visually impaired students will be discussed. How do the vocal pedagogical techniques differ between teaching a student who has never had vision with a person who has some vision, or recently lost his or her vision? The concepts of shapes are different. The hands on approach are more readily applied with regards to a more kinesthetic approach to teaching.

There are different types of vision loss and these different areas effects the individual approach to teaching singing. Some of these visual disabilities are cataracts, glaucoma, macular degeneration, retinopathy, retinitis pigmentosa, and CMV.

In order to adapt to the different vision losses, the printing of either Braille music, or print materials must be adapted in order to fit the needs of the student. Areas such as contrasting print, point size, spacing, fonts, margins, paper finish, etc. will be discussed, in addition to describing the various audio devices and video magnifiers that aid the students.

I can bring some of my students from the Lighthouse to Philadelphia, and/or students from the Foundation can be presented to me.

Charlotte Surkin, M.A., B.M.Ed., Singing Voice Specialist, Lighthouse International, 111 East 59th Street, New York, NY, (212) 989-0826, charlotte_s@earthlink.net

Ref#: W10

The Studio Singer & Voiceover Performer: Challenges to Vocal Health
ABSTRACT to VOICE FOUNDATION for 2010 Philadelphia Conference June

This presentation will include lecture, live and recorded examples, discussion, and time for audience questions and answers. We will investigate vocal health issues of voice performers in the areas of studio jingle singing and voiceovers. These performers are regularly asked to produce potentially damaging sounds that can be harmful to the vocal mechanism, particularly when repeated over a lengthy career in the recording studios. Performers voice radio TV commercials, cartoons, videogames, jingles, and songs in all vocal ranges, all musical genres. This potentially lucrative area often obscures the inherent danger to vocal health. Performers are asked to voice lengthy recording sessions, often daily, sometimes several sessions per day, plus some also perform in theatres or cabarets simultaneously.

My training in voice speech science will permit me to address vocal health issues from a performer's standpoint. My career spans thirty years as a recording studio singer, voiceover performer, former RCA Recording Artist, live performer, and teacher. I have served on several college faculties but currently, I work as a speech coach in my private studio and present workshops worldwide. I am a performer's coach to actors, singers, voiceover talents, and executives. I am currently the speech voice coach at two television cable networks.

A live singer and piano accompanist in attendance will illustrate various types of vocal demands put upon recording studio singers. I will also illustrate as a singer and voiceover performer.

Additionally, I will provide a compact disc (audio CD) of approx. 8 minutes duration containing actual examples of studio singing and voiceovers of a particularly challenging type.

I request a CD audio player ('boombox'), a female singer capable of both classical and mass-media vocal production, and a pianist. I will require a phone conference with the singer prior to the workshop. I will provide instructional handout packets at my expense for the audience members. I will need an address to mail the handouts prior to the workshop as I am located in Dallas.

Bettye Zoller Seitz, B.M., M.M ED, Ph.D., ABD Speech Science Vocal Pedagogy, Voice Coach Singers Voiceover Performers, Actors, Executives, Owner Voicesvoices.com, Voiceover Professional and Studio Singer, PO Box 7991 Dallas, TX 75209, (214) 638-8255, btzol@aol.com

Workshop Proposal : Katie Bull, Whole Body Voice
Voice Foundation 2010

Empowering the Professional Actor: Self Coaching Techniques for the Whole Body Voice Approach

Mentored in vocal production for the speaking voice by the late Chuck Jones, and drawing from a wide range of influences including structured movement improvisation, jazz vocal improvisation, and Tibetan Buddhist meditation, Katie Bull will present several fundamental principles regarding the role of Gravity in vocal production:

Gravity Exploration

1. musculo-skeletal and energy sensations of gravity
2. sensations of release into gravity
3. sensations of resistance to gravity
4. “engagement for support” in relationship to sensations of gravity

Bull will lead conference participants through visceral explorations of the whole pedestrian body as a vocal instrument, drawing on their pre-existing visceral self-knowledge, and the application of the Gravity Exploration. Bull will also contextualize professional coaching in relationship to its root in character development.

KATIE BULL

Katie was first mentored in vocal production for the speaking voice in 1978, by the late Chuck Jones, an influential vocal production coach for Broadway, Television, and film with whom she maintained a working collaboration, and friendship, until his untimely passing. Katie’s professional vocal coaching credits are numerous and include (to name only a few): Felicity Huffman in TransAmerica (Golden Globe Winner/Oscar Nomination) & Phoebe in Wonderland; Jonathan Cake in Coriolanus (Old Globe); Maggie Kiley in Scarcity (Atlantic Theater Company); Eden Regal in All My Children (TV/Emmy), David Shiner in Seussical (Frank Galatti, director). Most recently Katie vocal coached Bill Irwin for the Roundabout Theater Company’s production of Waiting for Godot (numerous awards). Katie has evolved her relationship to the core Jones sequence of developmentally based vocal exercises to include an emphasis on the improvisational nature of daily practice and application.

Katie Bull, BFA Theater Arts, SUNY Purchase, Head of Vocal Production, Atlantic Theater Company, 76 9th Avenue, (917) 754-2990, kjbull@mindspring.com

On the Ball: Using the Physio Ball in the Singing Studio**Sarah Adams Hoover, DMA**

Whether a singer is recovering from injury, seeking to enhance performance, or looking to improve physical coordination, the physio ball can be used as an important teaching tool in the singing studio. This workshop will show how to use the physio ball to address a range of issues which include: developing physical awareness and kinesthetic perception; refining balance and proprioception; improving breathing coordination and breath control; increasing abdominal muscular strength and coordination; developing pelvic floor awareness and control; and increasing spinal flexibility to aid postural adjustments and respiration. Exploring the use of a variety of physio balls while sitting, standing, and lying down, participants will observe how tactile feedback, strengthening/coordination exercises, resistance, and balance challenges can be used to optimize healthy vocal production.

Biography

Soprano **Sarah Adams Hoover**, DMA, earned a degree in Medieval Studies *magna cum laude* from Yale and a D.M.A. in Vocal Performance from Peabody Conservatory where she studied with Phyllis Bryn-Julson. Currently Vice-President of the New York City chapter of NATS, Dr. Hoover is also a member of NYSTA, the Voice Foundation, and Andover Educators as well as Pi Kappa Lambda and Mu Phi Epsilon. She has taught a wide range of students from treble children to adult professionals. Teaching positions include Head of Vocal Studies at Washington National Cathedral (where she developed and implemented a curriculum of solo vocal study for 40 professional boy and girl choristers), Concordia Conservatory, C.W. Post's Hutton House, The Levine School of Music, The Wilmington Music School, Jersey City State College, National Cathedral/St. Albans Schools, and the Madeira School.

Dr. Hoover's training in voice science and clinical observation at the Johns Hopkins Center for Laryngeal and Voice Disorders and with Margaret Baroody at the practice of Dr. Robert Sataloff has prepared her to assist singers in recovery from vocal injury. Additional training in yoga, Alexander Technique, Pilates (she holds a certification in Pilates matwork from PhysicalMind Institute), and Body Mapping (in which she was certified by Barbara Conable's Andover Educators in 2003) form the basis of her expertise as a somatic educator. She has presented clinics and workshops for educational and professional organizations including the Voice Foundation, Washington Opera's Summer Institute, the National Association of Teachers of Singing, the Royal School of Church Music, Shenandoah Conservatory, Levine School of Music, the Wilmington Music School, and as a keynote speaker at the 2005 Andover Educators Conference. She has also designed and taught semester courses in "Bodywork for Singers" and "Body Awareness in Singing."

She has appeared in recital, oratorio, operatic and chamber music performances throughout the United States. As soloist she has performed with the St. Luke's Chamber Orchestra, the Palisades Chamber Symphony, the Amadeus Orchestra, the Goliard Chamber Ensemble, the Bach and Handel Chorale, the West Village Chorale, the New Dominion Chorale, Grace Choral Society, and Mélomanie. Operatic performances include roles with DiCapo Opera, Peabody Opera Etudes, Opera Americana, and Mozart & Friends Opera. She is a winner of the National Federation of Music Clubs' Young Artists Competition, the Gretchen Hood Memorial Award Competition, and the Paul Robeson Competition and was a national semi-finalist in the NATS Artist Award Competition.

Dr. Hoover is also a music journalist; her reviews and articles have been published in the *Washington Post*, *Baltimore Sun*, *Johns Hopkins Magazine*, and *Peabody Magazine*. Currently Associate Editor of the New York Singing Teachers' Association's *VOICEPrints*, she has also written program notes for organizations including Strathmore Hall, the Baltimore Chamber Orchestra, the Tilles Center, and Concordia Conservatory.

Multidisciplinary Approach to Managing Jaw Problems in Vocal Performers

Cervical area dysfunction is reported in 45% general population and temporomandibular joint dysfunction (TMD) is estimated to occur in 20% of the population (Hertling, 2003; Magee , 2006). Vocal Performers (VP) rely on their temporomandibular joint (TMJ) and cervical region as a key contributor to performance (Carroll , 2000; LeBorgne , 2007; Melton, 2007) and demands of vocal training and performance on the TMJ may predispose that joint and its associated structures to increased impairments, functional limitations and participation restrictions (Howard 1998, Sataloff 1991, Schneider & Sataloff 2007).

There is evidence to suggest that strengthening and alignment techniques such as Alexander technique, Feldenkrais, yoga, Pilates, Fitzmaurice technique and prophylactic physical therapy may provide protection from TMD (Emerich ,2003; Head ,2006; Heirich,2005; Melton, 2001).

DeLeo and LeBorgne (DATE) looked at Temporomandibular Joint Dysfunction in Conservatory Trained Vocalists. Findings suggested that 66% of vocal performers demonstrated decreases in strength in cervical musculature in addition to poor dynamic stability of the temporomandibular joint in 73% of vocal performers.

Alignment and strength technique classes may provide a protective mechanism for decreasing injuries, decreased vocal training and lost performance time and a multidisciplinary approach may be warranted when working with TMJ dysfunction if vocal performers. Consideration must be given to body and self-awareness issues in performers versus nonperformers. Body and self-awareness, in this sense, refers to the patient's awareness of his or her own behaviors and the ability to make changes as instructed.

The purpose of this workshop is to introduce a protocol for managing TMD for vocal performers encompassing physical therapy and voice therapy.

Marci Daniels Rosenberg, B.M, M.S, Speech Pathologist, Voice & Singing Specialist, University of Michigan, Vocal Health Center, 19900 Haggerty Rd Suite 103, Livonia, Mi 48152, (734) 763-4003, marcied@med.umich.edu

Alison T. DeLeo, PT, DPT, Assistant Professor, The George Washington University, 900 23rd Street NW, Suite 6144, (202) 994-8177, hspaxd@gwumc.edu

Wendy LeBorgne, Ph D, Voice Pathologist, The Blaine Block Institute for Voice Analysis and Rehabilitation, The Professional Voice Center of Greater Cincinnati, 369 West First St.; Suite 408, (937) 496-2622, wleborgne@dhns.net

Abstract: A Team Approach to Voice Disorders

Laishyang (Melody) Ouyoung, MS, Speech Pathologist, acupuncturist
Uttam K. Sinha, MS, MD, FACS
USC University Hospital,
Los Angeles, CA. 90036

Summary:

Voice treatment outcomes have been shown to be positive for vocal disorders of various etiologies. The techniques for voice therapy can be applied across diverse patients resulting in improved vocal quality as measured by hoarseness, breath control and pitch range. The success of voice treatment depends on 1) the cordial working relationship between otolaryngologists, speech pathologists and patients. 2) clinical expertise and experience of the therapist; and 3) patients' understanding of their voice problems and motivation to improve.

This workshop will be co-presented by an otolaryngologist and a speech pathologist. Three types of voice problems such as vocal cords tension, vocal cords weakness, and pitch breaks of a professional singer will be presented with a role-play format. The otolaryngologist will demonstrate how he examines the patients and outlines his medical management on specific voice disorders. The speech pathologist is also a certified acupuncturist and has included acupuncture techniques into her voice therapy with positive outcome. She will demonstrate these unique and combined modalities along with evidenced-based voice therapy approach to manage voice disorders. Specific breathing exercises, voice exercises, laryngeal manipulation and myofascial release techniques will be covered.

Participants will have the opportunity to observe the team approach to voice disorders from the beginning: medical diagnosis to voice evaluation and treatment. Furthermore, participants will have the opportunity to have hands-on practice, using the newly-learned techniques on each other.

Laishyang(Melody) Ouyoung, MS, Speech Manager, ASHA, CSHA, (323) 935-1902,
mouyoung@sbcglobal.net

Uttam Sinha. MD, Chief and Program Director, American Academy of Otolaryngology-Head and Neck Surgery, (323) 442-5790, sinha@usc.edu

The Accent Method: Foundations and Applications to the Voice Studio

The Accent Method is a highly effective set of exercises based upon improving the coordination of the respiratory, phonatory, resonatory, and articulatory systems. If this method is chosen for use in the voice studio or in voice therapy, it is imperative that the correct underlying bases and activities be understood and validly reproduced as intended by the original creators of the method. A distortion of the protocol will result in decreased effectiveness.

The Accent Method's applicability is wide-spread, as it can be used with performers of all ages and experience levels and for both healthy and pathologic voices. It is a "user-friendly" choice for any performer or vocal pedagogue, in particular, because it draws upon our "user" knowledge gained through years of singing and focuses it specifically on more efficient vocal production, or "more bang for the buck". It also helps ensure safe and healthy vocal production, thus reducing the likelihood of future vocal pathologies.

As both a professional singer and a licensed speech-language pathologist, I have used the Accent Method with a variety of singing students and with voice, resonance, and/or articulatory impairment patients with great success over the past 10 years. It is quickly learned and includes advancing levels of complexity correlated to fine-tuning this coordination that is so crucial to healthy voice and speech production. I would like to propose this session as a workshop session held at the AVA, to include active participation by the audience.

Christine Bergan, M.M., M.A., Ph.D., CCC-SLP, Program Director and Assist. Professor, Stephen F. Austin State University, P.O. Box 13019, SFA Station, (936) 468-1337, (319) 530-7469,
berganc@sfasu.edu

The Anatomy of Public Speaking!

The workshop is intended for speech-language pathologists with an interest in corporate speech and professional voice users. The basis for this workshop demonstrate to the SLP how to educate the professional voice user to become more effective/engaging communicators. This presentation was originally designed for lawyers to better understand/read/assess their juries and modify their presentation to captivate their audiences.

It is an explanation of the interaction between a public speaker and their audience beginning at the neuron-anatomical level. A brief overview of mirror neurons (Rizzolatti, 2004) and the neuro-anatomy of the audience will be discussed. A mirror neuron is a neuron that fires both when an individual acts and when the individual observes the same action performed by another. Most don't realize the importance for a speaker to understand this unique neuron-anatomical system. Mirror neurons are the system through which the speaker "reads" their audience, therefore if the audience appears engaged, looks bored, or demonstrate other reactions, both negative or positive, to the speaker, they can assess the audience based on reactions and modify their presentation style. Those speakers that are most engaging have learned to use their mirror neurons to read their audience and modify their style to engage the crowd.

A short statistical explanation of connotative and denotative meanings, posture, spacing and movement for professional voice users will be demonstrated. These are techniques used in public speaking to increase audience involvement. The SLP attending will be able to demonstrate and instruct on public speaking and engaging an audience.

Andrew Christler, MA, Speech-Language Pathologist, Schools of Palm Beach County, 6650 Lawrence Rd, (313)421-2166, andychristler@yahoo.com

Ref#: W17

Laryngeal Manual Therapy: A Contribution to the Treatment of Clinical Voice Disorders

Lesley Mathieson FRCSLT
Visiting Lecturer in Voice Pathology
The Ear Institute
University College London
United Kingdom

Manual therapies are being used increasingly in the treatment of muscle tension dysphonia and other voice disorders where hyperfunctional phonation is a significant primary or secondary feature. Aronson originally described manual treatment for the reduction of musculoskeletal tension associated with vocal hyperfunction, in the 1980s. Subsequently, a number of practitioners in the UK, USA and elsewhere have developed various manual therapy techniques. As a result, journal papers are emerging which are providing an increasing evidence-base for manual therapies in the treatment of voice disorders.

This workshop will describe and demonstrate the palpatory evaluation of the perilyngeal musculature and the method of Laryngeal Manual Therapy (LMT) developed by the author for use by speech-language pathologists. The Palpatory Evaluation Protocol, used in recording muscle resistance, and the Vocal Tract Discomfort Scale, a patient self-rating scale completed by patients prior to intervention, will also be discussed. This workshop will give attendees the opportunity to observe the techniques which are described in the following paper:

Mathieson L, Hirani SP, Epstein R, Baken RJ, Wood G, Rubin JS. Laryngeal Manual Therapy: A preliminary study to examine its treatment effects in the management of muscle tension dysphonia. *J. Voice.* 2009; 23:3, 353-366

Lesley Mathieson, DipCST, FRCSLT, Visiting Lecturer in Voice Pathology, UCL Ear Institute, Speech and Language Therapy Dept., Royal National Throat Nose and Ear Hospital, Gray's Inn Road, London WC1X 8DA, +44 (0)1494 762263, lesley_mathieson@yahoo.com

Ref#: W18

Singing for Mind/Body Connection: A Preventative Tool

Vocalists, music teachers, and other voice professionals spend the bulk of their day using their voices to make money, entertain, please others, or instruct others. We can become more and more disconnected from the experience of using the singing voice for personal pleasure and the singing voice can become more and more disconnected from the body.

Yet, finding a way to re-establish this connection for voice professionals is a part of balanced vocal and self care. The research on singing and mental/ physical health is growing and results indicate that there are great benefits to utilizing mind/body exercises while singing, including lowering blood pressure and raising immune efficiency.

In this workshop this concept will be taken a step further as participants will be shown how to use the biopsychosocial aspects of singing to gain awareness of psychological, social, and physical tensions that can exist around one's voice, and, which can cause potential acute or subtle long-term harm to the voice and/or to the individual as a whole. Stress Reduction and self-awareness techniques such as breathing, imagery, body scan and rational thinking will be combined with simple singing experiences.

Participants will be encouraged to use these techniques for generalized stress, performance stress, creative blocks, and expression of emotions while singing, and in life.

Kelly Meashey, Masters in Music Therapy, Music Psychotherapist, Professional Vocalist, Temple University, Immaculata University, 13th and Broad Sts, Phila, Pa, 1145 King Rd, Immaculata, Pa, (215) 464-5044, MeashK@verizon.net

Pediatric Voice Therapy

The incidence of voice disorders in the pediatric population has been estimated at 6-24% (e.g., Carding et al 2006, Choi and Zalzal, 1999, Wilson, 1979) This indicates a need for speech-language pathologists to be skilled in working with children with voice disorders. Treatment of children with voice disorders differs from the treatment of adults in many ways. While the basic principles of voice therapy are the same, motivation, treatment techniques, and strategies for teaching vary. During this workshop, I will discuss the similarities and differences between adult and pediatric therapy and demonstrate ways of adapting voice therapy to the pediatric population. I will demonstrate therapy in preschool and school-aged children with hyperfunctional voice disorders which may include nodules, laryngeal edema, and muscle tension dysphonia. Therapy will include vocal warm-ups for children, and therapy techniques to facilitate optimal vocal production, including semi-occluded vocal tract exercises, forward resonance, and flow phonation, as well as carry-over into connected speech for conversation/ play. Participants will have the opportunity to practice techniques, and discuss ways to adapt their current therapy practices to suit pediatric patients. Workshop participants will leave with practical strategies to use immediately in their therapy practice.

Maia Braden, MS, Speech-Language Pathologist, University of Wisconsin, 1675 Highland Ave, Madison, WI 53792, (608) 262-3695, braden@surgery.wisc.edu

Techniques for Extreme Singing

TVS Training Vocal Athletes Workshop

How to bridge passagio and engage vocal fold closure in the head resonance

1. Bridging & connecting: the foundation of extreme singing

- **SPECIALIST WORKOUTS DESIGNED TO TRAIN BRIDGING OF THE PASSAGIO AND INDUCE VOCAL FOLD ADDUCTION/CLOSURE TO RID ONE SELF OF FALSETTO.**

Why Is This Important?

All singers want to be able to increase vocal range! Most singers have a strong desire to be able to sing high notes without sounding “Falsetto”. Many singers suffer from different levels of tension and constriction when singing high notes (chest pulling & throat constriction). Bridging & Connecting are the two most advanced skills that the trained singer must learn to coordinate and ultimately develop a new “attractor state” (habits).

Bridging and Connecting are the two most difficult skills any singer can endeavor to learn, but if you can learn to do it, you will have unlimited range potential, power, full, convincing head tones and all forms of tension creep will forever go away.

The difference between a “good” technical singer and a “great” technician, is their ability to bridge & connect. Robert Lunte is an expert and renown for training people how to “Bridge & Connect”.

- **VOCALIZES FOR BRIDGING & CONNECTING:**

Two Methods:

1. **Lift Up / Pull Back (Bridging)**

Coordinate the lift of the soft palate, increase physical space in the pharynx, and train Thyroarytenoid (TAs) / Cricothyroid (CTs) muscle coordination to continue vocal fold thinning.

2. **Establishing Laryngeal Twang Configurations: (Bridging)**

Find Your Twang: (Bridging & Connecting)

“Twang”/Pharyngeal Voice/Le Voce Faringea/The Singer’s Formant – All terms to describe a vocal mode that further trains TA/CT coordination and vocal fold thinning as the singer passes through the Passagio. Produced by coordinating a contraction of the Aryepiglottic Sphincter (AES), thyroid cartilage tilt and high velocities of sub/super glottal pressures. Twang configurations, when executed properly, eliminate “falsetto” and expands range of the voice by approximately 2.5 octaves and produce an amplification of 2-4k kilohertz which gives the singer a “cut” and fullness in the head voice. Advanced twang coordinations also produce an aggressive “rock/metal” sound and is the onset for healthier vocal distortion that will not harm the voice.

- Assists greatly in Passagio bridging
- Assists greatly in vocal fold closure
- Eliminates Falsetto and provides the head tone a full, “chesty”, amplified rock sound that CAN BE USED.
- Is the solution for healthy vocal distortion.

Application of vocal twang into the head voice is one of the innovations that The Vocalist Studio has developed. Vocal twang by itself is not new, application to the head voice with stronger than usual AES contractions to produce aggressive Rock tone and screams is one of the most important contributions that TVS pedagogy is developing for the industry.

Bridging & Connecting II:

Two workouts designed to develop and strengthen bridging and connecting.

Octave Registrations & Head Voice Twang Development:

Workout that trains registration and AES contractions for twang.

These vocalizes may take us into discussions regarding:

- Sirens.
- Calibration & Transcending Tone (messa di voce) techniques that help student to switch between a contracted twang vocal mode to a projected, neutral, falsetto posture.
- Increasing Respiratory Velocity or working to make respiration more efficient.
- Adducting in the lower head voice.
- Vocal Distortion, provided that the student can effectively twang.

2. vocal effects: vocal distortion & Screams

- **OVERLAY GROTT (Aryepiglottic Sphincter Distortion).**

Vocal distortion produced by extreme contractions of the AES once sound column is placed.

- **ESDs (Extreme Scream Distortion)**

Activation of the FVF (False Vocal Folds)

- **HPDs (High Pitch Screams)**

High respiratory velocity supporting an AES contraction for twang in the head voice beyond C5.

Spectral and EGG Analysis in the Voice Studio

A vocal lesson/workshop designed to show how spectral analysis can be used as a tool to assist teachers and singers in their professional development.

I. Using spectral analysis during warm-up exercises.

- a) Monitor changes that occur in the harmonic structure during vowel transition.
- b) Harmonic structure similarities and differences between the male and female voice, as it relates to registration.

II. Preparing for registration transitions by adjusting the vocal tract formants in order to track different harmonics.

- a) Using relative harmonic strength to assist in determining proper registration.
- b) Using relative harmonic strength to assist in determining proper pharyngeal space.

III. Using the Electroglossalgraph (EGG) signal to assist singers in achieving greater glottal closure during tone production.

- a) Striving to make a breathy tone have more focus.
- b) Singing softly while maintaining the “core” (closed quotient or CQ) of the sound.
- c) CQ differences between vowels.

IV. Using the EGG signal to address *primo* and *secondo passaggio* transitions.

- a) As male and female singers negotiate the *passaggi*, what changes occur in their CQ.
- b) Using an increase or decrease in CQ to assist in navigating the register transition.

V. What vowel modification and harmonic #3 (H3) have in common in the male head voice.

- a) Using different resonance strategies in the male head voice.
- b) What resonance strategies have a stylistic affect on the vocal tone.

Hands on The Smith Accent Technique of Voice Therapy

Learner outcomes:

1. Understand the Physiological basis of Smith Accent (SA) Technique of Voice Therapy.
2. Observe and practice tasks used in each of the four stages of the SA Technique.
3. Identify appropriate clinical applications of the SA technique.
4. Review data of patients who underwent voice therapy using the SA technique.

Presentation Abstract:

The “Smith Accent Technique” is a holistic voice therapy technique, with a sound physiological basis, and a clear hierarchy of practice. The workshop will describe the technique, its physiological basis, hierarchy of practice drills and expected levels of skill achievements. It will also engage the audience in producing the different levels of abdomino-phonatory support utilized by the technique. The workshop will end with highlighting the clinical applications and review clinical outcome data for patients with UVFP who underwent the SA technique.

Presentation Summary:

We are faced with several major problems in voice therapy outcome studies. Very few studies address the effectiveness of specific voice therapy techniques. Most of the Voice therapy outcome studies available provide a very poor description of the technique used and tend to report on a collective “Voice therapy” technique that includes whatever it takes to make the voice better: Better breathing, pitch and volume modulation, etc. Also, most of the available voice therapy studies don’t attempt to explain what are the physiological bases / rationale for their adopted voice therapy technique. On the other hand, the “Smith Accent Technique” of voice therapy is one of the very well described voice therapy techniques, with ample information on the rationale for using it and the physiological changes that take place during and after therapy, both in normal volunteers and in patients with different voice disorders. This technique is very widely used in Europe, Japan and the Middle East. It is still new to voice clinicians in the United States and Canada. This Session will describe the technique; explain its physiological bases and provide hands on training for the tasks used in each of its stages as well as provide simple clinical means of assessment of the expected hierarchy of achievements. The session will also discuss pre-requisites for clinician training and share available clinical outcome data in voice therapy studies that used the “Smith Accent Technique” in patients with different voice disorders.

Aliaa Ali Khidr, MD, PhD, Assistant Professor, University of Virginia, Communication Disorders Program, 2205 Fontaine Avenue, Colony Plaza, Suite 202, Charlottesville, Virginia 22903, (434) 924-6354, aak2x@virginia.edu

Ref#: W22

Workshop: Articulation and Singing

Singers communicate text, but performers often focus on tonal placement for vowels with little regard to consonant tonal placement. Lack of attention to the critical features of consonants often causes the singer to work harder with text communication and with access to the pitches in the vocal line. Increased attention to consonant energy can also help unload the laryngeal demands during vowel production, allowing transfer of acoustic energy from consonants to vowels. This workshop addresses use of Phonemic Analysis to identify key phonemes in English texts (Broadway, art song).

Linda M Carroll, PhD CCC-SLP, Senior Voice Research Scientist, Children's Hospital of Philadelphia, Private Practice, Speech Pathology, 424 West 49 Street, Suite 1, New York, NY 10019, 212-459-3929, LMCarrollPhd@aol.com

Ref#: W23

Management of Vocal Tremor Based on Evaluation Patterns

The goal of this workshop is to demonstrate an abbreviated evaluation of vocal tremor patterns across a series of voice and speech tasks to determine the best management approach for reducing the perception of vocal tremor during connected speech. A demonstration of core voice therapy methods for reducing the perception of vocal tremor during connected speech will then be provided. To conduct this workshop, an individual with the diagnosis of Essential Tremor and vocal tremor is requested.

Julie Barkmeier-Kraemer, PhD, Associate Professor, University of Arizona, 1131 E 2nd St, Tucson, AZ 85721, (520) 621-5699, jbark@u.arizona.edu

Targeting Voice Feminization: Prosodic Dimension of Initial Pitch Intonation Pattern for Speech

TIMED SEGMENTS:

INTRODUCTION

FIVE min: general orientation to appropriate population; gender differentiation basis for the protocols; recognition of multiple goals in the vocal component of the feminization process: resonance, volume, stress and rhythm, smooth transitions (“liaison”), and pitch/melodic intonation patterns; the training process; and evolutional stages of change.

RATIONALE

FIVE min: Initial intonation pattern should be a primary focus for treatment:

Reasons:

Phone identification (universal transsexual complaint)

Interpersonal perception of gender (within seconds after hearing first sounds in someone’s voice)

Intercom identification (airplane, etc.)

Self-perception and identification

BODY OF PRESENTATION

TWENTY-FIVE min: The program for addressing initial intonation phonation pattern:

Deconstruction of pitch-related prosodic components of initial intonation pattern

AND

Reconstruction of feminine intonation pattern during initiation of phonation.

DECONSTRUCTION PHASE: *Breaking down the components*

Stage One: Identification of the intrinsic elements of initial pitch patterns

Goal: Establish understanding of components of pitch patterning

I. Contrastive identification of gender production patterns

A. Educating awareness of the masculine patterns of intonation: monotonic, “check”, and descending patterns

B. Training awareness of feminine intonation patterns

1. Upward inflection/circumflex inflection

Strategic targets:

- Train auditory awareness of upward inflection patterns:
 - Tapes, modeling using vowel syllables/words
- Train auditory awareness of circumflex inflection patterns
 - Tapes, modeling using vowel syllables/words

2. Vowel prolongation

Strategic Targets:

- Modeling
- Timing
- Gender contrastive awareness

3. Shift change vs. inflection change: masculine vs. feminine patterns

Strategic Targets:

- Awareness of difference between “shift” and “inflection”
- Awareness of the gender-related production differences

4. Demonstrating the difference between masculine and feminine resonance placement, and relative effect of these differences on pitch patterns

Strategic Targets:

- Modeling resonance differences

- Eliciting client-based productions reflecting awareness of placement differences

(Note: All strategies included in the protocol are considered complete when consistency of task is accomplished, i.e., 10/10 accurate repetitions/responses or when consistency is noted over time—accurate targets achieved from session to session, etc. A sensitive clinician should set parameters, keeping in mind that these may vary from client to client.)

Stage Two: Train client self-awareness of initial pitch production pattern

Goal: Establish client ability to monitor initial pitch production patterns

A. Client-centered establishment of self-awareness and self-monitoring

1. Suggested training strategies:

a. Audio recording:

Strategic targets:

- Client recognition of personal production in:
 - Conversation
 - Phrases, sentences
 - Words
 - Syllables

b. Visi-Pitch

Strategic targets:

- Visual recognition of initial intonation pattern
- Visual recognition of differentiated patterns using contrastive clinician modeling vs. client production on separate screens

B. Recognition of complicating factor and obstacle to intonation: Glottal attack

(Brief discussion of the following)

A. Training recognition of glottal attack

1. Concept definition

2. Modeled production

B. Client recognition through self-monitoring

C. Reduction of glottal attack

Three-stage practice

D. Suggested exercises for easy initiation (if time)

RECONSTRUCTION PHASE: Creating the feminine initiation pattern: replacing masculine intonation patterns with feminine patterns

Stage One: Training intonation and transition strategies

Goal: Establishing ability to produce initial intonation patterns and to transition to the following sound

A. Strategies to promote easy initiation and upward intonation

1. Easy initiation: Increasing breathiness

Strategic targets:

- Producing overriding breathiness
- Consistent ability to produce exaggerated breathiness
- Confirmation of client self-analysis of productions

2. Easy initiation: Gradual phasing out of exaggerated breathiness with replacement of oral “vocal flow”

Strategic targets:

- Phasing in gradually increasing amount of voicing using voiced continuants or /h/
- Utilization of timed productions to increase consistency of upward intonation pattern
- Confirm client ability to judge his/her own productions

3. Upward intonation: Production with “glissando”-like prolongation of initial

vowel/continuant

Strategic targets:

- Using Visi-Pitch model and train upward intonation without “check”

- Using Visi-Pitch/ chronometer establish goals related to Hz range levels
 - Suggested initial “glissando”: 2-3 Hz
 - Train consistent “glissandos” using Visi-Pitch, chronometer, tape recorder
 - Extend glissandos to 5-6 notes per production

Note: This technique (above: extension of range) can be utilized as a range enhancement strategy by promoting increased maximal note targets on a progressive basis while carefully adjusting the lowest note basis of the range.

I.e.: If initial optimal (without vocal stress or deterioration of stamina) note achieved is G below middle C with initial pitch movement from E to G, the next targeted gliding note goal would be A below middle C with hypothetical movement from F to A. While maintaining the boundaries within 2-3 note ranges, it has been found to be optimal to practice prolonging the highest targeted note, promoting laryngeal muscle readjustment and strengthening.

The target practice range may also be extended: as in the 5-6 notes extended glissando noted above this increases vocal flexibility for melodic intonation skill. Continued and graduated practice will gradually implement the assimilation of this target and will collaborate with incremental pitch range extension.

(Strategic targets continued from above):

- Exaggerated prolongation: timing for extension
 - Suggested time unit goals: 3-4 seconds per production
- Using tape recorder/Visi-Pitch / chronometer train client self-analysis of productions
 - Tape, question, replay
 - Visi-Pitch: (repeat productions until consistency is predictable), then:
 - Have client turn/close eyes and re-record
 - Ask for critique prior to visualizing the trace

4. Upward intonation: Trilling the vowel

Strategic targets:

- Light lip trill, followed by vocalization of vowel/continuant
- Light tongue trill, followed by vocalization
- Phasing out of trill/“thinking” trill
- Confirm client ability to self-analyze productions

B. Transition to following vowel/continuant Vowel prolongation/transition to following sounds with variant melodic patterns targeted

1. Vowel prolongation and smooth transition to following sounds

Specific targets:

- Concept recognition
- Training the productions
 - Intersound transition
 - Melodic variations following transition:
 - Moderate drop
 - Continuant melodic flow
 - Circumflexion of the following syllables
- Confirming the client self-awareness of production accuracy and consistency

Stage three: Integration of pattern into client’s intra/interpersonal conversational speech

Goal: Full assimilation of patterns for every conversational context

A. Assess “ownership” of pitch intonation pattern: constant tape recording at this stage is optimal so that immediate play-back can be used.

Strategic targets:

- Consistent and reliable client self-judgment

- Evidence of variant upward production lengths dependent on context
- Production is apparently without volition/labor and is immediate and easy
 - Tools:
 - Q and A format with
 - Short answers
 - Longer answers
 - Open-ended answers
 - Timed conversational units
 - Structured themes
 - Unstructured themes
 - (Always good to get a thumb-nail assessment of conversational skills at the beginning of each session)

B. Look for the “ah-ha” moment: client awareness of phone identification; reduction of uncomfortable interpersonal reactions; ability to feel comfortable in multiple situations.

TEN min: Summary and questions

Summary: . . . and:

Reminder that this is only one of the pitch pattern variations noted to be gender-specific as a prosodic dimension of speech we must also consider final intonation patterns as well as intrasentence patterns.

Mary E. (Tish) Moody, M.A., CCC-SLP, 308 Inspiration Lane, The Kentlands, Maryland 20878, (301) 840-1215, tishmoody@gmail.com

Ref#: W25

**Mechanics and Safety of Intended Vocal Distortion – A Must for Modern Broadway
and Current Popular Music**

Extreme forms of vocal production, such as those heard in the voices of singers such as Louis Armstrong, Jimmy Durante, James Brown, and Led Zeppelin is nothing new. In fact, the popularity of the “damaged” and “raspy” sound has increased greatly with disproportionate attention paid by science and pedagogy. Participants in this workshop, through audience participation and observation, will understand the physiological mechanics of safely produced intentionally produced vocal distortion, how to produce it and effective ways to teach it.

Melissa Cross, Principal, The Melissa Cross Vocal Studio, 251 West 30th Street Suite 11RE,
New York, New York 10001 U.S.A., (212) 736-3789, melisong@gmail.com

Inspect Your Voice Source

In this workshop participants can inspect their voice source in real time in terms of flow glottograms. Such glottograms show transglottal airflow versus time and are derived by inverse filtering the voice audio signal or the oral flow signal picked up by a flow mask. The flow glottogram will show the effect on the voice source of changing type of phonation from hypo- to hyperfunctional, of shifting register, of shifting between different types of vibrato. It will also visualize different tone onset types such as glottal stop, breathy attack, staccato attack. In this sense the workshop should help participants to focus their attention on various aspects of phonation.

Johan Sundberg, PhD, Professor, Speech Music Hearing, School of Computer Science and Communication, TMH/KTH, SE-10044, Stockholm, pjohan@speech.kth.se

Panoptikum of Voice Disorders in High Professional and Semiprofessional Singers and Speakers in Salzburg

Professional singing must be regarded as a high-performance sport; it requires special training conditions and top physical performance. Singing is an athletic activity and as such requires good physical fitness and coordinated interaction. As freelance artists, they may have a full diary of engagements in opera houses and at music festivals all over the world, and only air travel enables them to attend rehearsals in one place and concerts in another. The professional singers are subject to illness from the same causes as other people:

acute viral and bacterial infection, allergies, faulty diet, environmental influences at work (on stage), side effects of medication, hormonal factors (especially for female singers), psychological strain due to family or social circumstances, personal crises, overwork, overexertion in the course of working life. The voice doctor has to be aware of the possible causes that can put the singer's voice at risk and damage a singing career. He has to know the heavy demands made on the singer in respect of physical and psychological strain, artistic sensibility, individuality and empathy for the greatest possible expressive capability and interpretation

The voice doctor has to be aware of:

- Time of indisposition – gradual or possibly chronic preceding symptoms
- Nature and severity of the reaction to the disorder and its effect on the voice
- Stress situation and current demands made
- Medication taken
- Personal disposition and estimate of current stress
- Point in menstrual cycle for female singers under vocal stress
- Vocal hygiene regime
- Environmental influences (also on stage) which might lead to acute vocal and physical reactions or decompensation and thus indisposition

The aim of these Workshops is to present several very different cases of voice emergencies on stage and the history of the special nature of the circumstances

Josef Schlömicher-Thier, MD, Austrian Voice Institute, Salzburgerstrasse 7, A- 5202 Neumarkt, Austria, +43-6216-4030, austrianvoice@sbg.at

Matthias Weikert, MD, Austrian Voice Institute, Salzburgerstrasse 7, A- 5202 Neumarkt, Austria

Ref#: W28

Alexander Technique and Acting Voice

This workshop will explore ways to integrate the principles of the Alexander Technique in the context of actor voice training. Participants will have the opportunity to examine imaginative ways to apply the technique to encourage more expressive and useful voice usage.

Please wear loose clothing that allows for full range of movement.

Janet Madelle Feindel, MFA, DLT, ATI, Fitzmaurice Voice, Associate Professor, Voice/Alexander Technique, School of Drama, Purnell Center, Carnegie Mellon University, Pittsburgh, PA 15213-3890

Ref#: W3

Myth or Effective Method: A Demonstration of Some Voice Training Techniques that Appear to Work, but Need Scientific Investigation

I will demonstrate several ways insights of voice science can facilitate teaching actors projection (loudness) and enhanced quality. Several voice training methods maintain a lower tongue and jaw assists loudness. Protrusion of the upper lip can help open the mouth in two ways. First it inhibits the masseter (S.K.J Yu. *et al*, *Archives of Oral Biology*, 1973) to assist jaw lowering. Secondly, protrusion may trigger velar contraction helping open the back of the mouth, and incidentally decreasing hypernasality. For rich, unstrained flow phonation, feel the larynx with the fingertips for "soft and wide alae" as opposed to "hard and narrow," associated with pressed phonation. Feeling vibrations on the thyroid with the fingertips is a way to monitor the type of phonation. Sundberg and Askenfelt (1983) found a link between breathy and pressed phonation characterized by low amplitude of vocal fold displacement and low amplitude of cutaneous vibrations in the neck. A decrease in the open quotient of flow phonation, they concluded, was linked to greater amplitude of vocal fold vibrations and cutaneous vibrations. Harold Cheyne in his 1993 MIT dissertation confirms that acceleration measured on the skin of the neck can provide a measure of glottal adduction. A less frequently encountered problem with quality is the "palatal" sound, a Dudley Do-Right bright tone. When I produce that quality it feels *as if* the ring of swallowing muscles contracted slightly. Palpate the muscles under the chin; if hard, massage them, and release the tongue and the quality returns to modal.

Barbara Aker, BFA, MA, Ph.D., Associate Professor, Arizona State University, School of Theatre and Film, PO Box 872002, Tempe, AZ 85287-2002, (480) 965-2696, Barbara.Acker@asu.edu

Ref#: W30

Instant Replay as a Tool in the Teaching of Singing

Instant-Replay as a Tool in the Teaching of Singing begins with a brief history of *Dartfish*, (chiefly a sports instant-replay software), its capabilities and features, and its advantages over a regular digital video camera for instant feedback. I explain why I began using instant replay, its impact on my teaching, the benefits to my students, and the advantages of immediate feedback. I demonstrate with examples how it can be used to record and analyze all aspects of a singer's performance such as vocal technique, diction, pronunciation, musical accuracy and expression, facial expression, stage deportment, movement, gestures, etc., and chronicle one student's progress over four years using this technology. Several audience volunteer singers will be recorded live and instantly reviewed in a demonstration of how this technology is used in teaching singing. A question and answer session concludes the presentation.

William Stone, AB, MM, DMA, Temple University, Boyer College of Music and Dance, 2001 North 13th Street, Philadelphia, PA 19122, (215) 204-8335, wmstone@temple.edu

Ref#: W4

Spending the Interest, Not the Principal: Vocal Pacing During Voice Rehabilitation and Beyond

Singers are vocal athletes, and like athletes, must maximize range, endurance and coordination but avoid crossing the line into overuse or strain. This is especially critical when recovering from a vocal cord injury. Historically, vocal healthcare providers have recommended “voice rest” as part of the regimen for recovering from a vocal injury, but what is the appropriate amount of rest? How does a singer keep their voice in shape, and still observe adequate “rest” to allow for healing?

In this workshop, the instructor will explore a number of processes necessary to ensure that the voice is receiving adequate exercise during rehabilitation, but in a manner that supports the healing of the injury. The information covered in the workshop will also be applicable to prevention of voice injury. These principles will be explored primarily via hands-on demonstration with singers, but also through case examples and audience interaction. Topics explored will include:

- Principles of wound healing and tissue change during exercise
- What we know about vocal rest so far
- What is marking? How do you do it? When do you do it? How do you teach it?
- Vocal demands vs. actual amount of singing voice use
- Strategies for unloading non-productive or unnecessary voice use
- Vocal warm-up vs. technical practice
- “Tailoring” vocal exercise routine based on the singer’s injury, singing style and experience
- Application of skills learned in vocalizes to songs/repertoire

Leda Scearce, M.M., M.S., CCC-SLP, Performing Voice Specialist, Dir., Voice Programs and Development, Duke Voice Care Center, Duke Medicine, 3480 Wake Forest Road, Suite 404, Raleigh, NC, 27609, (919) 862-5739, leda.scearce@duke.edu

Using Technology in the Voice Studio Even if You Aren't a Voice Scientist

While technology can and will never replace competent caring teachers with critical listening skills, there are occasions when the use of technology in the studio can benefit voice students. In my studio I use several software programs to illustrate healthy vocal function or to explain various functional pathologies. I also use spectrograms to illustrate singer's formant clusters, overtones, vibrato and registration. I use "Smart Music" and encourage my students to use it at home as a practice tool.

I would like to present an interactive workshop demonstrating the use of these various technologies. This workshop would provide an opportunity for participants to see and use software programs including "Voiceprint", "Smart Music" and "Sing and See". There would also be examples of "Vocal Health", "Vocal Parts" and "Speech and Articulation". A handout would be included with names, addresses and purchasing information for all programs featured in the workshop. Time would be provided for questions and comments and collegial sharing. I look forward to sharing this information with my colleagues at The Voice Foundation.

Judy Wade, Vocologist, Voice Matters!, 1238 Murray Drive, Jacksonville, FL 32205, (904) 874-0106,
j.wade@voicemattersonline.com

Ref#: W6

Counseling Patients About Compliance: The Speech-Pathologist's Role

AUTHOR/PRESENTER: KAREN WICKLUND, DM, MHS, CCC-SLP

Your client has been diagnosed with a voice disorder, and have been referred for voice therapy by a laryngologist/MD, voice teacher, speech-language pathologist, other professional, colleague, or self-referred. If the client is a professional voice user/singer, this is one of the most potentially devastating times in his/her life- there may be much uncertainty about when the voice will feel vocally healthy again. Please assure your client that if he/she is willing to follow the voice therapy protocol as advised by your voice care team (laryngologist, speech pathologist and singing voice specialist) that the voice should heal well and in many cases, be better than ever. However, the KEY is to remember that the client may have suffered a vocal injury due to sub-optimal speaking/singing/vocal hygiene habits/technique. You will teach more optimal habits/technique by having therapy on a WEEKLY basis with your client. In other words, you will have to teach the client to HABILITATE (learn for the first time) new techniques to sing/speak. This takes time and patience and consistent work.

This workshop will present five compliance counseling points for your client:

1. Required length of therapy protocols,
2. How to do therapy "homework":
3. Understanding scope of practice issues in the voice team;
4. How to maintain patience during a therapy routine;
5. Ask questions early and often of your therapists.

Karen Wicklund, DM, MHS, CCC-SLP, Director, Chicago Center for Professional Voice, Clinic Supervisor, The Charles Van Riper Clinic, Associate Professor of Voice, Chicago Center for Professional Voice, Western Michigan University, 410 S. Michigan Ave., Suite 941, Chicago, IL 60605, (847) 476-7464, wicklund@singershealth.com

Ref#: W7

Learning to Manipulate the Physiology of Stress

Workshop Abstract for the 2010 Voice Foundation Symposium

Marty Heresniak, Presenter

The body has many different systems that are in charge of different processes. Which system is the dominant system in a certain situation can change and can be changed. Understand the systems, understand what triggers the systems, and you can understand how to make those changes.

After a basic theoretical discussion, the practical section of the workshop will present a variety of mind-over-body exercises and long-range training in breath, muscular relaxation, and personal interventions to learn to achieve the shift from the Sympathetic ANS to the Parasympathetic ANS at will.

Marty Heresniak, B.M., M.M., Private Studio Teacher, 5-2 University Avenue #1L, Ithaca, NY 14850,
(607) 272-2892, voxnaturalis@alumni.ithaca.edu

Ref#: W8

Utilization of Linklater Based Techniques for Treatment of Recalcitrant Muscle Tension Dysphonia

Often the traditional paradigm of vocal exercises does not result in adequate progress in patients with moderate and severe muscle tension dysphonia. For these patients, examination of the respiratory coordination and overall muscle patterns of the body become necessary. These patients may initially require breath work, work on posture and neck release prior to training vocal production.

Utilizing techniques from the work of Kristin Linklater in conjunction with traditional exercises for phonation is often effective at achieving initial vocal release. Achieving an initial release of sound often becomes the pathway to connected speech for these patients. This workshop will explore several techniques including work on alignment, floor based and movement based techniques while incorporating exercises to achieve easy onset and full projected release of the voice.

Rebecca L. Hancock, B.F.A., M.Ed., Clinical Speech Pathologist, Singing Voice Specialist, VASTA, ASHA, 600 Highland Avenue, Madison WI 53792, (608) 263-1149, hancock@surgery.wisc.edu

Ref#: W9

Voice Training and Functional Assessment with Semi-Occluded Vocal Tract Techniques: Theory and Practice

Ingo R. Titze, National Center for Voice and Speech.

Exercises with semi-occluded vocal tracts (straw phonation, lip trills, nasals, lip-rounded vowels) have been adopted universally for voice therapy and vocal training. Only recently has scientific evidence been accumulated that justifies the continued optimization of these techniques. It is clear now that the benefits are at least three-fold, (1) to limit vocal fold collision by maintaining a positive intra-oral pressure, (2) to lower the first formant frequency so that a mixed register is trainable, (3) to lower the phonation threshold pressure (PTP) with vocal tract inertance for easier voice onset. The most recent advances show that phonation threshold pressure and a complete voice range profile can also be measured with simple instrumentation during the semi-occlusion, eliminating the need for excessively loud phonation in obtaining a voice range profile, and eliminating the need for shutting the lips to obtain PTP. Workshop attendees will learn to administer these techniques. (Work supported by NIDCD).

Ingo R. Titze, Ph.D., Director, National Center for Voice and Speech, University of Utah, University of Iowa, (720) 217-6512, ingo.titze@utah.edu

A New Paradigm Ushers in a New Global Community for Voice

My outline for an oral presentation to the entire assembly that will discuss how the internet and in particular, the power of social networks are proving to accelerate the access to information on vocal technique, health, science and products for singers. It will point out that there is a new paradigm shift happening in the culture of voice pedagogy due to the technology of social networks. The use of social media in voice pedagogy is creating a global community that is not exclusionary, but champions similarities and differences among styles and techniques and their differences are being made clear to all without prejudice, health is understood to be all inclusive, different pedagogies can be understood in a broader sense, and unification among disparate groups is being achieved because of mutual missions for the expression of artistry in the world.

The presentation will also examine statistics and research in regards to the effectiveness of social media as used as a technology to hasten the distribution of educational content to a global community.

I will use a PowerPoint presentation and use facts and examples from The Modern Vocalist.com. It will be a very media rich presentation.

Robert J. Lunte, B.A. Music, Founder, The Vocalist Studio, Founder and CEO, The Modern Vocalist.com, 9805 NE 116th Street, PMB 7114, Kirkland, WA 98034, (425) 444-5053, robert@thevocaliststudio.com

Voice Study in Children Based on the Analysis on the Glottal Source

Fernández-Baillo, R, Gómez Vilda, P

Oral Communication Laboratory, Universidad Politécnica de Madrid Campus de Montegancedo s/n,
28660 Boadilla del Monte, Madrid, Spain.

INTRODUCTION: The Phonatory System is changing from the birth. These modifications should be observable on the glottal source. The study of the voice pathology in childhood is complicated due the features of the biomechanical glottal during this period. The *vocalis ligament* is under developing, glottis and vocal folds have not their final length yet and as a result child voice is instability. This work studies the biomechanics characteristics of the voice during childhood and mutation period until to get the adult age.

METHODOS: The materials used in the present study consisted in a set of 157 recordings of the voicel /a/ of subjects between 3 to 18 years age extraction from the MAPACI database. The analysis and the processing were carried out using the software GLOTTEX®.

RESULTS AND CONCLUSIONS: The study of the voice based on the temporal parameters from the glottal source profile is a useful tools for the analysis of the changes happened during the development of the vocal tract. The results obtained by this procedures show an early mutational process that takes places by 3 to 5 years ago, but these are only preliminary results. Further studies are required that include a larger sample of subjects. Finally this work concludes that the in study of the voice disorders it should be consider the age and the gender of the subjects. And that discrimination of vocal pathology below the five years age based on acoustic parameters becomes complicated due to the instability existing vocal at this age.

Roberto Fernández-Baillo, Laboratorio de Comunicación Oral., Universidad Politécnica de Madrid, Campus de Montegancedo s/n, 28660 Boadilla del Monte, Madrid, Spain, +34913366905, rofebaillo@hotmail.com

Pedro Gómez Vilda, Dr., Laboratorio de Comunicación Oral., Universidad Politécnica de Madrid, Campus de Montegancedo s/n, 28660 Boadilla del Monte, Madrid, Spain, +34913366905

Effect of Yoga for Better Voice Production among Carnatic Singers

Introduction: Indian music is a part of Nada Yoga and Bhakthi Yoga. Yoga, Pranayama and Meditation will help every voice user to habilitate (to equip) his/her voice. In relation to Yoga Shastra, voice production is connected to three important systems in the body: (1) Air Pressure System (2) Vibratory System (Vocal Folds), and (3) Resonating System.

Aim: To find out the effect of Yoga and Pranayama, in breathing patterns used among Carnatic singers for better voice production.

Method: 20 singers who are involved in carnatic style of singing for more than 10 years and who are practicing Yoga and Pranayama since 5 years, were interviewed with a questionnaire. Further, the voice samples of these singers who are practicing Pranayama and Yoga, were recorded and analyzed, along with a group of 20 carnatic singers, who did not have any practice of Yoga and Pranayama, to find out the possible differences in the aerodynamic parameters and acoustic parameters. That is, to find out the effect of Yoga and Pranayama on singing. In turn the height (inches or centimeters) and age (years) of all the subjects were taken into consideration; in order to predict the Vital Capacity of each individual by making use of NOMOGRAMS, by locating the height and the age, and placing a straight edge between these two points, the intersects will give the predicted vital capacity (VC).

Results: Results revealed will be discussed in the light of existing literature

Hanna Nelson, BASLP, Student, Mar Thoma College, Institute of Speech and Hearing, Beejanthadka, Badiadka , PIN-671551, +919447900558, santhoshsimon01@gmail.com

Bibin Georgie Thomas, BASLP, Student, Mar Thoma College, Institute of Speech and Hearing, Beejanthadka, Badiadka, PIN-671551, +919745831601, simonmysore@yahoo.co.in

Avanthi Niranjan, MASLP, Speech Language Pathologist, University of Mysore, URS Road, University of Mysore, +919986567700, pranavsathe@gmail.com

Santhosh Simon, MASLP, SLP, Lecturer, Mar Thoma College, Institute of Speech and Hearing, Beejanthadka, Badiadka, PIN-671551, +919895409722, santhoshsimon@lycos.com

Swapna Sebastin, PhD, SLP, Head of the Department, Mar Thoma College, Institute of Speech and Hearing, Beejanthadka, Badiadka, PIN-671551, +919895251564, swapna_santhosh@yahoo.co.in

Quantifying the Degree of Perceived Nasality in Vowels

Nour El-Bashiti, Rahul Shrivastav, J. D. Harnsberger

Background: Most studies evaluating the acoustic correlates for nasality in normal speakers attempt to make a binary classification of phonemes and have suggested that nasality is cued primarily by changes in the first formant frequency (F1), first formant bandwidth, and the relative amplitude of nasal resonances. However, in speakers with cleft palate, it is necessary instead to quantify the degree/severity of nasality. Currently, there is no universally-accepted approach to quantify the perception of nasality in such individuals.

Objective: This study investigated the effects of two spectral cues on the perception of nasality in synthetic vowels.

Methods: Each of six vowels ([i], [u], [ɛ], [ʌ], [æ], [ɑ]) from five talkers was used to generate two continua that varied systematically in two acoustic correlates of nasality identified in previous studies: 1) the difference in F1 amplitude (A1) and the amplitude of the nasal resonance between F1 and the second formant and 2) The difference in A1 and the amplitude of the nasal resonance below F1. These stimuli were presented to naïve and expert listeners in a nasality ratings task to determine the effects of each of these correlates on perceived degree of nasality.

Results: The results of the listening test will show how nasality varies with specific changes in the vocal acoustic signal. The data will be useful in developing tools to describe the severity of nasality.

Nour El-Bashiti, University of Florida, PO Box 117420, Gainesville, FL, 32611, (352) 273-3720,
nour.slp@gmail.com

Rahul Shrivastav, Ph.D., CCC-SLP, Assoc. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611,
(352) 273-3710, rahul@ufl.edu

James Harnsberger, Ph.D., Asst. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3720, jharns@ufl.edu

Effects of Vocal Exercising with a Tube on Vocal Tract Sound Power Transfer

Two 3D finite element models were constructed, based on CT measurements of a subject phonating on [a:] before and after phonation into a tube. Transient and harmonic analyses were performed exciting the model by acoustic flow velocity at the vocal folds. The generated acoustic pressure and the power spectral density of the response were computed in front of the mouth, and SPL was evaluated in different frequency ranges. Relative amplitudes of the pressure oscillations inside the vocal tract were compared to the maxima of power spectral density to display a cost-efficiency of sound energy transfer at different frequencies.

The formants F1-F3 represent classical vibration modes also solvable by 1D vocal tract model. However, for higher formants, the more complicated transversal modes require 3D modeling. Comparison of the of the pressure oscillation in the vocal tract with the maxima of power spectral density showed that formants differ in their efficiency, F4 (at about 3.5 kHz, i.e. at the speaker's or singer's formant region) being the most effective. The human hearing threshold is also relatively low between 2 and 4 kHz. Consequently, a sound energy concentration around 3.5 kHz (F4) is an effective tool for communication.

Based on the FE modeling, the changes observed in the vocal tract are able alone to explain the measured increase of 3.3 dB in SPL. The results suggest that exercising on semi-occlusions help in improving the vocal economy.

Jaromir Horacek, Dr.Sc. Eng., Director, Department, Deputy Director, Institute, Dept. of Dynamics and Vibration, Institute of Thermomechanics, The Academy of Sciences of Czech Republic, Prague, Czech Republic, +420266053125, jaromirh@it.cas.cz

Tomas Vampola, Ph.D., Associated Professor, Dept. of Mechanics, Biomechanics and Mechatronics, Faculty of Mechanical Engineering, Czech Technical University in Prague, Karlovo nám. 13, 121 35 Prague 2, Czech Republic, 420 224357244, tomas.vampola@fs.cvut.cz

Anne-Maria Laukkanen, Ph.D., Professor, Dept. of Speech Communication and Voice Research, University of Tampere, Finland, +358503635152, Anne-Maria.Laukkanen@uta.fi

Jan G. Švec, PhD, Palacky University Olomouc, Faculty of Science, Department of Experimental Physics, Laboratory of Biophysics, tr. 17. listopadu 12, 771 46 Olomouc, the Czech Republic, +420 585 63 4171, svecjan@vol.cz or jan.svec@upol.cz

Construction and Characterization of a Portable Sound Booth for Onsite Voice Recording

The negative effects of environmental noise on sound recordings are recognized in the professional literature. Sound booths and anechoic chambers are examples of controlled acoustical environments widely used in research. However, both enclosures are expensive, require substantial space and are non-portable. Our research question, to study vocal endurance and measure voice quality before and after vigorous voice use onsite without transporting subjects, necessitated the development of a portable, recording environment. In response to the need for controlled portable acoustical measurement, we built a Portable Sound Box (PSB) for onsite recording. Construction and characterization of a PSB for onsite voice recording has thus far not been addressed in the literature. The purpose of PSB characterization is the development of a research tool to record singers. Simulations were carried out to model the intended use of the box. Two acoustic characterization procedures (first method and modified method) were performed on the PSB. The first method showed higher intensity variations by region and depth as frequency changed. For the modified method, intensity response was more uniform and displayed less variation as frequency increased with the exception of F4. The first method enabled us to (1) refine onsite recording procedure, (2) provide insight into sources of analysis errors, and (3) develop detailed analysis of frequency intensity response affected by equipment variability. We found that it is possible to construct a PSB for onsite quality recording.

Christophe E. Jackson, Ph.D Candidate/ Graduate Researcher, National Science Foundation, University of Alabama at Birmingham, (205) 401-2999, christof@uab.edu

Paul Richardson, D.M.A, Research/Voice Professor, Samford University School of the Arts, 800 University Blvd , Birmingham, AL 35229, (205) 726-2496, parichar@samford.edu

John T. Tarvin, Ph.D., Chair, Physics Department, Samford University, Departments of Physics, 800 University Blvd, Birmingham, AL 35229, (205) 726-2818, jttarvin@samford.edu

Stephen Watts, Ph.D, Graduate Director of Biology, University of Alabama, Birmingham, 1300 University Blvd., Birmingham, AL 35294-1170, (205) 934-8308, sawatts@uab.edu

Paul F. Castellanos, M.D., Associate Professor of Surgery, University of Alabama, Birmingham, School of Medicine, Div. of Otolaryngology Head and Neck Surgery, 1530 3rd Avenue South, Birmingham, AL 35294-0012, (205) 934-9765, larynx@uab.edu

Ref#: BS-P1**Effects of Caffeine on Voice Acoustics and Aerodynamics**

The objective of this investigation is to explore the effect of caffeine intake on voice as evidenced by (a) acoustic measures of voice, and (b) aerodynamic measures, using the Computerized Speech Lab (CSL), and the Phonatory Aerodynamic System (PAS), computer-based systems manufactured by KayPentax. The research question involves whether ingestion of 100 mg of caffeine causes a degradation in vocal performance, because caffeine is considered to be a general systemic dehydrating agent.

Participants are randomly assigned to one of two groups, control and experimental, and scheduled for testing individually. The participants in both control and experimental groups are asked to abstain from any caffeine ingestion for 24 hours – from 8am of the morning before testing to 8am of the morning of testing. In addition, the participants are asked to abstain from ingesting any foods and liquids for 12 hours – from 8pm to 8am of the following morning. After pretest, participants in the experimental group ingest a 100 mg caffeine tablet before being retested after 30 minutes. Participants in the control group ingest placebo and otherwise follow the same protocol as the experimental group.

Data collection is presently in progress; 40 participants have completed the protocol to date with the eventual goal being 60 participants. Preliminary results will be presented at the ASHA Convention, 2009. Conclusion of this study is anticipated to occur during the first semester of 2010.

Maria Claudia Franca, Ph.D., Assistant Professor, Southern Illinois University Carbondale, 1025 Lincoln Drive, Mail Code 4609, Carbondale IL, 62901, (618) 453-8292, franca@siu.edu

Kenneth O. Simpson, Ph.D., Associate Professor, Southern Illinois University Carbondale, 1025 Lincoln Drive, Mail Code 4609, Carbondale IL, 62901, (618) 453-7721, ksimpson@siu.edu

Acoustic Measures of the Voices of Older Singers and Non-Singers

This study sought to investigate any differences in the acoustic measures of fundamental frequency (Fo), jitter, intensity and shimmer between older amateur singers and non-singers and any significant correlations between these acoustic measurements and listener judgments of speaker age. Acoustic measurements were obtained on 60 speaker participants from a sustained vowel production. Study participants included 30 male and female singers and 30 male and female non-singers who were between the ages of 65 and 80. In addition, 10 speech language pathology graduate students were recruited as listener participants to estimate the age of speakers from recorded vowel sounds.

The results of this study partially supported previous findings regarding acoustic measures and listener age judgments of elderly speakers. Speaker participants were perceived as significantly younger than their real ages and male and female singers were perceived to be significantly younger than male and female non-singers. Significant differences were found between male and female singers and non-singers with regard to jitter and intensity, with singers displaying significantly less jitter and significantly greater intensity than non-singers. Perceived age was found to be related to jitter in male singers and non-singers and female singers. Perceived age was found to be related to intensity in female non-singers. No statistically significant differences were found between singers and non-singers with regard to Fo or shimmer. No significant correlations were found between perceived age and intensity in male singers, male non-singers or female singers. Implications for future research are discussed.

242

Barbara L. Prakup, Ph.D., Assistant Professor, Cleveland State University, 2121 Euclid Avenue, MC 429, Cleveland, OH 44115-2214, (216) 687-3803, b.prakup@csuohio.edu

Effects of Vocal Intensity and Vowel Type on Cepstral Analysis of Voice

Several studies have reported that vowel elicitation factors such as fundamental frequency, intensity, and vowel type may have a significant effect on measures of perturbation such as jitter and shimmer. In contrast, it has been indicated that these extraneous variables do not affect cepstral measurements of voice. Unfortunately, data to substantiate this claim are not currently available. The purpose of this study was to examine the effects of vocal intensity and vowel type on cepstral analysis measurements.

Participants included normal adult males and females (N=100). Subjects sustained the vowels /ɑ/ and /i/ under three different conditions: (a) "As softly as possible";(b) "As loudly as possible, without screaming or straining the voice"; and (c) at a "comfortable pitch and loudness". Three trials for each intensity level and vowel were elicited and counterbalanced across subjects. Recordings were made using a calibrated headset microphone and digitized to computer. Vowel samples were analyzed for vocal intensity (dB), fundamental frequency (Hz), and relative amplitude of the smoothed cepstral peak prominence (CPP in dB).

Results indicated significant main effects of (1) Gender (males having greater mean CPP's than females); (2) Vowel type (greater CPP's for /ɑ/ vs. /i/); and (3) Vocal intensity (a significant increase in CPP from quiet to comfortable to loud intensity). These results indicate that separate cepstral norms are necessary for gender and vowel; in addition, the intensity of vowel elicitation should be monitored closely in both research and clinical situations.

Shaheen N. Awan, Ph.D., Professor, Bloomsburg University of PA, Dept. of Audiology & Speech Pathology, (570) 389-4443, sawan@bloomu.edu

Ashley Giovinco, M.S., Speech Pathologist, Bloomsburg University of PA, Dept. of Audiology & Speech Pathology, (570) 389-5381, arg55949@huskies.bloomu.edu

Jennifer Owens, M. S., Speech Pathologist, Bloomsburg University of PA, Dept. of Audiology & Speech Pathology, (570) 389-5381, jo62590@huskies.bloomu.edu

Genetic Profiling of Animal Vocal Folds

Robbins S., Chen X., Thibeault S.

Vocal fold scarring and atrophy can seriously impair voice function, and current treatment is unsatisfactory. Information on the biomolecular processes associated with aging, scarring, and wound healing in the vocal folds could help guide research to develop effective therapies. However, study of human larynges is limited to static observations in cadaver or biopsied tissue. Research in animals can measure the effects of injury and aging on tissue; however, it is not clear how closely the processes in animals correlate with that of humans. The purpose of this study is to create genetic profiles of ECM proteins in vocal fold tissue of various laboratory animal models for comparison to human vocal fold tissue. Vocal folds were removed from the larynges of pigs, sheep, mice, rabbits, monkeys, and dogs. The lamina propria was removed and homogenized for extraction of RNA. Q-PCR was performed with targets of elastin, collagen-I, collagen III, procollagen, decorin, glyceraldehyde 3-phosphate dehydrogenase, fibronectin, fibromodulin, hyaluronidase 2, and hyaluronan synthase 2. Because sound is produced with the vocal folds, differences in genetic expression among the samples will be attributed to basic differences in vocalization abilities. The data will be used to describe the genetic profiles of different animals' ECM composition and to assess similarity to human vocal folds. We believe that animals that vocalize the most, such as monkeys, will have vocal folds that are most genetically similar to human. These data will be useful indicators of the appropriateness of these animal models for studies of aging and wound healing.

Susan Thibeault, PhD, Assistant Professor, Division of Otolaryngology Head and Neck Surgery, University of Wisconsin, Madison, 5107 Wisconsin Institutes Medical Research, (608)263-6751, THIBEAUL@surgery.wisc.edu

Xia Chen, MD, PhD, Researcher, Division of Otolaryngology Head and Neck Surgery, University of Wisconsin, Madison, 5107 Wisconsin Institutes Medical Research, (608)265-0488, chenx@surgery.wisc.edu

Sarah Robbins, Student Researcher, Division of Otolaryngology Head and Neck Surgery, University of Wisconsin, Madison, 5107 Wisconsin Institutes Medical Research, (608)265-0488, robbins@surgery.wisc.edu

Vocal Fold Side Population Cells Contribute to Fibrotic Tissue Repair

Masaru Yamashita, M.D., Ph.D., Diane M. Bless, Ph.D., Nathan V. Welham, Ph.D.

Division of Otolaryngology - Head and Neck Surgery, Department of Surgery, University of Wisconsin School of Medicine and Public Health, WI, USA

Tissue-specific stem cells may play a role in vocal fold mucosal healing post-injury, however such a cell population has not been reported to date. Side population (SP) cells, defined by a self-protective nuclear dye efflux phenotype, are considered a subpopulation rich in stem cells, and have been linked to tissue-specific stem cells in several organs. The purpose of this study was to characterize the cell surface immunochemical features of human vocal fold SP cells and examine the importance of ABCG2, a membrane protein that contributes to the SP phenotype, in a mouse vocal fold injury model.

Human vocal fold mucosal cells were stained with a nuclear dye and array of cell surface stem cell markers and analyzed using flow cytometry. The SP population represented 0.34% of total live cells and demonstrated positive staining of both hematopoietic and mesenchymal stem cell markers. ABCG2 knockout (-/-) and wildtype (+/+) control mice were subjected to vocal fold injury, tissue harvest at one month post-injury, and immunohistochemical staining against a series of extracellular matrix proteins. Uninjured ABCG2 -/- lamina propria was indistinguishable from wildtype, whereas injured ABCG2 -/- lamina propria showed significantly less collagen accumulation during tissue repair compared with wildtype.

These findings suggest that tissue-specific stem cells might exist in the human vocal fold, within the subpopulation of cells that display the nuclear dye efflux phenotype. Further, this cell population may play an important role in vocal fold tissue repair.

This study was presented in 2009 AAO-HNSF meeting in San Diego.

Masaru Yamashita, M.D., Ph.D., Researcher, Division of Otolaryngology-HNS, Department of Surgery, University of Wisconsin, School of Medicine and Public Health, K4/723 CSC, 600 Highland Avenue, Madison, WI 53705, U.S.A., (608) 263-0121, matya-nkmc@umn.edu

Diane Bless, Ph.D., Professor, The University of Wisconsin-Madison, Div. of Otolaryngology-Head and Neck Surgery, University of Wisconsin-Madison, K4/709 Clinical Science Center, Madison, WI, (608) 262-5300, bless@surgery.wisc.edu

Nathan V. Welham, Ph.D., Assistant Professor, Division of Otolaryngology-HNS, Department of Surgery, University of Wisconsin, School of Medicine and Public Health, K4/723 CSC, 600 Highland Avenue, Madison, WI 53705, U.S.A., (608) 263-0121, welham@surgery.wisc.edu

Ref#: BS-P6

Nasalance and Voice Low Tone to High Tone Ratio of Connected Speech in Mandarin Speaker

Voice low tone to high tone ratio (VLHR) is defined as the power ratio of low frequency to high frequency by dividing the voice spectrum with a specific cut-off frequency. In the previous studies, VLHR correlated significantly with nasalance and perceptual ratings of hypernasality in 6 vowels. The correlation was investigated in this study using connected speech. Fourteen Mandarin-native speakers with a history of learning English over 8 years were enrolled in. Speech samples of the Zoo Passage, the Rainbow Passage, the English Nasal Sentences and the Chinese Nasal Sentences were used to obtain nasalance and VLHR. Each passage was recorded twice for averaging. The cut-off frequency used for calculating VLHR is 600 Hz. The results showed significantly lower nasalance for the Mandarin-native speakers than the English-native speakers of the reviewed literature. The correlations between mean VLHR and mean nasalance was also significant ($r = 0.47$, $p < 0.01$, Pearson's correlation). The lower nasalance of Mandarin-native speakers might come from a shorter duration and/or lower intensity of nasal articulation. The significant correlation of VLHR with nasalance also provides an evidence of basic and clinical applications in connected speech.

Guo-She Lee, M.D., Ph.D., Associate Professor, National Yang-Ming University, No.155, Sec. 2, Li-Norng St., Bei-Tou District, Taipei City 112, Taiwan, +886-911292325, guosheli@ms12.hinet.net

Evidence of Different Pitch Control Mechanisms for Three Vocal Registers: Chest, Chestmix, and Head

Kochis-Jennings, K., Ph.D., Finnegan, E. M., Ph.D., and Hoffman, H., M.D.

Theories of frequency control during speech and singing have been developed by a number of researchers. However, most are quantitative theories and are supported by little if any human data. The purpose of this study was to examine previously collected electromyographic data of thyroarytenoid and cricothyroid muscle activity and simultaneously recorded nasendoscopic data and audio signals for evidence of different frequency control mechanisms across different registers. Data from two trained female singers, one classically trained and one commercially trained, was analyzed for levels of thyroarytenoid and cricothyroid muscle activity during the production of same pitch phonation in different registers. In addition, audio signals, video stills, and video recordings of simultaneous nasendoscopy were analyzed for differences in amplitude of the audio signal, relative amplitude of vocal fold vibration, and relative vocal fold thickness across registers. All audio samples were rated for register by two singing teachers. Results for the commercial singer show evidence of different frequency control mechanisms during same pitch phonation in three different registers, chest, chestmix, and head. Results for the classical singer, who produced only headmix and head registers, show evidence of only one frequency control mechanism. However, the frequency control mechanism for head voice appeared the same for both subjects. Results are discussed in relation to existing theories of frequency control.

Karen Kochis-Jennings, Ph.D., Assistant Professor, California State University, Northridge, 18111 Nordhoff Street, Northridge, CA, (818) 677-3903, karen.kochis-jennings.32@csun.edu

Eileen Finnegan, Ph.D., Assistant Professor, University of Iowa, Hawkins Drive, Iowa City, IA, (319) 354-8717, eileen-finnegan@uiowa.edu

Henry Hoffman, M.D., Otolaryngologist, University of Iowa Hospitals and Clinics, Hawkins Drive, Iowa City, IA, henry-hoffman@uiowa.edu

Dysphonia Severity Index (DSI) as Part of Objective Voice Evaluation in Dysphonic Patients

Eva Dentcheva, D. I. Dentchev, R. T. Sataloff; Drexel University College of Medicine

OBJECTIVES: The main purpose of the study was to assess the effectiveness and reliability of DSI and to describe its advantages and limitations in dysphonic patients.

METHODS: 1000 patients were separated into groups according to their gender, age, and leading clinical diagnosis. All of them had subjective perceptual evaluations (Voice Handicap Index and GRBAS scale) and comprehensive objective voice assessments (acoustic, perturbation, spectrographic, and aerodynamic measures), as well as a voice quality measurement by means of the DSI. This retrospective analysis was performed as part of the initial voice evaluation before any kind of therapeutic intervention.

RESULTS: A high correlation between the DSI and patients' dysphonia was established. Furthermore, DSI is quite reliable due to the application of objective multidimensional approach using Maximum Phonation Time in seconds, Jitter %, highest voice frequency in Hz, and lowest voice intensity in dB, at the same time. Statistical analysis shows very good correlation between DSI and VHI, and GRBAS – scale data, as well.

CONCLUSIONS: DSI is a valuable tool in assessing patient's voice quality in a scientifically appropriate way for a short period of time.

Eva Dentcheva, BS, Medical Student, DUCOM, 2900 Queen Lane, Philadelphia, PA 19129,
(267) 671-8641, dentcheva@gmail.com

Dimiter I. Dentchev, MD, PhD, Director of Voice Lab, AIVER, DUCOM, 1721 Pine Street,
Philadelphia, PA 19103, (215) 790-5179, dimidentch@gmail.com

Robert T. Sataloff, MD, DMA, FACS, Chairman, Department of Otolaryngology Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (215) 790-5165,
rtsataloff@phillyent.com

Comparison of Labial and Mechanical Interruption for Measurement of Aerodynamic Parameters

Objectives/Hypothesis: To directly compare the mechanical and labial interruption techniques of measuring subglottal pressure (P_s), mean flow rate (MFR) and laryngeal resistance (R_L).

Methods: Thirty-four subjects performed 10 trials with both mechanical and labial interruption. P_s and MFR were recorded while R_L was calculated by dividing P_s by MFR. Coefficients of variation were calculated in order to compare intra-subject precision. A subset of 10 subjects performed the tasks twice with thirty minutes between sessions. Bland-Altman plots were used to determine intra-subject repeatability for each of the methods.

Results: Mechanical interruption produced coefficients of variation for P_s , MFR, and R_L of 0.0995, 0.127 and 0.129 respectively. Labial interruption produced coefficients of variation of 0.102, 0.147 and 0.169 respectively. P-values were 0.824 for P_s , 0.159 for MFR and 0.043 for R_L . The Bland-Altman plots revealed comparable repeatability between the two methods. The 95% confidence intervals of the Bland-Altman plots for mechanical interruption were (-0.050 to 0.072), (-0.543 to 1.832), and (-2.498 to 10.528) for MFR, P_s , and R_L . Confidence intervals for labial interruption were (-0.018 to 0.031), (0.057 to 2.442), and (-3.267 to 10.595) for MFR, P_s , and R_L .

Conclusions: Mechanical interruption produced higher precision when measuring R_L due to more reliable airflow measurements. Mechanical and labial interruption showed comparable repeatability. Further research into using mechanical interruption clinically is warranted.

William J. Chapin, Research Specialist, University of Wisconsin, School of Medicine and Public Health, Department of Surgery - Division of Otolaryngology, 1300 University Ave., 5745 Medical Sciences Center, Madison, WI 53706, (608) 265-9854, wjchapin@wisc.edu

Matthew R. Hoffman, B.S., Research Specialist, University of Wisconsin, School of Medicine and Public Health, Department of Surgery - Division of Otolaryngology, 1300 University Ave, 5745 Medical Sciences Center, Madison, WI 53706, (608) 265-9854, mrhoffman@wisc.edu

Adam L. Rieves, B.S., Research Specialist, University of Wisconsin, School of Medicine and Public Health, Department of Surgery - Division of Otolaryngology, 1300 University Ave, 5745 Medical Sciences Center, Madison, WI 53706, (608) 265-9854, rieves@wisc.edu

Jack J. Jiang, M.D., Ph.D., Principal Investigator, University of Wisconsin, School of Medicine and Public Health, Department of Surgery - Division of Otolaryngology, 1300 University Ave / 5745 Medical Sciences Center, Madison, WI 53706, (608) 265-9854, jjjiang@wisc.edu

Vocal Fold Paresis and Thyroid Disease

Objective: The purpose of this study is to evaluate the prevalence of previously undiagnosed thyroid disease in patients with primary complaints of dysphonia and diagnosis of vocal fold paresis, and to compare this prevalence to that in a similar cohort of patients without dysphonia or vocal fold paresis.

Study Design: Case series with chart review. **Methods:** 308 patients with dysphonia and vocal fold paresis and 333 patients without vocal fold paresis or dysphonia (control group) were reviewed.

Prevalence of previously undetected thyroid disease was compared between the two groups. **Results:** 47.4% patients with vocal fold paresis had evidence of thyroid disease, while 16.5% patients from the control group had thyroid disease; $p < 0.001$. Thyroid diagnoses among those with vocal fold paresis included benign growths (29.9%), thyroiditis (7.8%), hyperthyroidism (4.5%), hypothyroidism (3.6%) and thyroid malignancy (1.6%). **Conclusions:** Thyroid abnormalities are more prevalent in patients with dysphonia and vocal fold paresis compared to the cohort without laryngeal symptoms or paresis. The study suggests an association between previously undiagnosed thyroid abnormalities and symptomatic vocal fold paresis.

Shruti S. Joglekar, MD, Instructor, Dept of Otolaryngology-Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (612) 232-9099, drshrutisj@gmail.com

Yolanda Heman-Ackah, MD, Associate Prof, Dept of Otolaryngology Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (610) 864-3624, phillyvoicemd@aol.com

Malka Caroline, Medical Student, Temple University, Philadelphia, PA, (215) 380-0560, malka.caroline@gmail.com

Reena Gupta, MD, Director-Voice and Swallowing Center, Osborne Head and Neck Institute, Los Angeles, CA, (516) 423-1373, guptar01@gmail.com

Robert T. Sataloff, MD, DMA, FACS, Chairman, Department of Otolaryngology Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, PA, (215) 790-5165, rtsataloff@phillyent.com

Effectiveness of Voice Therapy in Patients with Laryngopharyngeal Reflux Accompanied by Muscle Tension Dysphonia

Background : Laryngopharyngeal reflux(LPR) is often associated with the muscle tension dysphonia(MTD). It has been demonstrated that vocal hygiene and the direct techniques are both effective in treating LPR. However, it is controversial whether voice parameters improve while treating LPR with MTD.

Objective : To evaluate the improvement of multidimensional voice parameters according to the treatment methods in patients with LPR associated with MTD, and to assess association between the degree of glottal insufficiency and the effectiveness of voice therapy.

Materials and Methods : 50 patients who were diagnosed as LPR with MTD were chosen. We divided those into two groups, one treated with medication only and the other done with both medication and voice therapy. To diagnose LPR and assess the effectiveness of treatment, the results of following parameters were recorded from the patients at the time of diagnoses and 3 months after starting treatment : reflux symptom index(RSI), reflux finding score(RFS), GRBAS scale, voice handicap index(VHI), voice analysis, acoustic analysis, aerodynamic analysis and videostroboscopic findings.

Results : There were 20 patients in the medication only group, and 30 patients in the voice therapy group. RSI, RFS and GRBAS scale showed significant improvement in both groups. Jitter, shimmer and VHI improved significantly only in voice therapy group. Voice parameters were improved in both groups regardless of the glottis gap.

Conclusion : Improvements in the voice therapy group were significantly better than in patients who received medical therapy only. Treatment for LPR improves dysphonia. When combined with LPR medication, voice therapy enhances the improvement.

Jung-Hae Cho, MD, Doctor, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-31-249-8306, jhchomd@catholic.ac.kr

Mi-Ran Shim, SLP, Speech Pathologist, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-2-2258-6212, junghae.cho@gmail.com

Yeon-Shin Hwang, SLP, Speech Pathologist, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-2-2258-6212, junghae.cho@gmail.com

Jun-Ook Park, MD, Doctor, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-2-2258-6212, junghae.cho@gmail.com

Min-Sik Kim, MD, PhD, Professor, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-2-2258-6212, junghae.cho@gmail.com

Dong-Il Sun, MD, PhD, Professor, Dept of Otolaryngology-Head and Neck Surgery, College of Medicine, Banpodong, Seochogu, Seoul, Korea, 82-2-2258-6212, hnsdi@catholic.ac.kr

Voice Performance in Children after Vocal Fold Injection vis-à-vis Recurrent Laryngeal Nerve Reinnervation: A Case Report

David Wolraich, Linda M. Carroll, Karen B. Zur

Introduction: Unilateral recurrent nerve paralysis is one of the most common causes of hoarseness in children. Vocal fold injection laryngoplasty effectively medializes the fold but fails to return tone to laryngeal muscles, and it requires successive treatments to maintain efficacy. Recurrent nerve reinnervation via anastomosis to the ansa cervicalis is an alternative treatment. While the procedure has been performed in adults with significant benefit, limited information exists on voicing outcomes of this therapy in children.

Methods: We present 2 patients with unilateral vocal fold paralysis who initially underwent an injection laryngoplasty with Radiesse Voice Gel. When dysphonia recurred, a reinnervation was performed with concurrent injection laryngoplasty to temporarily augment the ipsilateral vocal fold. Both patients had subjective voice evaluations, including pediatric Voice Handicap Index (pVHI) and perceptual assessment, and objective evaluations, including acoustic performance, aerodynamics and laryngoscopy.

Results: The first patient showed enhancement in voice quality after both injection laryngoplasties with substantial improvement by 10 months post reinnervation. The second had improved voice quality after her first laryngoplasty but poor performance after her second (concurrent) laryngoplasty. She then had substantial improvement with reinnervation. The pVHI was the most consistent with the expected post-operative course followed by semi-tone range and maximum phonation time.

Conclusion: Vocal quality improved after recurrent nerve reinnervation in both patients, while improvement after injection laryngoplasty was more variable across measurements with pVHI being the most reliable test performed.

David Wolraich, MD, Resident, University of Pennsylvania, 3400 Spruce St., (215) 662-2777,
david.wolraich@uphs.upenn.edu

Linda M. Carroll, PhD, Speech Pathologist, Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, Pa. 19104, (215) 590-1000, lmcarrollphd@aol.com

Karen B. Zur, MD, Assistant Professor of Otorhinolaryngology, Children's Hospital of Philadelphia, University of Pennsylvania, 34th Street and Civic Center Boulevard, Philadelphia, Pa. 19104, (215) 590-1000, zur@email.chop.edu

A Comparative Study of Voice parameters before and after Phonosurgery and Voice Therapy

Authors: Anjali.G, B.S.Premalatha, Nisha Krishnani, Rashmi Ramesh

Abstract

Diagnosis and management of Voice disorders is multi-dimensional in nature. The voice therapist and the voice surgeon work in close coordination with each other and form the central figures in the Voice rehabilitation team. The term Phonosurgery refers to function oriented surgical procedures which are designed to improve, restore, or maintain the voice (International Association of Phonosurgery, 2000). Voice therapy is a part of post operative care for patients operated for vocal cord lesions which includes Vocal abuse reduction program, Pitch or intensity monitoring, Vocal fold adduction exercises, Voice quality modification etc.

The present investigation aims to evaluate the voice parameters before and after Phonomicicrosurgery and the role of Voice Therapist in improving the Vocal quality post-surgery.

Two subjects diagnosed with Vocal nodule and Sulcus Vocalis by Direct Laryngoscopy served as subjects. Both the subjects underwent Phonomicicrosurgery followed by intensive voice therapy. The pre-operative, post-operative and post-therapy voice parameters of subjects were obtained by a Voice Therapist and compared. The Objective Voice assessments were done using Praat software and MDVP of CSL. Subjective evaluations were based on VHI, MPD and perceptual rating of voice quality.

The results indicated a slight improvement in the variables evaluated, after surgery. However, following Voice therapy there was a significant improvement in the voice parameters.

Thus it was concluded that Phonosurgery does help in overcoming the Voice disorder, but may not be sufficient to provide a near normal Voice. This goal of achieving an optimal voice can be met through strictly monitored post-operative Voice Therapy. Thus role of Voice therapist in pre and post- operative assessment and successful management of clients undergoing Phonosurgery is inevitable and has been highlighted here.

Anjali.G, MSc Speech Language Pathology, Lecturer & Senior Clinical Supervisor, Dr.SR Chandrasekhar Institute of Speech and Hearing, Lingarajapuram, Hennur Main Road, Bangalore- 560084, +91-9035435217, anjali_slp@yahoo.com

B.S.Premalatha, MSC, PhD, Professor and HOD, Dept of Speech Language Pathology, Dr.SR Chandrasekhar Institute of Speech and Hearing, Lingarajapuram, Hennur Main Road, Bangalore- 560084, +91-9845276134, dr_premalatha@rediffmail.com

Nisha Krishnani, BSc, Speech Language Pathology & Audiology, Dr.SR Chandrasekhar Institute of Speech and Hearing, Lingarajapuram, Hennur Main Road, Bangalore- 560084, +91-9886196434, naughty-nish123@yahoo.co.in

Rashmi Ramesh, BSc, Speech Language Pathology & Audiology, Dr.SR Chandrasekhar Institute of Speech and Hearing, Lingarajapuram, Hennur Main Road, Bangalore- 560084, +91-9880291442, rashmirocks@rediffmail.com

The “Ah-ha” Moment: A New Method for Understanding Clinicians’ Perceptions of Resonant Voice

Aaron Ziegler, MA, PCE-SLP
Edie Hapner, Ph.D., CCC-SLP
Emory Voice Center, Atlanta, GA

Theoretically, resonant voice productions yield the greatest acoustic output with the least amount of overall effort (Verdolini, Druker, Palmer, & Samawi, 1998). However, there is not a gold standard measure of resonant voice and, consequently, clinicians rely on their perception for assessment. The problem remains that auditory-perceptual judgment of voice quality has demonstrated both inter- and intra-rater variability and may not be a valid and reliable method of assessment (Kent, 1996). Little is known about clinicians’ perception of resonant voice. Perhaps voice clinicians differ in what they listen to or watch for when judging a resonant voice. Q methodology (Brown, 1991/1992), a research method originally developed by William Stephenson, provides a platform to qualitatively study this problem. The purpose of this study is to discover which factor(s) clinicians believe they rely on to determine that a voice is resonant. METHODS: Statements were collected from 20 voice clinicians with a variety of years of experience and sorted by commonalities. A subset of statements (Q sample) were ranked by 4 experienced voice clinicians (P sample). The rankings were subjected to factor analysis in order to identify elements of subjectivity inherent in their beliefs and to what extent they are similar. RESULTS: Preliminary findings reveal that most clinicians believe they employ a two-factor synthesis in judging resonance. DISCUSSION: Determining that a voice is resonant may require an integration of perceptual factors. A follow-up study is underway to discover commonalities among expert clinicians’ rankings of resonant voice productions.

Aaron Ziegler, MA, Speech Pathologist, Emory Voice Center, 550 Peachtree St., NE, 9th Floor, Suite 4400. Atlanta, GA 30308, (404) 686-5475, aaron.ziegler@emoryhealthcare.org

Edie Hapner, Ph.D., Assistant Professor, Emory Voice Center, 550 Peachtree St., NE, 9th Floor, Suite 4400, Atlanta, GA 30308, (404) 686-7798, edie.hapner@emory.edu

The Vocal Clarity and Skill of Speech Pathology Students

Samantha Warhurst, Catherine Madill, Patricia McCabe & Robert Heard

Speech Pathologists (SPs) are professional voice users, who require a clear voice to communicate effectively (Rogerson & Dodd, 2005). In clinical practice, SPs also control voice clarity and power when modeling evidence-based voice techniques such as the Lee Silverman Voice Treatment (Ramig et al., 2001) and Resonant Voice Therapy (Verdolini-Marston et al., 1995). Students SPs may receive voice training during their degree however evidence regarding their vocal skill is negligible. Acoustic and auditory-perceptual analyses were used to evaluate the vocal quality of two groups of speech pathology students (beginning their degree and completing their degree) in two conditions. Students produced a sustained vowel using their habitual speaking voices and then produced a 'clear' voice as if they were modeling during voice therapy (performance voice). Minimal differences in acoustic and auditory-perceptual results were found between beginning and graduating students. Additionally, in exploring differences between highly-skilled, perceptually clear participants and participants perceived as not clear it was found that noise-to-harmonic ratio could consistently differentiate the two groups ($p<0.001 - 0.044$). This differentiation effect is discussed, specifically in regard to its use with listeners groups of very expertise and experience.

Samantha Warhurst, BAppSc (SpPath) Hons, Postgraduate Student, University of Sydney, Speech Pathology C43, PO Box 170, Lidcombe NSW 1825, +61402835994, swar0066@uni.sydney.edu.au

Catherine Madill, PhD, BA (Hons), BAppSc (HonsM1), Lecturer, University of Sydney, Speech Pathology C43, PO Box 170, Lidcombe NSW 1825, +6129351 9692, c.madill@usyd.edu.au

Patricia McCabe, PhD BAppSc (SpPath)(hons), Lecturer, University of Sydney, Speech Pathology C43, PO Box 170 , Lidcombe NSW 1825, +6129351 9747, p.mccabe@usyd.edu.au

Robert Heard, Senior Lecturer, University of Sydney, PO Box 170, Lidcombe NSW 1825, +6129351 9498, r.heard@usyd.edu.au

Chest to Head Passaggio: Understanding its Subtleties through Physiological and Anatomical Perspectives and its Applicability to Spoken Voice

Mr Pedro Amarante Andrade
Professor Andrew Todd-Pokropek
Dr Ruth Epstein

Throughout the years many areas of the singing voice have been explored. Nevertheless, a vital area within the singing voice has been neglected due to its intricate array of physiological possibilities – the head to chest passaggio. This study aimed to reveal the subtle mechanisms of the aforementioned passaggio, explained through physiological observations of changes in the vertical displacement of the vocal tract and vocal folds vibration pattern.

Thirteen well-experienced singers participated in this study, comprising of 37 sample recordings. The data was collected with a USB Laryngograph®MicroProcessor device and analysed with the Speech Studio and Voce-Vista Pro software. A repeated-measures ANOVA and paired-sample t-test were applied to analyse the following: formants centre frequency transition, vocal folds' closure quotient, the amplitude of the Lx signal acquired through the laryngograph and the vertical movement of the larynx measured through the estimate time delay between the laryngograph and microphone signal.

The results showed a significant difference of scores from the ‘pre’ to the ‘post’ passaggio condition, indicating a lowering of the formants centre frequency transition, and increased amplitude of the Lx signal and vocal tract length. No significant difference of scores was found for the closure quotient.

The results suggest that the larynx does indeed lower after the passaggio, causing the vocal folds to vibrate with a deeper vertical phase. It can be assumed that if the lowering mechanism of the larynx is violated, the impact of the vocal cycle concentrates on smaller surface unit, causing potential voice problems similar to mechanisms found in MTD.

Pedro Amarante Andrade, MSc, (pending award), Speech and Language Therapy, University College London, The Ear Institute, Laryngology & Voice Pathology, 330-336 Grays Inn Rd, London, UK, WC1X 8EE, 0044787 216 7982, pedroamarante@hotmail.com

Ruth Epstein, PhD, Head of Speech & Language Therapy Services, Royal National Throat Nose & Ear Hospital, Director - MSc Voice Pathology UCL Ear Institute, 330 Gray's Inn Road, London WC1X 8DA, 00442079151545, ruth.epstein@royalfree.nhs.uk

Andrew Todd-Prokopek, Professor of Medical Physics, University College London, The Ear Institute, Laryngology & Voice Pathology, 330-336 Grays Inn Rd, London, UK, WC1X 8EE, 0044207 679 0300, atoddpok@medphys.ucl.ac.uk

Ref#: SLP27

Improved Voice Quality After Forward Focused Voice as Measured by Perturbation in the Acoustic Signal as a Method for Engaging Patients

Heather Shaw Bonilha, PhD CCC-SLP
Medical University of South Carolina

Voice Foundation Abstract: Improved Voice Quality After Forward Focused Voice as Measured by Perturbation in the Acoustic Signal as a Method for Engaging Patients

One common clinical challenge is convincing a patient that you can improve their voice quality and engaging them in a treatment plan. This is especially difficult when patients have seen various professionals prior to you and are skeptical regarding your profession as a whole. Acoustic analysis, particularly with understandable visual feedback, is a method of analyzing a patient's voice that is typically viewed as creditable by patients' due to its objective nature. This study sought to test whether a brief stimulability trial of forward focused voice could produce enough change in jitter, shimmer, and noise-to-harmonic ratio to provide visibly improved objective results. Twenty-five consecutive patients referred for a voice evaluation participated in this study. No patients were excluded from the study based on diagnosis or other reasons to prevent bias. The patients who participated in the study had diagnoses ranging from nodules to cysts to unilateral paralysis. Results demonstrated a significant change from pre- to post-trial, as indicated by the objective measure transitioning from being outside to within normal limits, in 75% of patients ($p=0.0005$, Fisher's Exact test). The benchmark of the measure crossing threshold is a stringent one, but it is also the most visibly appealing (from red to green). When less rigid criterion of a positive change in one or more of the 3 acoustic measures of interest is used, 96% of patients noted improvements. The pairing of acoustic analysis before and after trial therapy during a voice evaluation appears to be a possible method of engaging patients.

Heather Shaw Bonilha, PhD CCC-SLP, Assistant Professor, Medical University of South Carolina, 77 President St, (843) 792-2527, bonilhah@musc.edu

An Accelerometer Measure of Cutaneous Vibrations on the Neck in Three Phonational Modes: Pressed, Breathy, and Flow, as a Possible Guide to Training Non-Pressed Phonations

I want to report on an investigation I am conducting into the possible relationship between the amplitude of vibrations measured by an accelerometer on the skin of a thyroid ala and the type of phonation: pressed, flow or breathy as judged by a speech pathologist and voice teacher and confirmed by spectral analysis. Harold Cheyne (1993), in his study of 10 subjects, did not find a clear association of amplitude of vibration with phonational mode, but his subjects *could not accurately differentiate productions of pressed and modal*. As a theatre voice teacher I find many people have difficulty producing flow phonations. Pressing seems pervasive in untrained speakers.

I will use 20 subjects, students of Arizona State University, trained to produce acceptable tokens of /ah/ in sustained phonations in three different modes: pressed, flow and breathy, recorded on a KayPentax CSL 4500 while wearing a BU-21771 accelerometer taped with surgical tape to the right thyroid alae. Post-recording listening judgments (speech pathologist and principal investigator) will disqualify phonations that do not clearly fit: pressed, flow, and breathy.

After spectral analysis: the amplitude of vibrations in the three conditions will be compared inter- and intra-subject and statistically analyzed to determine if the amplitude of cutaneous vibrations reflect the type of phonation.

If there is sufficient variation in amplitude of cutaneous vibrations measured on the thyroid ala, monitoring these vibrations could serve as a non-invasive way to monitor the type of phonation.

Barbara Acker, BFA, MA, Ph.D., Associate Professor, Arizona State University, School of Theatre and Film, PO Box 872002, Tempe, AZ 85287-2002, (480) 965-2696,
Barbara.Acker@asu.edu

Objective and Subjective Measures of Voice Change Following Transcutaneous Electrical Stimulation to the Laryngeal Area

Previous studies have documented measurable changes in acoustic and spectral measures of vocal function following transcutaneous electrical stimulation (TES) with a myriad of symptoms reported by participants. These subjective reports range from no discernible sensation or a vocal warm-up feeling to symptoms associated with vocal fatigue and delayed onset muscle soreness (DOMS). Symptoms of vocal fatigue and DOMS were described following 30 minutes and 1 hour of TES, suggesting that the duration of TES is too long. A reduction in the duration of TES may lessen the occurrence of vocal fatigue and DOMS. To examine this question, 10 men and 10 women will be recruited as participants. All participants will exhibit a normal vocal quality, with hearing acuity within normal limits. Participants will have no history of respiratory, neurological, cardiac, or speech/language difficulties. Each participant will be asked to undergo 15 minutes of TES administered via VitalStim®. The electrodes will be placed submentally and lateral to the thyroid notch. Voice recordings will be obtained prior to and immediately following TES. The voice recordings will be made using an omnidirectional microphone connected to a desktop PC and will consist of three trials of a sustained vowel “ah” for 3-5 seconds, and three repetitions of the first two sentences of the Rainbow Passage. Participants will also be asked to provide subjective comments regarding any physical sensations 5 minutes and 24 hours post-TES. Data will be analyzed for changes in fundamental frequency and loudness. Data collection and analysis is currently underway.

Mary Gorham-Rowan, Ph.D., Associate Professor, Valdosta State University, Dept. of Communication Sciences and Disorders, 1500 N. Patterson Street, Valdosta, GA 31698, (229) 219-1321, mmgorhamrowan@valdosta.edu

Linda Fowler, Ph.D., Assistant Professor, Georgia State University, Communication Disorders Program, Dept. of Educational Psychology and Special Education, P.O. Box 3979, Atlanta, GA 30302-3979, (404) 413-8301, epelpf@langate.gsu.edu

Richard J. Morris, Ph.D., Professor, Florida State University, 127 Honors Way, Tallahassee, FL 32306-1200, (850) 644-8459, rmorris@fsu.edu

An Alternate (Low-Tech) Method for Quantifying Amount of Voice Use in Primary School Teachers

Abstract

Teachers form a large group of professional voice users and are thought to be at risk for voice problems than the general population. Primary school teachers report the common need to shout or raise the voice to make children heard in the classroom. Loud or prolonged vocalization contributes to voice problems in teachers. Measuring the amount of voicing performed by speakers' over time may give valuable information on voice use and load. However, there are no commercially available gadgets in India to measure the same, and it is cost-effective if available. To fulfill this need, an alternate simple method was proposed and tested. Two primary school teachers aged 32 and 42 years, having twelve and twenty years of teaching experience respectively participated in the study. A digital audiotape was used to record the speech/voice from the teachers used on a regular working week days, from Monday to Friday (in the class & outside) through-out working hours, from 10 am to 4 pm. The voicing periods from the recorded sample were extracted using PRAAT and the total voicing duration was summed up for the entire one-week sample. The average voicing percentage was also calculated and the results are discussed in-terms of the amount of voice use on daily and eventually on a week basis. The percentage of voicing duration can be measured through this method, and it can be considered as an alternate, simple way to quantify the voicing periods at workplace.

Key words: Voicing duration, Vocal load, Accumulation, Vocal fatigue.

R. Rajasudhakar, M.S., Speech Language Pathology, Research Scholar, All India Institute of Speech & Hearing, University of Mysore, Manasagangothri, Mysore, Karnataka, India, +91 9886342654,
rajasudhakar82@yahoo.co.in

S.R. Savithri, Ph.D (Speech & Hearing), Professor, Speech Sciences, All India Institute of Speech & Hearing, University of Mysore, Manasagangothri, Mysore, Karnataka, India, 08212514449,
savithri_2k@yahoo.com

Effectiveness of Vocal Hygiene Program in Preventing Phono-Trauma using Story Method in at Risk Teachers

Abstract

There is a need for primary prevention of voice disorders among the teaching profession, which may prevent the emergence of voice disorders. The present study would be carried out to bring out an easy, cheap, effective method of vocal hygiene in teachers. The study aims at finding out which method of creating awareness would be most effective for teachers at risk of developing voice problem, as assessed by the quality of life measures VHI, Acoustic (Jitter %) and perceptual measures (GRBAS scale). The results are based on of 20 teachers who reported experiencing voice symptoms related to classroom teaching. Five teachers each were randomly assigned to three experimental groups, 1st, 2nd and 3rd group teachers were provided with the vocal hygiene program in a story, pamphlet and oral form respectively and teachers in control group were not provided with any intervention. To assure the equivalence of grouping, one way ANOVA was applied, thus validating the randomization process. Voice evaluation took place both at the beginning and was again re-assessed after 3 weeks of completion of program. Post then pre design for VHI-30 measurement was used. Paired 't' test reveal the total VHI scores and Jitter percentage approaching significant values post treatment, especially in the group 1 & 3 .Changes in measures over two times have found to be approaching significance and a third evaluation could be done, to see significant results Thus, vocal hygiene program in general are effective & methods such as story form and pamphlet are feasible, cheap recommended for creating awareness in Indian set-up.

Raksha R. Meti, Dr. M.V. Shetty College of Speech and Hearing, Panjimugaru, 9019022683,
rakshameti@yahoo.in

Avinash M.C., Dr. M.V. Shetty College of Speech and Hearing, Panjimugaru, 9480629224,
avi_yash42@yahoo.com

Minu Jose, Dr. M.V. Shetty College of Speech and Hearing, Panjimugaru, 9844681877,
minnie_jos@yahoo.co.in

Urvi Mehta, Dr. M.V. Shetty College of Speech and Hearing, Panjimugaru, 9980228949,
poohrokz@yahoo.com

T A Subbarao, Phd, Professor & Principal, Dr.M V Shetty College of Speech and Hearing., Maladi Courts, Kavoor, Mangalore-575 015, Karnataka, India, +91 9448043096, subbaraota@yahoo.com

Objective Voice Analysis and Gender Variation

Objectives:

Objective measurements in general and acoustic measurements in particular have become a substantial aspect of voice assessment during the last few decades and the mentioned measurements are related to gender characteristics of speakers. On the other hand, comparatively little is known about the characteristics of female voice as compared with male voice. Therefore, the present study aims to provide a more complete picture of the relationship between acoustic measurements and gender.

Methods:

A group of 90 unpaid, healthy, randomly selected subjects with normal voices (45 Iranian men and 45 Iranian women), was selected for this study. All test subjects were between 20 and 50 years of age. Males and females were divided into three subgroups based on the following age ranges, with six total groups ($n = 15$ per group): 20–30 years, 31–40 years, and 41–50 years. Data collection was carried out, using the Dr. Speech Software version 4.0 from Tiger Electronics (subprogram: vocal assessment) at the speech therapy clinic under comfortable phonation and was used the sustained vowels /â/ and /i/, in a comfortable and habitual way, for more than 3 seconds.

Results:

The value of (vowels /â/ and /i/) was greater for females than for males and the F_0 of vowel /i/ was significantly higher than the F_0 of vowel /â/ in all populations ($P < 0.05$). Conversely, the value of MPT was greater for males than for females ($P < 0.05$). There were no significant differences in average shimmer and jitter between females and males ($P > 0.05$). However, the value of HNR was greater for females than for males ($P < 0.05$).

Conclusions:

All in all there are many reasons for differences between acoustic parameters of males and females. We would think that some of these differences definitely are based on physical sex and general differences in the vocal organs of men and women. But we also think that there are additional aspects based on social gender. Therefore, In light of the differences that emerged for acoustic measurements between males and females, a person's gender should be taken into account when applying spectral analyses to research or clinical situations.

Keywords: Acoustic measurements; Gender, Fundamental frequency; Harmonics-to-noise ratio; Maximum phonation time

Postural Laryngeal Exercises for Wind Instrumentalist's Laryngeal Repositioning

The larynx exhibits different functions such as respiration, swallowing, protective function, effort maneuvers, and phonation.

A disequilibrium between respiratory and phonatory functions is generated by playing wind instruments. That's why wind players can acquire long-term vocal disorders.

The purpose of this investigation is to develop a routine of laryngeal exercises in order to relocate the larynx in a phonatory position after playing wind instruments.

Material: fifteen young wind instrument players, students from the School of Music- Universidad Nacional de Cuyo and six professional wind instrument players from the Philharmonic Orchestra of Mendoza.

Methodology: 1- laryngostroboscopic examination before playing

2- electroglottographic examination before playing and after thirty minutes of

Performance 3- Analysis of functional phonatory differences between:a) pre/post execution b)
saxophone/ oboe players c) students/ professional performers

4- Elaboration of post-performance laryngeal repositioning exercises based on
electroglottographic findings.

First results: it seems that there is not a typical laryngeal behaviour for specific instrument but
laryngeal behaviour depends on the technique used.

Ana Gloria Ortega, PhD, Vocologist, Instituto de Voz Profesional, J.F.Moreno 1880- 5500,
Mendoza Argentina, 54-261-4234585, anagloriaortega@gmail.com

Carlos Stipech, MD, Otorhinolaryngologist, Faculty of Medical Sciences, Godoy cruz 333-5500,
Mendoza Argentina, 54-261 4258340, carlos_stipech@yahoo.com.ar

Ref#: SLP46

Using MP4 Videos to Improve Voice Therapy Motivation and Adherence

Treatment adherence presents a problem in the voice clinic. Many patients do not complete voice therapy, and those who do, often struggle with both the acquisition and implementation of healthy voice technique. This presentation investigates the effect of practice support in the form of clinician, patient and peer videos on patient adherence and motivation. Results of two studies of different design (crossover and group comparison) will be discussed. Results include improvement in goal commitment, practice and generalization. Challenges in measuring, affecting, and understanding the factors that affect patient compliance are discussed, with particular emphasis on the degree of influence clinicians and peers may have in affecting change.

Eva van Leer, MS, MFA, Research Fellow, University of Wisconsin, Division of Otolaryngology, 600 Highland Ave, Madison WI 53792, (608) 263-4904, vanleer@surgery.wisc.edu

Nadine P. Connor, PhD, Associate Professor, University of Wisconsin, Division of Otolaryngology, 600 Highland Ave, Madison WI 53792, (608) 265-8711, connor@surgery.wisc.edu

**A Prospective Evaluation of Voice – Related Quality of Life Trends in Music
Theater Majors in a Competitive University Training Program**

Marci Daniels Rosenberg, M.S CCC
University of Michigan

Roy, et.al. reported lifetime prevalence of voice disorder to be approximately 30%; and incidence of voice disorders to be 7%. Risks of having a voice disorder for classical singer has been reported to be greater than 50% (Elias, 1997). Incidence of vocal injury in contemporary commercial style music has not been well studied, however, existing literature suggests that they are at even more increased risk for vocal injury (Koufman, et al 1996). This is not surprising given the vocal demands for this type of performer including high vocal dose (8 shows per week often with high level dancing), expectation for vocal skill with several vocal styles (pop, belt, mix, legit), and vocal hygiene issues including reduced sleep and reflux. Vocal injury in this population can be devastating and can have significant impact of quality of life.

The purpose of this study was to follow V-RQOL trends in music theater majors prospectively during their four years of study at a competitive collegial pre-professional training program. The incoming class of freshman (N=17) completed the V-RQOL during the first semester of their program, and then again at the end of their sophomore year. We are continuing to follow V-RQOL trends throughout their four year program. Results from VRQOL measures of this first phase of the study will be reported.

Marci Daniels Rosenberg, B.M, M.S, Speech Pathologist, Voice & Singing Specialist, University of Michigan, Vocal Health Center, 19900 Haggerty Rd Suite 103, Livonia, Mi 48152, (734) 763-4003, marcied@med.umich.edu

Voice Training in the Dubbing
Marco Guzman, SLP¹

The voice dubbing is the replacement of the original dialogues in an audiovisual production. One reason to have voice dubbing is to change the original language of an audiovisual production to the language of the buyer country for diffusion. A very common case is the dubbing of American movies, series and documentaries to neutral Spanish. The training of the voice dubbing is a process that involves four elements: acting through the voice, technical training in the recording process, articulation training, and vocal training of neutral Spanish. The neutral or international Spanish is characterized by the lack of a regional accent of a specific country. The voice training for this kind of dubbing is a process that involves two major stages. The first one is the auditory discrimination of specific vocal characteristics of the dubbing actor and the neutral Spanish. The second stage is the vocal process itself, where the dubbing actor learns the vocal skills to speak in neutral Spanish. The voice training at this stage include: control of the melody of speech, control of melody and intensity at the end of each sentence, training rhythm and pauses, vowel length and stresses.

¹ Visitor Fellow: Lakeshore Professional Voice Center, Sister Program Department of Otolaryngology, School of Medicine, Wayne State University, Detroit, MI. USA. Professor, School of Speech and Hearing Sciences, University of Chile. Santiago, Chile

Marco Guzman, SLP, University of Chile (Santiago, Chile), Lakeshore Professional Voice Center, 21000 E. Twelve Mile Road, Suite 111, St. Clair Shores, MI 48081, (517) 355 9947, guzmanvoz@gmail.com

The Voice Handicap Index: A Translation and Cultural Adaptation to Puerto Rican Spanish Dialect and its Validation

Dr. Albert Villanueva-Reyes, Professor, University of Puerto Rico, Medical Sciences Campus

Abstract

The purpose of the present project is to translate, culturally adapt, and validate a Spanish language version of the Voice Handicap Index, a statistically robust instrument to quantify the psychosocial consequences of voice disorders. This work is of great importance for public health in Puerto Rico, since there exists a great need for a psychometrically robust voice disability/handicap inventory in the Spanish language spoken in Puerto Rico that could be used with patients that exhibit a variety of voice disorders in Puerto Rico and in United States. If a questionnaire or instrument is to be used in another country in a different language, translation and cultural adaptation are required. For the translation and adaptation of the Voice Handicap Index to Puerto Rican Spanish dialect, the cross-cultural adaptation process recommended by the American Academy of Orthopaedic Surgeons will be followed. Two forward translations to Spanish will be made of the original version of the Voice Handicap Index by two bilingual translators whose native language is Spanish. To assure that the translated version accurately reflects the item content of the original version, the instrument will be translated back into the English language. An expert committee will work on internal consistency reliability, will consolidate all the versions and components of the instrument, and will develop the pre-final version of the instrument for field testing. The validation process will consist of pre-testing and testing procedures followed by appropriate statistical analysis (Pearson product-moment correlation coefficient and Cronbach's alpha coefficient). Students will collaborate with the PI with pre-testing and testing procedures. Outcomes of this work are relevant to mission proposed by The Voice Foundation. Preliminary findings will be discussed.

Albert Villanueva-Reyes, Ed.D., M.Sc., CCC-SLP University of Puerto Rico, Medical Sciences Campus PO Box 365067 San Juan, Puerto Rico 00936-5067 (787) 461-3700
albert.villanueva@upr.edu

Ref#: SLP-P10

Comparison of Two Acoustic Analysis Systems to Aid Outcome Reporting

Poster Submission: Voice Foundation 2010 Annual Symposium

Authors: Olga Clark, BS, University of Georgia-Athens

Edie R. Hapner, PhD, Emory Voice Center, Emory University School of Medicine, Atlanta, GA

INTRODUCTION: Acoustic assessment of voice is an integral part of the comprehensive evaluation of vocal capabilities (Kent & Ball, 2000). Karnell et al. (1995) discussed the importance of comparing evaluation tools for comparison of voice outcome studies that utilize different measurement systems. The aim of this study is to compare the Kay Pentax, Inc. Multidimensional Voice Profile™ (MDVP) and the Vocal Innovations Voice Evaluation Suite™ (VES) on measures of fundamental frequency, perturbation, and noise in the signal. Methods of pitch extraction, algorithms for determining perturbation, and digital sampling rate were compared. **METHODS:** 47 male and female non- dysphonic participants, ages 21-59 years, were evaluated utilizing both the MDVP and the VES. The middle 4 seconds of a prolonged vowel was analyzed using both instruments. Difference measures and correlation analyses were used to compare the systems. **RESULTS:** There was not a significant difference between fundamental frequency measures for both systems ($t=-1.012$, $p=.317$). There was no significant difference in measures of pitch perturbation between the systems ($t=.247$, $p=.806$). There was a significant difference between measures of intensity perturbation ($t=-9.636$, $p=.00$). **DISCUSSION:** Both the MDVP and the VES are designed for clinical use in the evaluation of vocal pathologies, to track progress during treatment, and to document treatment outcomes. Clinicians are advised to understand the difference between methods of analysis when comparing results from different evaluation tools and to document the specific instrument when reporting results of voice evaluations to better determine treatment outcome.

Olga Clark, BS, Graduate Student, University of Georgia, Aderhold, Athens, GA, (770) 634-4534, olgaclarkslp@gmail.com

Edie Hapner, PhD, Assistant Professor, Emory Voice Center, Emory University School of Medicine, 550 Peachtree Street, NE, Atlanta, GA 30308, (404) 686-7798, ehapner@emory.edu

Long-Term Average Spectrum (LTAS): Parameters to Detect Vocal Aging in Elderly People

Paula Torres da Silva, Suely Master, Paulo Pontes, Luiz Roberto Ramos.

ABSTRACT:

Along the normal aging process, voice tends to become weak, breathy and loses projection. Age related vocal alterations are associated to other body functional disorders, and may occur as a pathology when interfere with the communication process and, therefore, with interpersonal relationships. Distinguishing between vocal changes that occur with normal aging and those that are associated with disease is an important goal of research in voice. One reliable way to evaluate voice quality is through acoustical analisys, particularly the long-term average spectrum (LTAS) which reveal contributions from the glottic source and filter. The aim of this study was to identify the LTAS parameters that characterize vocal aging in women, at different loudness. Sixty female speakers, without vocal complaints were equally divided in two groups by age. From a read task, in habitual and loud levels, the following parameters were assessed: in LTAS, the alpha ratio and the amplitudes obtained in 50 points, at equal intervals of 160Hz, within the frequency band between 0-8 kHz, and the average sound pressure level (SPL) and the fundamental frequency (F_0). From the physiological point of view, a poor vocal fold adduction, providing a slower glottal closing speed, may be characteristic of these voices. And the LTAS bring out this condition as the alpha ratio seems to be the most reliable indicator for aging voices. In elderly women, in a normal vocal aging process, the mean values of this variable were -17.67dB and -13.02dB, in habitual and loud phonation respectively.

Key Words: Vocal aging, long-term average spectral analysis, acoustic analysis, voice quality.

Paula Torres da Silva, Master in Science, Speech Therapist, Universidade Federal de São Paulo, Saúde Coletiva Department, Rua Borges Lagoa, 1341 - 2º floor, 04038-034. São Paulo/SP – Brasil, 55 11 82184594, paula.torres.silva@gmail.com

Suely Master, PhD, Phonoaudiology (Speech Therapist), Arts Institute – UNESP, Rua Dr Bento Teobaldo Ferraz, 271. 01140-070, São Paulo - SP. Brasil, (5511)83398589, suely.master@uol.com.br

Paulo Pontes, M.D., Professor, Universidade Federal de São Paulo, Chief of Otolaryngology, Head and Neck Surgery Department, Rua Diogo de Faria, 171, 55 11 5492188

Luiz Roberto Ramos, M.D., Professor and Chief, Public Health Department, Director of Centro de Estudos do Envelhecimento, Univesidade Federal de São Paulo, Saúde Coletiva Department, Rua Borges Lagoa, 1341 - 2º floor 04038-034, 5511 55715000, lrr@uol.com.br

Does Patient Complaint Predict Presence of Vocal Pathology in Undergraduate Voice Students

The goal of this study is to define the vocal health awareness of undergraduate voice students which may ultimately help to prevent injury. Additionally, gaining vocal awareness may help students differentiate between pathological symptoms and the effects of poor training or inefficient practice to eliminate confusion. Therefore, it is essential that undergraduate voice student training in vocal hygiene be conducted at the onset of their collegiate education to promote vocal health awareness.

A sample of 60 undergraduate voice students were asked to identify the presence of a vocal complaint prior to a voice health screening near the onset of the academic year. After recording the statement of complaint, participants answered a case history form specific to singing, the singer's voice handicap index (Cohen, Statham, Rosen, & Zullo, 2009), and a singer's reflux symptom index created at the University of Central Florida. Answers to initial questioning and case history information allowed investigators to place the participants in three groups for evaluation: complaint, complaint after probing, and no complaint. The participants then underwent videolaryngostroboscopic examination for evaluation of laryngeal structure and function.

Data collection is underway and will be completed by November 2009. Currently, the data suggests that students tend to respond without vocal complaint until probing and then state complaints. Comparison of endoscopic findings between groups and their self-evaluations will be analyzed by the investigators using non parametric statistics by Spring 2010.

References:

- Cohen SM, Statham M, Rosen CA, Zullo T. (2009) Development and validation of the Singing Voice Handicap-10.Laryngoscope. 119(9):1864-9.

Sarah Altman, BM, M.M, M.A., Graduate Student, Dept. of Communication Science and Disorders, University of Florida, 335 Dauer Hall, Gainesville, FL 32611-7420, (740) 350-8444, sarah.m.altman@gmail.com

Adam Lloyd, M.M., Graduate Student, University of Central Florida, P.O Box 162215 HPA 2 Room 101 K, Orlando, FL 32826-2215, (407) 823-4804 , atlloyd@mail.ucf.edu

Jeffrey Lehman, M.D., Otolaryngologist, University of Central Florida, 201 North Lakemont Avenue Suite 100, Winter Park, FL 32792, (407) 644-4883

Christine Sapienza, Ph.D., Professor and Chair, University of Florida, 335 Dauer Hall, Gainesville, FL 32611, (352) 273-3712, sapienza@ufl.edu

Bari Hoffman Ruddy, Ph.D., Associate Professor, University of Central Florida, P.O Box 162215 HPA 2 Room 101 K, Orlando, FL 32826-2215, (407) 823-4804, bhruddy@mail.ucf.edu

Voice and the Enterprise Image

Ana Maria Parizzi and Annelise Maria Bento Gama de Carvalho

The voice is essential in the communicative situation. It allows the professional to express himself (or herself) as well as to represent the enterprise where he (or she) works at. The voice is a marketing tool and it establishes the first impression for the client. Through the voice, the person can show confidence in the conversations, and this demands techniques and training. Valuing the image of the enterprise means to improve communication by ameliorating oral and speech performances likewise the appropriate verbal language use. We executed a vocal image consulting in an aviation company which deals with aircrafts and helicopters selling as well as air taxi service, focusing the professional of the voice communicative skills improvement, giving priority to confidence and self-possession aspects, elicited by adequate voice use during internal and external interpersonal relationships. For that purpose, we created a communicative profile designed specifically for the typical enterprise client which should be reflected in the company's vocal marketing. Its efficiency will strengthen the essence of the image that the enterprise wants to show. Our main objective is to supply the enterprise with: a) a more functional and efficient communication as a result of the standardization of the appropriate language use in the conversation with the client; b) a reduction of the employee's vocal disease cases and, consequently, the reduction of absences in the job.

Ana Maria Parizzi, Speech Therapist, Professor, Sociedade Brasileira de Fonoaudiologia, 55-31-32916643, amp@fumec.br

Anneliese Maria Bento Gama de Carvalho, M.A., Professor, 55-31-91678874, anne@fumec.br

Anchoring as Strategy to Increase Vocal Intensity in Speakers

Many voice disorders (e.g., muscle tension dysphonia) are characterized and identified by an individual's perception of increased muscle activation, tension, and fatigue, as well as reduced loudness and power. Clinically, most traditional approaches designed to increase loudness also require an increase in laryngeal effort and lead frequently to vocal fatigue. Anchoring or supporting the torso and head/neck are ways that singers successfully support vocal productions when singing. This strategy has rarely been studied in speakers to determine if external muscle support (as is done in anchoring) increases loudness and power of the speaker's voice while minimizing the perception of vocal fatigue. The purpose this study was to assess the relationship between acoustic output, closed phase of vocal fold vibration, subglottal pressure, and airflow (i.e., acoustic and aerodynamic properties that change with increased vocal intensity) with anchoring of the head/neck and torso in untrained speakers. Fifty subjects were solicited for the study, 25 males and 25 females with no voice training and no history of voice disorder. Data collection is ongoing, however, preliminary results suggest that (1) anchoring results in an increase in intensity of the voice (decibel level), decrease in noise-to-harmonic level, increase in closed phase of vocal fold vibration, increase in subglottal pressure, and decrease in airflow, and (2) acoustic and aerodynamic parameters of the voice are not significantly different between head/neck and torso anchor in isolation or in combination, but there is a significant difference between anchors in isolation and in combination.

Cari Tellis, PhD, CCC/SLP, Assistant Professor, Misericordia University, 301 Lake Street, Dallas, PA 18612, (570) 674-1057, ctellis@misericordia.edu

Kaitlyn Frey, Graduate Student, Misericordia University, 301 Lake Street, Dallas, PA 18612, (570) 674-1057, freyk@misericordia.edu

Alicia Drumheller, BS, Graduate Student, Misericordia University, 301 Lake Street, Dallas, PA 18612, (570) 674-1057, drumhela@misericordia.edu

Nicholas Barone, BA, Graduate Student, Misericordia University, 301 Lake Street, Dallas, PA 18612, 570-674-1057, baronen@misericordia.edu

Kimberly Steinhauer, PhD, President, Vocal Innovations, LLC, 55 Standish Boulevard, Pittsburgh, PA 15228, 412-498-2948, ksteinhauer@trainmyvoice.com

Denis Anson, MS, Assistive Technology Research Institute, Misericordia University, 301 Lake Street, Dallas, PA 18612, danson@misericordia.edu

Vocal Tract of Dysphonic Adults with Vocal Nodules: MRI Study in Rest Position

Objective: To analyze the vocal tract morphometry of patients with vocal nodules in comparison to normal subjects by means of MRI in rest position. **Methods:** The present research included 20 young adult women, age 18 to 40 years old: 10 dysphonic patients with vocal nodules and 10 normal subjects. All participants were tested for MRI; twelve measurements of the vocal tract were performed: 9 in median sagittal section and 3 in the axial plane. **Results:** all measurements were lower in the dysphonic group; statistical significance was obtained for 3 parameters: the area of the laryngeal vestibule was significantly smaller in the dysphonic group, $p=0.012^*$; in the axial plane, it was observed that the distance between the right and left vocal processes of the arytenoids' cartilages and the distance between the anterior commissure of the glottis and the lamina of the cricoid cartilage were also significantly lower in the dysphonic group, p values of 0.036^* and 0.010^* , respectively. Moreover, the dysphonic group showed two interesting tendencies: higher positioning of the hyoid bone, $p=0.085^*$, and a shift of the apex of the epiglottis towards the posterior wall of the pharynx, $p=0.052^*$. **Conclusion:** significant differences in the vocal tract morphometry of individuals with vocal nodules were observed in comparison to normal subjects, even in rest position. Patients with vocal nodules present anterior-posterior constriction of the laryngeal vestibule and reduced glottic space. This study poses a novel research model to define and investigate vocal tract measurements in dysphonic patients.

Rosiane Yamasaki, PhD, Associate Researcher, UNIFESP / CEV, R. Machado Bittencourt, 361-10º Andar / CEP.:04044-905, São Paulo, Brazil, + 55 11 55751710, r.yamasaki@uol.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Osíris de Oliveira Camponês do Brasil, PhD, Associate Researcher, UNIFESP, R. Machado Bittencourt, 361-10º Andar / CEP.:04044-905, São Paulo, Brazil, +55 11 55751710, osirisbrasil@uol.com.br

Helio Yamashita, PhD, Full Professor, UNIFESP, R. Napoleão de Barros, 800 - CEP 04024-002, São Paulo-Brazil, +55 11 5908-7905, helio.yamashita@uol.com.br

Overall Severity of Dysphonia Rated in Two Different Scales: Visual Analog and Numerical

The goal of the present study is to analyze the relationship between a visual analog scale (VAS) with 100 units and a 4 point Numerical Scale (NS) as perceptual analysis instruments for the voice clinic. 211 voice samples (plus 10% of repetition for reliability analysis) from adults with and without vocal complaints were submitted to two sessions of perceptual auditory evaluation, with a ten-day interval. The task was to rate the overall severity of vocal deviation from a connected speech sample (counting numbers from 1 to 10). In the first evaluation session, four judges performed a perceptual assessment with the VAS and, in the second one the same judges employed the NS. ROC Curve was used to establish the discrimination power of the measure (sensitivity, specificity and efficiency). Results showed high level of agreement among judges in both scales: 0,849 to VAS and 0,821 to NS, with an intrajudge reliability of 75%. The results provided a reference system for perceptual analysis, with four ranges: 0 to 35,5 units for normal variation of voice quality or mild dysphonia (0 to 1 NS); 35,6 to 50,5 units for mild to moderate deviation (1 NS); 50,6 to 90,5 units for moderate deviation (2 NS) and 90,6 to 100 for severe deviation (3 NS). Both instruments are useful and reliable measures for the voice clinic. The limit of 35,5 units is suggested as a screening level for perceptual auditory analysis.

Rosiane Yamasaki, PhD, Associate Researcher, UNIFESP / CEV, R. Machado Bittencourt, 361-10º Andar / CEP.:04044-905, São Paulo, Brazil, + 55 11 55751710, r.yamasaki@uol.com.br

Sylvia Leão, MsC, Master Graduate Student, UNIFESP, Rua Machado Bittencourt 361, 10 andar, 04044-001, São Paulo, Brasil, (55 11) 5575 1710, sylvialeao@yahoo.com.br

Glauycia Madazio, PhD, PhD Graduate Student, UNIFESP and Associated Professor, CEV, UNIFESP and CEV, Rua Machado Bittencourt 361, 10 andar, 04044-001, São Paulo, Brasil, (55 11) 5575 1710, glaumadazio@uol.com.br

Marina Padovani, PhD Graduate Student, Associated Researcher, UNIFESP / CEV, R. Machado Bittencourt, 361-10º Andar / CEP.:04044-905, São Paulo, Brazil, +55 11 55751710, mapadovani@uol.com.br

Renata Azevedo, PhD, Associated Professor, UNIFESP, R. Machado Bittencourt, 361-10º Andar / CEP.:04044-905, São Paulo, Brazil, +55 11 55497500, renata.r.azevedo@uol.com.br

Mara Behlau, PhD, Director, CEV: Rua Machado Bittencourt 361, São Paulo, Brazil, 5511-5575-1710, mbehlau@uol.com.br

Comparison of Psychophysical Methods for Evaluation of Rough Voice Quality

Stacie Cummings, Rahul Shrivastav, David A. Eddins, Sona Patel

Background: The magnitude of “roughness” in voices has typically been evaluated using rating scale tasks. However, the ratings assigned to a particular voice stimulus are arbitrary and prone to context-related biases, resulting in poor reliability and agreement. An adaptive matching task minimizes such biases and has successfully been used to study a number of psychoacoustic continua, including “breathiness.” However, no such task for evaluating roughness has been developed.

Purpose: In the present experiment, a matching task for roughness is described and the magnitude of roughness measured through this task is compared against three other psychophysical methods for evaluating perceptual continua. These include the rating scale task, a rank-ordering task and a paired-comparison task.

Methods: Ten participants judged the roughness of 34 disordered voices using the 5-point rating scale task, a rank-ordering task, and a paired comparison or an adaptive matching task. The matching task required listeners to compare the roughness of test stimuli to that of a sawtooth and noise reference stimulus with a specific amplitude modulation. Listeners manipulated the modulation depth of the amplitude-modulated sawtooth and noise complex until the test stimulus and the sawtooth reference were perceived to have equal roughness. The modulation depth at the point of subjective equality was used as a measure of roughness in that voice.

Results: The results indicate all four psychophysical methods provided similar magnitude of roughness. However, the adaptive matching task may be ideal since it can avoid several biases.

Stacie Cummings, B.A., Research Assistant, University of Florida, 336 Dauer Hall, Gainesville, FL 32611, (850)258-4364, scpana@ufl.edu

Rahul Shrivastav, Ph.D., CCC-SLP, Assoc. Prof., U. Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3710, rahul@ufl.edu

David A. Eddins, Ph.D., CCC-A, Associate Professor, University of Rochester, 2365 S. Clinton Avenue, Suite 200, (585) 758-5628 (ext. 283), David_Eddins@URMC.Rochester.edu

Sona Patel, Ph.D., University of Florida, 336 Dauer Hall, Gainesville, FL 32611, (217)615-7971, Sona.Patel@unige.ch

Descriptive Study on Voice Parameters for Spanish-Speaking Adults

Abstract

The aim of this study is to establish normative references for standard acoustic and physiologic voice measures collected from vocally healthy Spanish-speaking adults that can be used as a baseline to determine clinical relevance in diagnosing and treating voice disorders. Such baseline voice norms include average pitch, average intensity (loudness), pitch range, intensity range, and maximum phonation time. Establishing a normative voice database using our rigorous scientific design will provide a standard that voice clinics in Puerto Rico and throughout the United States wherever Hispanic populations are served, can use to reliably distinguish between healthy and disordered voices.

A total of 90 subjects with a healthy voice quality, 30 in each age group (15 males, 15 females), will be recruited for the proposed study. The three different age groups will be divided as follows: group A = 18 to 39 years; group B = 40 to 59 years; group C = 60 years or older. All participants will be speakers of Spanish and pass a pure-tone hearing screening as well as a voice screening. All recordings and analysis will be performed using The Voice Evaluation Suite™ (VES), by Vocal Innovations™, a program that automates collection, analysis, storage, and retrieval of significant voice measures. Standard statistical methods (means and standard deviations) will be used to analyze the acoustic data. Preliminary findings will be discussed and compared with previous studies with English-speaking groups.

Albert Villanueva-Reyes, Ed.D., M.Sc., CCC-SLP University of Puerto Rico, Medical Sciences Campus
PO Box 365067 San Juan, Puerto Rico 00936-5067 (787) 461-3700 albert.villanueva@upr.edu

**Acoustic and Aerodynamic Characteristics
of the Voices of Healthy Korean Adults by Gender**

Jaeock Kim, Ph.D

Objective: To develop the standardized the acoustic and aerodynamic characteristics of Korean adults by gender using Multi-Dimensional Voice Program (MDVP) and Phonatory Aerodynamic System (PAS).

Methods: Acoustic and aerodynamic measures were collected from 170 healthy Korean adults (70 men, 100 women) aged from 18 to 45, who were evaluated with G0 in GRBAS scale and normal laryngeal structure in stroboscope by two experienced speech-language pathologists. Acoustic characteristics of them were analyzed by MDVP (Model 5105) from a sustained phonation of the vowel /a/. These included eight categories of the 34 parameters. Aerodynamic characteristics were analyzed with PAS (Model 6600) while producing /pa/. These included mean SPL, mean pitch, target airflow, mean airflow, mean peak air pressure, aerodynamic resistance, and aerodynamic efficiency. The means and standard deviations of these data were obtained and those were compared by gender.

Results: Among MDVP categories, Fundamental Frequency Parameters and Frequency Perturbation Parameters were significantly different by gender. And other parameters were not significantly different by gender. In addition, Fundamental Frequency Parameters of our data were remarkably different from the data suggested in the MDVP program which currently used in clinics. With PAS results, mean pitch, target airflow, mean airflow, aerodynamic resistance, and aerodynamic efficiency were significantly different by gender, however, there were no significant different in mean SPL and mean peak air pressure by gender.

Conclusion: The data obtained from the current study can be effectively used for the diagnosis of voice disorders as the standard acoustic and aerodynamic parameter values of Korean adults.

Jaeock Kim, Ph.D., Assistant Professor, Kangnam University, Korea, 111 Gugal-dong Giheung-gu, Yongin-si Gyeonggi-do Korea 446-702, 82-31-280-3221, jaeock@gmail.com

Anxiety and Depression in Voice Disorders: Causes or Consequences?

Voice disorders can be associated with laryngeal discomfort, fatigue, and impairment of social and/or occupational functioning. While voice disorders may cause psychological distress, it has also been speculated that such distress might contribute to the formation of certain voice disorders. Currently, it is not known whether psychological features such as depression and anxiety should be viewed as causal, concomitant, or outcomes. This investigation addressed two research questions regarding the voice-psychology relationship: (1) Do voice disordered groups differ on measures of psychological distress (i.e., anxiety and depression), (2) Is the presence and degree of depression and anxiety related to the level of vocal handicap? 169 women from four voice disordered groups (Functional Dysphonia (FD), n=45; Vocal Nodules (VN), n=37; Adductor Spasmodic Dysphonia (ADSD), n=35; Unilateral vocal fold paralysis (UVFP), n=15) and a non-voice disordered otolaryngology control group (n=37), participated in this study. All subjects completed self-report questionnaires designed to assess levels of depression, anxiety, and vocal disability. The Beck Depression Inventory (BDI; Beck, 1993), the State-Trait Anxiety Inventory (STAII-Trait; Spielberger, et al., 1983), and the Multicomponent Anxiety Inventory IV (MCA IV) were administered along with a measure of voice-related handicap. Although the voice disordered groups did not differ substantially from one another on the voice-related handicap scale, significant differences between groups on psychological distress measures were found. The group with FD reported the highest levels of depression and anxiety, yet these affective problems were unrelated to their level of vocal disability. Based upon the results, it appears that in FD depression and anxiety might be more accurately interpreted as contributing to the voice disorder, rather than as consequences.

Nelson Roy, Ph.D., Associate Professor, The University of Utah, Dept. of Communication Sciences and Disorders, 390 South 1530 East, Salt Lake City, UT 84112, (801) 585-0428, nelson.roy@health.utah.edu

Diane Bless, Ph.D., Professor, The University of Wisconsin-Madison, Div. of Otolaryngology-Head and Neck Surgery, University of Wisconsin-Madison, K4/709 Clinical Science Center, Madison, WI, (608) 262-5300, bless@surgery.wisc.edu

Short-Term Outcome Measurements of Vocal Hygiene Program and Resonant Voice Therapy for Hyperfunctional Voice Disordered Patients

Objectives. The purpose of the study is to investigate short-term outcome of vocal hygiene program and resonant voice therapy on vocal function, communication function, voice self report, and life quality for hyperfunctional voice disordered patients. **Study design.** A prospective study was designed for this research. **Methods.** Twenty-four hyperfunctional voice disordered patients were randomly assigned into 3 groups: 1) vocal hygiene group (VH group); 2) resonant voice therapy group (RVT group); and 3) placebo group. All subjects received vocal function, communication function, voice self report, and life quality evaluations before and 2 weeks after treatment. Two-way ANOVA repeated measurement、Post Hoc Scheffe、 and paired-t test were used for statistical analysis. **Results.** The severity of resonance and glottal fry, and jitter value for RVT group were significantly reduced after treatment. Self-reported voice severity for placebo group was significantly reduced after treatment. The score of physical scale and functional scale in Voice Handicap Index for VH group was significantly reduced after treatment. The score of total scale of VHI for VH group and RVT group was significantly reduced after treatment. No significant difference was found in life quality among groups and treatments. **Conclusions.** Both resonant voice therapy and vocal hygiene program can improve communication function for hyperfunctional voice disordered patients. Resonant voice therapy can further improve voice characteristics and vocal function for the patients. Long term follow up of the subjects could provide evidence for the maintenance effects.

Sheng Hwa Chen, Ph.D., CCC-SLP, Professor and Dean of Academic Affairs, Dept of Speech and Hearing Disorders and Sciences, National Taipei College of Nursing, #89, Nei-Chiang Street, Wanhua 108, Taipei, Taiwan, +886-2-28227101 ext 2300, shchen@ntcn.edu.tw

Tzu-Yu Hsiao, M.D., Ph.D., Professor and Attending Physician, Department of Otolaryngology, National Taiwan University, #7, Chung ShanSouth Road, Taipei, Taiwan, +886-2-23123456 ext 65214, tyhsiao@ntu.edu.tw

Cheng-Chien Yang, M.D., Attending Physician, Department of Otolaryngology, Mackay Memorial Hospital, #92, Section2, Chung Shan North Road, Taipei, Taiwan, +886-2-25433535 ext 2308, s120185@ms2.mmh.org.tw

Ching-Wen Chang, M.S., Speech-Language Pathologist, Department of Otolaryngology, Mackay Memorial Hospital, #92, Section2, Chung Shan North Road
Taipei, Taiwan, +886-2-25433535 ext 2308, chinwen7@hotmail.com

Yuh-Yu Lin, M.A., Speech-Language Pathologist, Department of Rehabilitation Medicine, National Taiwan University Hospital, #7, Chung ShanSouth Road
Taipei, Taiwan, +886-2-23123456 ext 66764, yuhulin@hotmail.com

Shu-Chiung Chiang, Ph.D., Biostatistician, Department of Informatics, Veterans General Hospital-Taipei, #201, Section2, Shih-Pei Road, Peitou, Taipei, Taiwan, +886-2-28757264 ext 358, scchiang@vgthpe.gov.tw

Using Self-Report Measures to Screen Voice Disorders in Student Performers

Tanya Eadie, PhD, Martin Nevdahl, MS, Tiffany Ackerman, BS, Devon Sawin, & Albert Merati, MD

Objectives/Hypothesis: Beginning theater students are at increased risk for voice disorders due to increased vocal demands, lack of training, and may be inexperienced in protecting their voices in vocally demanding parts. One non-invasive method of screening voice difficulties is through self-report measures. While results from individual questionnaires are not strongly predictive of pathology, it is unknown whether combined information could be used to predict voice disorders and used as a screening tool. The purpose of this study is to determine whether demographic factors and self-report measures could be used to predict voice disorders in a group of beginning students of classical and musical theater.

Study Design: Exploratory.

Methods: One hundred seventeen incoming students at a performing arts college provided demographic information about vocal hygiene and use, attitudes about voice and healthcare, self-rated voice quality, and completed the *Voice Handicap Index*, *Reflux Symptom Index*, and *Glottal Function Index*. All individuals then underwent standard voice evaluation, including videostroboscopy. Exams were reviewed by an experienced laryngologist to diagnose any occurrences of vocal pathology.

Results: Demographic variables as well as results from the self-report measures are currently being analyzed. Mean values will be entered into a linear regression model to determine significant predictors of vocal pathology. Sensitivity, specificity, and likelihood ratios will be calculated to determine whether the selected non-invasive measures can be used to predict voice disorders in this group.

Conclusions: Results will reveal whether non-invasive measures can be used to predict voice disorders, and may reveal possible screening methods for beginning performers.

Tanya Eadie, PhD, Associate Professor, University of Washington, 1417 NE 42nd St., Seattle, WA 98105, (206) 616-2753, teadie@uw.edu

Martin Nevdahl, MS, Lecturer, University of Washington, 1417 NE 42nd St., Seattle, WA 98105, (206) 543-3384, mnevdahl@uw.edu

Tiffany Ackerman, BS, Graduate Student, University of Washington, 1417 NE 42nd St., Seattle, WA 98105, (206) 616-0312, tackerma@uw.edu

Devon Sawin, Undergraduate Student, University of Washington, 1417 NE 42nd St., Seattle, WA 98105, (206) 616-0312, sawind@uw.edu

Albert Merati, MD, Associate Professor, University of Washington, 1959 NE Pacific St., Seattle, WA 98195, (206) 543-5662, amerati@uw.edu

Ref#: SLP-P7

The Effect of Expiratory Muscle Strength Training with Choral Singers

Reynolds, Traci & Wingate, Judith M.

The purpose of the study was to determine the effect of strengthening the expiratory musculature on the pitch range and intensity control for a cohort of amateur choral singers. A total of 19 choral singers, currently active in choirs and not receiving individual voice lessons, were recruited for the study. Ages of participants ranged from 18 to 74 years. Pre and post treatment measures included a modified phonetogram measuring 10% intervals across the phonation range (LeBorgne & Weinrich, 2002), maximum phonation times for low, mid, and high pitches, maximum expiratory pressures, and a rating of effort to sing. Participants were assigned randomly to an EMST or sham training group (control). The sham trainer was identical to the expiratory muscle strength trainer but lacked the pressure threshold component of the device. Seven participants received sham trainers and 13 completed EMST training. Post-training results showed increases in MEP's for the EMST group as well as increases in maximum phonation times and minimum and maximum intensity.

Judith M. Wingate, PhD, Clinical Associate Professor, University of Florida, PO Box 117420, Gainesville, FL 32611, (352) 273-3737, wingate@ufl.edu

Traci Reynolds, B.A., University of Florida, PO Box 117420, Gainesville, FL 32611, tracir@ufl.edu

Long Term Results of Transcutaneous Injection Medialization for Unilateral Vocal Fold Paralysis

The purpose of this study is to determine the duration of response after transcutaneous injection medialization for a unilateral vocal fold paralysis (UVFP) and to determine factors associated with need for repeat injections. Retrospective review of the medical charts of patients with UVFP that underwent an injection medialization from 2001-2008 and had a minimum of 6 months follow-up were included for study. 84 patients met full criteria for inclusion and were divided into two groups based on re-injection rate: Group 1 (1 injection) and Group 2 (>1 injection). Both groups were then compared for outcome measures including: demographic factors (age, gender), side of paralysis, etiology of paralysis (idiopathic, iatrogenic, other), type of injection (Cymetra or Radiesse), timing of injection (early: ≤ 6 months; late: > 6 months), degree of glottal closure pre- vs. post-injection, and quality of life (Voice Handicap Index). The results of this study indicate that 58.3% required only one injection while 41.7% required multiple injections. Participants requiring only one injection rated their VHI total at 40.84, while those requiring more than one injection rated their VHI total at 41.79, yielding no statistical difference. Total number of injections was also not statistically significant to whether patients were injected early or late. Injection medialization via a transcutaneous approach has long-lasting results making it an appropriate minimally invasive option for long-term medialization of UVFP.

Mario A. Landera, M.A., Speech Pathologist, University of Miami, 1475 NW 12 Avenue, Suite 4025, Miami, FL 33136, (305) 243-9479, MLandera@med.miami.edu

Donna S. Lundy, Ph.D., Associate Professor, Speech Pathologist, University of Miami, 1475 NW 12 Avenue, Suite 4025, Miami, FL 33136, (305) 243-4315, DLundy@med.miami.edu

Roy R. Casiano, M.D., Professor, Otolaryngologist, University of Miami, 1475 NW 12 Avenue, Suite 4025, Miami, FL 33136, (305) 243-4756, RCasiano@med.miami.edu

F0 Changes in Teachers in Comparison with Normative Data

Introduction: Risk of voice disorder increases due to over using voice as in all professional voice users like teachers. It seems that most of them are not aware of this probability or it doesn't make sense to them. If we accept these facts it is presumed that their acoustics characteristics of voice like F0, intensity, range, and so others are deviant from normal.

Methods: We gathered 373 voice samples of school female teachers and compare some of their voice characteristics (F0, F0 RANGE) with some existence normative data. They read a Persian standard text and analyzed the sample by DOCTOR SPEECH program.

Results: Mean of F0 and F0 Range in group 2(average of age 34.5) group 3 (average of age 44.5) and group 4 (average of age 54.5) are significantly different from normal ($p<0.05$), but in group 1 (average of age 24.5) it doesn't.

Conclusion: we find that by increasing the job acquaintance as well as age increased in these groups of female teachers' f0 and f0 range differed from normal. This is very important to consider that it can be the signs of a closet voice disorders; it is so clear that voice disorders are very stressful for them and a menace for their job.

Maryam Fahaam, MSc, Speech Language Pathologist, Shiraz University of Medical Sciences, Iran-Shiraz-Chamran Blvd-Abiverdi 1, Rehabilitation Faculty (Daneshkade Tavanbakhshi), 00989126709404, mfaham@sums.ac.ir

Nahid Jalilevand, MSc, Speech and Language Pathologist, Iran University of Medical Sciences, Iran-Tehran-Mirdamad Ave., 0098-21-22225556, nahidjalilevand@yahoo.com

Farhad Torabi Nejad, PhD Student, Speech Language Pathologist, Iran University of Medical Sciences, 0098-21-22225556

Baharak Baranaian, MSc Student, Speech Language Pathologist, University of Sheffield, 17A Park Road-Bingley-Bradford-West, Yorkshire-UK BD164Bd, 0044-7522933179, Baharak_baranian@yahoo.com

Hyper-Formant Acoustical Presence in Classically Trained Singers

David Okerlund, Director
Graduate Vocal Pedagogy Program
Assistant Professor of Voice
College of Music
Florida State University
September 15, 2009

ABSTRACT

The purpose of this investigation is to determine whether open throated/low laryngeal singing produces stronger harmonic amplitudes in the 5 to 20 kHz range. 20 male and female singers, ranging in experience from undergraduate to professional will be utilized for this study. The increased amplitude of these higher harmonics should present, as a result of this open throated/low laryngeal approach to singing. This investigation could provide definitive results in support of the lower laryngeal/open throated approach to create the sound of classical/operatic singing.

METHOD

Each singer will stand exactly 5 feet from the AKG 414 XLII condenser microphones and follow these instructions:

- 1) Provide a sound sample that lasts four to five seconds.
- 2) Sing an [a] vowel in the three registers of the voice; chest, middle and head.
- 3) Sing an [a] vowel at *pianissimo*, *mezzoforte* and *fortissimo* in each of the aforementioned registers.
- 4) Sing each example with an open深深/low laryngeal position and a shallow/closed/high laryngeal position.

DISCUSSION

The spectral differences between a low laryngeal and a high laryngeal approach to singing should become quite clear. Both approaches should have hyper-formants present in their harmonic spectra. The strengths of these hyper-formants should be significantly enhanced by the lower laryngeal placement. It is anticipated that future research involving magnetic resonance imaging will render visual data in support of these findings.

David Okerlund, B.M., M.M. Voice Performance, Director of Graduate Vocal Pedagogy, Assistant Professor of Voice, Florida State University, 132 N. Copeland Ave, (850) 645-6821, dokerlund@fsu.edu

Acoustic Analysis of Teacher's Voice – Pre and Post Teaching Circumstances

BACKGROUND: In India, with a population of about 500 million, the total number of teachers working at elementary schools accounts to approximately two million. They are often victims of voice abuse and misuse since they speak continuously for long hours and loudly in order to overcome poor acoustic conditions. They have an increased risk of developing voice disorders.

AIM: The current study considers the acoustic variables of one day's work duration of the teachers and compares their voice in the beginning and at the end of a typical working day.

METHOD: 25 elementary school teachers, (15 females; 10 males); mean age 29.3 years volunteered as subjects. They had professional experience of 10-12 years, taking regular classes for 6 hours a day with 1 hour break after 3 hours of teaching. None reported presence of any speech, hearing or psychological problems. Before and after a working day, (1) conversation for 3 minutes, (2) phonation of /a:/, and (3) utterance of a sentence "May god Bless the world" in English were recorded. The recorded sample was digitized with quantization level set at 16 bits and at sampling rate of 44100 Hz and was analyzed using Praat voice recorder and analysis software (5.0.17 Version for pitch (Mean, Minimum, and Maximum), perturbation (jitter and shimmer), number of voice breaks, and mean harmonic to noise ratio.

RESULTS: After a working day, shimmer, number of voice breaks (except for slogan repetition in males), and jitter (except for slogan repetition in males as well as females) showed no significant differences. Whereas mean pitch, minimum pitch, maximum pitch and mean harmonic to noise ratio showed significant difference (except for slogan repetition in males) when compared to the voice sample taken before work.). Hence these factors should be kept in mind when working upon teacher's vocal hygiene program.

Mathew Kuruvilla, BASLP (Intern), Mangalore University, DR. M. V. St. College of Speech and Hearing, 09886436084, kuruvillathykuttathi1986@yahoo.com

Ann Alexander Swathy, BASLP (Intern), Mangalore University, DR. M. V. St. College of Speech and Hearing, 09886436084, swathyann1988@yahoo.com

Shetty Parinitha, BASLP (Intern), Mangalore University, DR. M. V. St. College of Speech and Hearing, 09886436084

T A Subbarao, Phd, Professor & Principal, Dr.M V Shetty College of Speech and Hearing., Maladi Courts, Kavoor, Mangalore-575 015, Karnataka, India, +91 9448043096, subbaraota@yahoo.com

The Meaning of Ecological Mental Processes and Programs in Voice Production – Voice Coaching Future Pre-School Teachers

This presentation aims to introduce elements of mental processes and strategies and their meaning as important factors in ecological voice production and to outline voice coaching tools used in voice education in teacher training. There has been much research on physical aspects of caring for the professional voice. In this presentation I would like to focus on mental aspects of voice production.

It's important to become aware of one's mental strategies in voice production and to be aware of how ecological these programs are. I have gathered research material since 1996 while developing voice training courses as my work as music lecturer. One useful tool in my work has been Neuro -Linguistic Programming.

Thinking leads the human voice production. Important in our thinking are the beliefs which lead action. One important goal in my work as a voice coach is to help the teacher students to reframe their beliefs to become more ecological. Language is one tool to open and change these beliefs. According to Robert Dilts (1998) "language is in some ways a product of the nervous system , but language also stimulates and shapes the activity within our nervous systems" (Dilts 1998, 3).

Raija Perko, MA, Music Lecturer, University of Jyväskylä, P.O.Box 35, 400014 University of Jyväskylä, FINLAND, raija.perko@jyu.fi

**Music Theater Vocal Pedagogy and Styles:
An Introductory Teaching Guide for Experienced Classical Singing Teachers**

The purpose of the guide is to introduce experienced classical singing teachers to music theater vocal pedagogy and styles. Most singing teachers in music theater degree programs are classically trained since the music theater degree and training for the associated pedagogy did not exist until the early 1970s. While music theater singing can trace its roots to classical singing, the pedagogy necessary to sing music theater repertoire is significantly different from classical vocal pedagogy. Therefore, an introductory guide for teaching music theater vocal pedagogy and styles for the experienced teacher is needed. Before developing the guide, the current scientific and perceptual research on music theater mix/belt singing and styles was gathered. To aid the classical teachers in learning about music theater vocal pedagogy and styles, the guide details the results of the pedagogical research on mix/belt singing and compares and contrasts the pedagogy to classical singing. The styles found in music theater singing are named and defined. The introductory guide underwent a formative and summative evaluation. In the formative evaluation, two music theater singing teacher experts (Robert Edwin and Mary Saunders) reviewed the guide. Their suggestions for improvement were added to the guide. Three experienced classical teachers were given the updated guide, which constituted the summative evaluation portion of the research. The two experts and the three classical teachers found the guide to be an effective training tool for beginning to teach music theater vocal pedagogy and styles.

Karen S. Hall, Ed.D., M.M., B.M., Assistant Professor, The University of North Carolina at Pembroke, 1 University Drive, Pembroke, NC 28372, (910) 775-4384,
hallkarens@yahoo.com

Are We Forgetting Something?

Steps in a learning process should be presented in the correct order, with no steps skipped. It is my hypothesis that in the fields of voice pedagogy, speech therapy, and voice science a step is missing.

In conversations during the 2007 symposium voice pedagogues, speech-language pathologists, speech therapists, voice scientists, physicians, and singers were unfamiliar with the concept of employing non-lingual consonants articulations accomplished without using the tongue as a training tool. Non-lingual consonants are an intermediate step between teaching vowels and lingual consonant articulations, allowing the brain to realize that articulation can happen without extraneous jaw and tongue tension.

Many, if not most, functional vocal problems come from unnecessary tension and/or tension in unnecessary systems. Many vocal problems arise from a tight tongue. Many cannot even phonate without engaging the tongue. If those clients have just mastered a freer vowel production, would it not be a logical step to approach articulation without tongue involvement before letting the tongue get involved?

Although not presented at the time, this abstract was originally submitted and accepted for the 2008 Voice Foundation Symposium. The author has since used the concepts and techniques to be presented in the rehabilitation of a student who, after awakening from an eighteen-month coma resulting from a traumatic brain injury, has had to relearn motor coordination of all phonation and articulation processes. This case will elucidate the progression of steps in the use of non-lingual consonants to train both normal and challenged voices.

For Author's CV go to <http://users.arczip.com/voxnaturalis/info/cv.html>

Marty Heresniak, B.M., M.M., Private Studio Teacher, 502 University Avenue #1L, Ithaca, NY 14850, (607) 272-2892, voxnaturalis@alumni.ithaca.edu

Ref#: VP8

**(Author also suggests this could be an SLP abstract)

Motor Learning Principles and Vocal Pedagogy

The principles of motor learning have proven very useful in their applications to the teaching and learning of a variety of tasks requiring various types of coordinated physical movement. The successful combination of these coordinated physical movements is necessary for skilled performances. The vocal pedagogy and vocal performance domains are no exception to the reality of and necessity for the learning of skilled movements. The bases upon which these principles are built may be applicable to the type of motor learning necessary for skilled vocal performance, and it is important to consider the wealth of information available in this domain and to determine which, if any, of the principles can or should be attempted in the voice studio.

I would like to present a special topics session covering the basic principles of motor learning and how these can be applied to both voice production (in the voice studio or in voice therapy) and voice perception (to increase the independence and validity with which individuals can judge their own vocal productions as well as others). There is a vast amount of research demonstrating the effectiveness of these principles for other types of physical training, and recent studies have confirmed and expanded the application of motor learning to both the physical and cognitive learning domains.

Some of the principles that are most relevant to the voice studio or voice therapy include the differentiation of skill acquisition from true learning, practice models and methods (within the lesson or therapy session), scheduling of lessons or sessions, “part” vs. “whole” practice, closed vs. open tasks, and constant vs. variable practice. Other concepts that would be covered include the contextual interference effect, the forgetting and reconstructing hypothesis, augmented feedback, “errorful” vs. “errorless” learning, and knowledge of results vs. knowledge of performance. Finally, the possibility of predicting individual differences in skill acquisition (e.g. vocal performance acuity) would be presented.

This session could either be a stand-alone presentation, or I could be the moderator (and presenter) for a series of presentations that would be focused on this topic.

Christine Bergan, M.M., M.A., Ph.D., CCC-SLP, Program Director and Assist. Professor, Stephen F. Austin State University, P.O. Box 13019, SFA Station, (936) 468-1337, (319) 530-7469,
berganc@sfasu.edu