Title: ***BREATHING FOR WESTERN-CLASSICAL SINGING IN TWO BODY POSITIONS***
Category: Basic Science

Abstract:

Objective: Objective: To study breathing during speaking and singing tasks in the upright and the supine body positions in experienced western-classical (WC) singers. Sarah Billinghurst, assistant-general manager for artistic affairs at the Metropolitan Opera was quoted as saying "A lot of people sing lying down these days in the opera" (The New Yorker, March 2, 2009). The influence of gravity on the breathing apparatus affects breathing for singing quite differently in the two body positions, requiring different mechanical and neural-control solutions.

Methods: Seven singers were studied, with classical-voice training ranging from 5 to over 10 years. Respiratory-kinematic and EMG data were recorded and analyzed for breathing, speaking, and singing two songs of contrasting tempos in the upright and supine body positions.

Results: Results: Rib cage contribution to lung volume change and abdominal EMG data for breathing and speaking in 2 body positions were similar to data reported searlier (e.g., Hixon, et al., JSHR, 1973; Hoit et al., JAP, 1988). Singing in the supine body position used more rib cage contribution for lung volume change and proportionally greater EMG activity than what would have been predicted from the supine breathing and speaking data.

Conclusions: The demands of WC singing in the supine body position require the mechanical advantage of the rib cage to finely control breath energy and the higher abdominal EMG values relative to speech, reflect the abdomen's role of providing a base for the rib cage to develop efficient pressure generation.

Authors:

Peter Watson Lisa Butcher Gina Cruciani	

Title: ***GLOTTAL ATTACK TIME AND GLOTTAL OFFSET TIME COMPARISON BETWEEN VOCALLY NORMAL SPEAKERS AND PATIENTS WITH ADDUCTOR SPASMODIC DYSPHONIA DURING CONNECTED SPEECH***
Category: Basic Science

Abstract:

Objective: Adductor spasmodic dysphonia (AdSD) is a neurological disorder that affects the laryngeal muscles and interferes with vocal fold vibrations and voice production during speech. In this study, high-speed videoendoscopy (HSV) was used to compare the glottal attack time (GAT) and glottal offset time (GOT) between norm and AdSD during production of connected speech.

Methods: A high-speed monochrome camera coupled with a flexible fiberoptic endoscope was used to record readings of six CAPE-V sentences and the "Rainbow Passage" from vocally normal adults and patients with AdSD at 4,000 frames per second. Audio recordings collected simultaneously with the HSV data were used to transcribe the recordings into phonemes and words. Three raters analyzed the data visually using a specialized video software to measure GAT (as the time difference between the initial oscillation and initial contact of the vocal folds during the vocalization onset) and GOT (as the time difference between the last contact and last oscillation) from the HSV recordings.

Results: The raters measured the GAT and GOT for each phoneme and word. The measurements were done successfully with high inter-rater reliability. The raters were able to establish consensus after comparing their differing measures. GAT and GOT for the different phonemes and words were compared between vocally normal participants and those with AdSD.

Acknowledgments: We acknowledge the support from NIH/NIDCD, K01DC017751 "Studying the Laryngeal Mechanisms Underlying Dysphonia in Connected Speech," Michigan State University Discretionary Funding Initiative, Trifecta Initiative Matching Funds Award, and Sandi Smith Research Fellowship.

Authors:

Maryam Naghibolhosseini Nicole Heinz Corinne Brown Farrah Levesque Stephanie Zacharias	Dimitar Deliyski

Title: ***CHARACTERIZATION OF SOURCE-FILTER INTERACTIONS IN VOCAL VIBRATO USING NECK-SURFACE ACCELEROMETRY***
Category: Basic Science

Abstract:

Objective: Vocal vibrato is a singing technique that involves modulation of fundamental frequency (f_o) and intensity. Although the primary source of f_o modulation is oscillation within the larynx, both laryngeal and vocal tract oscillation may contribute to intensity modulation due to the interactions of the laryngeal source and vocal tract filter. Unlike typical acoustic and aerodynamic measures, neck-surface accelerometry captures the source features prior to vocal tract filtering. Therefore, the purpose of this study was to examine the relationship between the extent and rate of f_o and intensity modulation in simultaneously collected microphone and accelerometer recordings to investigate the source-filter interactions in vibrato.

Methods: Nine classically-trained singers produced sustained vowels with vibrato. Simultaneous audio recordings were collected using a head-mounted microphone and a neck-surface accelerometer. Praat scripts were used to analyze the extent and rate of f_oand intensity modulation. Data were analyzed using related-samples Wilcoxon signed-rank tests in SPSS.

Results: The rate of intensity modulation was significantly higher in the microphone signal than the accelerometer signal (p=0.008). Although the extent of intensity modulation in the microphone and accelerometer signals was not significantly different on average, five singers' extents differed between microphone and accelerometer signals. The higher rate of intensity modulation in the microphone signal reflects the interaction of the laryngeal source and vocal tract filter in vibrato. Further investigation is warranted to determine if disparate patterns in the extent of intensity modulation in the microphone and accelerometer signals might be related to physiological differences in laryngeal and vocal tract involvement in vibrato.

Authors:

Rosemary Lester-Smith Elaina Derrick Charles Larson	

Title: ***EFFECT OF INTERFERENTIAL CURRENT STIMULATION TO THE NECK ON VOCALIZATION IN GUINEA PIGS***

Category: Basic Science

Abstract:

Objective: The attenuation of the sensory afferents of the larynx due to the botulinum toxin therapy and the type 2 thyroplasty can decrease spasmodic vocal fold adduction during vocalization in patients with spasmodic dysphonia. This sensory afferent feedback mechanism underlying vocal control can be attributed, at least in part, to the sensorimotor configuration of the vocal pathway in the brainstem. To reveal the laryngeal afferent feedback mechanisms that govern vocal motor control, we aim to investigate the effects of the sensory afferent modulation in the larynx during vocalization. We thus recorded the changes in the acoustic features of voice and the respiratory muscle activities during brainstem vocalization in response to the interferential current stimulation to the neck, which can stimulate laryngeal sensory afferents without pain and muscle movements, in guinea pigs.

Methods: Vocalization was induced by electrical stimulation to the brainstem vocal pathway in decerebrate guinea pigs and was recorded using a microphone. The activities of the external oblique muscle and diaphragm were also recorded. The Ag-AgCl ball electrodes were diagonally placed in the skin across the larynx to deliver the interferential current. The voice and the muscle activities were compared before and during the current stimulation.

Results: The pitch, amplitudes, and durations were altered by the interferential current stimulation to the neck, depending on the current intensities. Besides, vocal-related respiratory muscle activities were also influenced by the stimulation. The laryngeal sensory stimulation can modulate the acoustic features and the vocal motor patterns in a specific manner.

Authors:

Yoichiro Sugiyama Mami Kaneko Shigeru Hirano	

Title: ***AUTOMATED GLOTTIS OBSTRUCTION DETECTION IN HIGH-SPEED VIDEOENDOSCOPY DURING CONNECTED SPEECH FOR PATIENTS WITH ADDUCTOR SPASMODIC DYSPHONIA***
Category: Basic Science

Abstract:

Objective: Objective: Adductor spasmodic dysphonia (AdSD) affects the intrinsic laryngeal muscle control. AdSD reveals only during connected speech. High-speed videoendoscopy (HSV) coupled with a flexible fiberoptic endoscope provides a unique opportunity to study voice production in AdSD during running speech. The goal of this study is to automatically detect instances, during which the glottis is obstructed on the HSV images obtained during connected speech.

Methods: Methods: HSV and acoustic data were recorded simultaneously from vocally normal adults and patients with AdSD during reading of the "Rainbow Passage" and six CAPE-V sentences. The vocalized segments of the HSV data were extracted using a gradient-based image-processing approach. The glottis obstructions were detected automatically through analyzing the pixel intensities of the HSV data. The automated data were validated against manual analysis performed using a specialized playback software by three raters.

Results: Results and Conclusions: The developed algorithm was successful in the automated detection of the glottis obstructions in connected speech, in norm and AdSD, and demonstrated excellent agreement with the manual analysis of the data by the raters. The proposed algorithm can be used to determine the phonemes and words, during which HSV can be recorded with an unobstructed view of the vocal folds. This knowledge is crucial for developing optimal passages for precision HSV examination during connected speech and subject-specific clinical voice assessment protocols.

Acknowledgments: We acknowledge the support from NIH/NIDCD, K01DC017751 "Studying the Laryngeal Mechanisms Underlying Dysphonia in Connected Speech," Michigan State University Discretionary Funding Initiative, and Trifecta Initiative Matching Funds Award.

Authors:

Ahmed Yousef Dimitar Deliyski Stephanie Zacharias Maryam Naghibolhosseini	

Title: ***CONTROL OF THE PRE-PHONATORY VOCAL FOLD POSTURE IN THE LARYNX MODEL SYNTHVOICE***
Category: Basic Science

Abstract:

Objective: The basic aim of synthetic larynx models is to reproduce the phonation process and to enable a detailed analysis of the phonation process. Thus, we develop the synthetic larynx model SynthVOICE that incorporates the control of the pre-phonatory posture (ad-/abduction) and the elongation of the vocal folds (VFs). Thus, physiological and pathological phonation characteristics can be produced similar to dysfunctions of the muscular and nerval control such as muscle tension dysphonia.

Methods: The model is composed of a cylindrical part mimicking the thyroid cartilage, the VFs and five manipulator devices to control the pre-phonatory VF posture. Both, single- and three-layer VF models are used that consist of silicone. The pre-phonatory settings are computer-controlled by seven linear and two rotational electromechanical traverse tables to adjust the glottal gap and the pretension of the VFs. On top of the synthetic larynx, a simplified vocal tract model is placed that is based on physiological MRI data from six tenor singers who phonated the vowel /a/.

Results: The SynthVOICE model showed the characteristic behavior of symmetric and asymmetric VF posture regarding the onset pressure and the oscillation frequency. Acoustically, the sound signal exhibited the harmonic components of the fundamental frequency and the first two formants corresponding to the vowel /a/ for all applied vocal tract models.

This model enables a detailed analysis of the VF vibration, the flow field and the sound signal. Furthermore, the electromechanical control allows the continuous passage between different VF posturing settings.

Authors:

Stefan Kniesburges Reinhard Veltrup Matthias Echternach Michael Döllinger Anne Schützenberger	

Title: ***DEPTH OF ENDOSCOPE INSERTION INTO THE MOUTH: DERIVING THE MOUTH-TO-MICROPHONE DISTANCE FOR REPORTING SOUND PRESSURE LEVELS OF VOICE IN RIGID LARYNGOSCOPY***
Category: Basic Science

Abstract:

Objective: During rigid laryngoscopy, sound pressure level (SPL) of voice is mostly monitored using a microphone connected to the laryngoscope. The measured SPLs are, however, of limited use without knowing the mouth-to-microphone distance. This study aims at determining the normative values for deriving this distance from the depth of insertion of the rigid endoscope into the mouth.

Methods: Side photographs of 40 adult women and 40 adult men undergoing laryngeal examination were obtained. 90dg rigid laryngoscope with an integrated microphone was employed for laryngoscopy. The ImageJ software was used to derive the depth of laryngoscope insertion into the mouth from the photographs using the known length of the laryngoscope as the reference.

Results: The average depth of insertion of the rigid scope into the oral cavity up to the upper lip edge was 9,4 ± 0,7 cm in men and 8,7 ± 0,6 cm in women. The male-female difference was statistically significant. At the average microphone distance of 8,2 cm from the upper lip, as was the case for our endoscope-integrated microphone, the inter-individual distance variability of ± 1,4 cm (95 % confidence interval) reveal the theoretical uncertainty of the measured SPL values in the range of <-1,7; +1,4> dB.

The normative values reported above can be used for determining the average mouth-to-microphone distance in rigid laryngoscopy once the distance of the microphone from the end of the laryngoscope is known. Reporting the mouth-to-microphone distance is important so that the measured SPL values are meaningful, reproducible and comparable among different clinical sites.

Authors:

Jan Svec Dominika Valaskova Jitka Vydrova	

Title: ***INFLUENCE OF VOWEL QUALITY CHANGES ON VOCAL FOLD OSCILLATION PATTERNS***
Category: Basic Science

Abstract:

Objective: Previous theoretical work suggests that the vocal tract can interact with the voice source in a non-linear fashion. However, there are only few studies analysing this theory in vivo.

Methods: 12 professional classical singers (6 females and males each) were asked to produce sustained vibrato-free phonations on pitch D4 (ca. 294 Hz) while changing the vowel quality from /i/ via /a/ and /u/ back to /i/. The phonations were simultaneously documented with transnasal high speed videoendoscopy (20.000 fps), electroglottography (EGG), and audio recordings. Vocal tract formants (ƒFn) were estimated using a cepstral based method.

Results: Although the open quotient showed some increase for the /i-a/ and the /u-i/ transition, there were no clear effects for all participants at the expected crossings /i-a/ (2ƒo/ƒF1), /a-u/ (2ƒo/ƒF1) and /u-i/ (3ƒo or 4ƒo /ƒF2). However, at some perceptually events in the EGG signal, some subjects exhibited spontaneous ƒo adjustments and changes in the phonovibrogram, suggesting the occurrence of level 2 interactions during a crossover of nƒo and ƒFn. Also, there was the tendency for suppressed vocal vibrato at the vowel transitions in some of the subjects.

The data presented partially corroborates the notion that non-linear interactions between the vocal tract and the voice source may result in level-2 interactions. However, the lack of systematic occurrence of these level-2 interactions across all participants' phonations suggests that the influence of confounding factors, such as individual anatomical differences or individual fine-adjustments within the voice production musculature, may play a crucial role for the emergence of non-linear interaction effects.

Authors:

Matthias Echternach Donata Gellrich Brad Story Marie Köberlein Michael Döllinger	Christian Herbst

Title: ***3D-PRINTED SYNTHETIC VOCAL FOLD MODELS***
Category: Basic Science

Abstract:

Objective: Synthetic vocal fold (VF) models for studying the physics of voice production are comprised of silicone and fabricated using traditional casting manufacturing processes. The purpose of this study was to develop and demonstrate a new method of creating synthetic VF models through 3D printing to reduce fabrication time, decrease model failures during fabrication, and lay the foundation for creating models with more lifelike geometric, material, and vibratory properties.

Methods: A 3D printing technique based on embedding a UV-curable liquid silicone into a gel-like medium was selected and refined. Cubes were printed and subjected to tensile testing to characterize the material properties of silicone printed in this manner. Self-oscillating vocal fold models were then printed, coated with a thin layer of silicone representing the epithelium, and used in phonation tests to gather onset pressure, vibratory frequency, amplitude, and flow rate data.

Results: The cubes were found to exhibit different modulus values corresponding to the layer orientation of the printed material. This feature may be advantageous for future VF modeling efforts to print models with anisotropic features. The 3D-printed VF models self-oscillated and withstood the strains induced by phonation. Print parameters affected model vibration frequency and onset pressure. Their onset pressures were higher than what is found in human VFs. However, their frequencies were within a comparable range. The results demonstrate the effectiveness of 3D printing to fabricate synthetic VF models. It is anticipated that this approach will be further refined and used in future studies involving flow-induced vibratory characteristics of voice production.

Authors:

Ryan Romero Taylor Greenwood Clayton Young Serah Hatch Natalie Boehm	Mark Colton Scott Thomson

Title: ***COMPUTATIONAL NEUROMUSCULAR CONTROL OF INTRINSIC LARYNGEAL MUSCLES FOR VOICE PRODUCTION***
Category: Basic Science

Abstract:

Objective: Voice production is a highly complex, fine motor skill that requires the coordinated function of three major components: lungs, larynx, and sublaryngeal (trachea), and supralaryngeal (vocal tract) airways. The current study's objective was to develop a computational neuromuscular control system for the larynx with the lung pressure and the three intrinsic laryngeal muscle activations as output that control vocal fold posturing by assuming constant vocal tract shape during phonation.

Methods: A self-sustaining three-mass vocal fold model was used to approximate vocal fold movement. A constant /a/ vowel was used for the vocal tract shape. The neuromuscular control system tries to achieve four acoustic (fundamental frequency, sound pressure level, normalized spectral centroid, and signal-to-noise ratio) and four somatosensory (vocal fold length, longitudinal fiber stress in the mucosa, ligament, and thyroarytenoid muscle layers) targets. The artificial neural network-based control system comprises one feedforward controller and two feedback (auditory and somatosensory) controllers. Seven thousand targets were generated for training, and 3000 targets were used to test the control system's performance.

Results: The results suggested that the control system achieved the four acoustic and four somatosensory targets with high accuracy.

Authors:

Anil Palaparthi Rishi Alluri Ingo Titze	

Title: ***EXTERNAL VALIDITY OF CALIBRATED MEASUREMENTS FROM A LASER-PROJECTION TRANSNASAL FIBEROPTIC HIGH-SPEED VIDEOENDOSCOPY SYSTEM***
Category: Basic Science

Abstract:

Objective: Methods using laser-projection endoscopes allow for calibrated surface measurements. The design and evaluation of these methods are typically done in controlled settings, using benchtop recordings. However, many factors could be contributing to measurement errors from in-vivo images. This study investigates the effect of two such factors: imaging angle and surface topology.

Methods: A laser-projection fiberoptic flexible endoscope was calibrated using benchtop recordings from flat surfaces (i.e. paper), perpendicular to the optical axis. Two experiments were conducted to evaluate its performance in situations modelling the in-vivo settings. (1) Images were acquired from tilted surfaces. (2) A target surface with known x- ,y- ,z-coordinates was 3D-printed and its measurements accuracies were contrasted with the flat surface.

Results: Results: The data analysis showed a significant effect of imaging angle on vertical measurement error. However, the effect of imaging angle on the magnitude of horizontal measurement error was not significant. Analysis of the effect of surface topology showed the reverse effects. The effect of surface type on vertical measurement error was not significant. But the magnitude of horizontal measurements errors from the 3D surface was significantly higher than the flat surface. The mean percent magnitude of horizontal measurement error increased from 5% (flat) to 10.6% (3D) at the working distance of 15 mm, which still represents satisfactory accuracy.

Conclusion: This study showed that imaging angle and topology of the target surfaces could introduce significant errors in horizontal measurements without calibration. However, properly designed calibration methods could lead to robust measurements under such in-vivo variations.

Authors:

Hamzeh Ghasemzadeh Ali Imani Azad Dimitar Deliyski	

Title: ***POST-SURGERY CHANGES IN VOCAL FOLD CLOSING VELOCITY IN PATIENTS WITH MASS LESIONS***
Category: Basic Science

Abstract:

Objective: Vocal fold kinematic measures are important features that can aid in modeling the input, output, and parameters of the phonatory system. This study investigates the post-surgical changes in the closing velocity (CV) of the vocal folds (VF) during phonation in patients with VF mass lesions.

Methods: Transoral rigid high-speed videoendoscopy (HSV) from habitual pitch/loudness of sustained phonation from 16 subjects with benign VF mass lesions were recorded pre- and post-surgery, along with spatially calibrated intraoperative images. HSV recordings underwent temporal segmentation, motion compensation, spatial segmentation and spatial calibration processes. The pre-surgical HSV images were spatially calibrated by registering the lesions from the intraoperative images. The VF width from each calibrated pre-surgical HSV was selected, then registered to its corresponding post-surgical HSV to provide indirect spatial calibration. Three different experiments were conducted to investigate the: (1) post-surgical changes in CV, (2) differences in pre- and post-surgical left-right closing velocity symmetry, and (3) association between post-surgical changes in CV and lesion size.

Results: Results: (1) Significant post-surgery increases were found in the CV of the surgically-treated VF at multiple points throughout its length. The contralateral VF showed small non-significant improvement in the lesion contact area. (2) Closing velocity of the two VFs became more symmetric after surgery. (3) Post-surgical changes in CV and lesion size were not significantly correlated.

Conclusion: Closing velocity of the VFs changes significantly after surgery. The VF with the lesion removed exhibits improvement throughout its length, whereas the improvement for the contralateral VF is localized to the lesion contact area.

Authors:

Hamzeh Ghasemzadeh Dimitar Deliyski Robert Hillman Daryush Mehta Katherine Verdolini	

Title: ***EFFECT OF EPILARYNGEAL NARROWING ON THE PEAK VOCAL FOLD CONTACT PRESSURE DURING PHONATION***
Category: Basic Science

Abstract:

Objective: Objective: This study aims to investigates the interaction between epilaryngeal narrowing and laryngeal adjustments in minimizing the peak vocal fold contact pressure during phonation.

Methods: Methods/Design: Computational simulation of voice production was performed in a three-dimensional vocal fold model at different vocal fold conditions and epilaryngeal narrowing. These data were used to investigate changes in the peak contact pressure as a function of epilaryngeal narrowing, vocal fold approximation, vocal fold thickness, and subglottal pressure, for voice tasks either with a constant subglottal pressure or targeting a specific sound pressure level.

Results: Results and Conclusions: The results show that the peak contact pressure may increase or decrease with epilaryngeal narrowing, depending on a complex interaction between the vocal fold vertical thickness, initial glottal angle, and subglottal pressure. However, epilaryngeal narrowing also significantly increases vocal efficiency so that for a target sound pressure level, the peak contact pressure decreases with epilaryngeal narrowing. Overall, the peak contact pressure and respiratory effort can be minimized by epilaryngeal narrowing, adopting a small initial glottal angle, and an intermediate thickness of the vocal folds. [Work supported by NIH/NIDCD]

Authors:

Zhaoyan Zhang	

Title: ***EFFECTS OF COVARYING BREATHINESS AND ROUGHNESS ON DYSPHONIA SEVERITY IN NATURAL VOICES***
Category: Basic Science

Abstract:

Objective: Dysphonic voices typically covary across multiple voice quality (VQ) dimensions. Our prior research in highly-controlled synthetic stimuli revealed robust and complex interactions. While roughness impacted breathiness perception, especially at low and high levels of breathiness, breathiness had minimal impact on roughness perception. The current study seeks to determine whether or not similar interactions between breathiness and roughness exist in natural voices and their relationship to dysphonia severity.

Methods: A two-dimensional matrix of 16 dysphonic /a/ vowels were selected such that each VQ dimension (breathy and rough) was sampled on a 4-point severity scale (none, mild, moderate, and severe). Ten listeners evaluated 480 stimuli (16 stimuli x 10 repetitions x 3 trials) on one-dimensional magnitude estimation (1DME) tasks and a novel two-dimensional magnitude estimation (2DME) task that allowed for simultaneous measurement of breathiness and roughness. Listeners assigned a number between 1 and 1000 to reflect the perceived magnitudes of the vowels. Prior to the completion of ME tasks, listeners completed a loudness ME task to ensure the use of the full range of the scale.

Results: Data indicate high intra- and inter-rater reliability for both VQ in 2DME and 1DME tasks. Regression analyses revealed a strong correlation between 2DME and 1DME judgments for breathiness and roughness. Unlike the synthetic stimuli, covarying roughness or breathiness had minimal impact on perception of the other VQ in natural stimuli. An understanding and quantification of the perceptual interactions among VQ dimensions will aid in modifying computational models and in establishing validity of clinical scales for VQ perception.

Authors:

Supraja Anand Rahul Shrivastav David Eddins	

Title: ***SYSTEMATIC ANALYSIS OF PHONATION MODES IN SINGING VOICE USING GLOTTAL SOURCE FEATURES***
Category: Basic Science

Abstract:

Objective: Humans have an extraordinary capability to produce extensive variations in voice through the complex interaction between the glottal source (the glottal volume velocity waveform generated by the vocal folds) and the vocal tract. This flexibility allows humans to produce speech and singing voices ranging from verbal sounds to nonverbal sounds and to produce, for example, different types of phonation modes and different vocal emotions. The characteristics of the glottal source are of fundamental importance in the generation of these variations in voice. This study provides a systematic analysis of glottal source features and investigates their effectiveness in the discrimination of phonation mode (breathy, flow, modal and pressed) in singing voice. Unlike several previous investigations in the study area, the current study investigates glottal source features using not just one method but three different techniques (as described in Methods section).

Methods: In this study, glottal source features are extracted (1) using glottal flows estimated with the quasi-closed phase (QCP) glottal inverse filtering method, (2) using approximate glottal source signals computed with the zero frequency filtering (ZFF) method, and (3) using acoustic voice signals directly. The features computed using the QCP method involve time-domain parameters (e.g. the open quotient (OQ), the closing quotient (CQ), and the normalized amplitude quotient (NAQ)) and frequency-domain parameters (e.g., the harmonic richness factor (HRF), the difference between the fundamental and the first harmonic (H1-H2)). The features derived from the ZFF method consist of the strength of excitation (SoE), the energy of excitation (EoE), the loudness measure and the ZFF signal energy. The glottal source features derived from the acoustic voice signals directly include parameters such as the cepstral peak prominence (CPP), the maximum dispersion quotient (MDQ), the peak slope (PS) and the Rd shape parameter. Statistical analyses of these features are carried out using ANOVAs and box plots.

Results: TBD

Acknowledgments: This study was funded by the Academy of Finland (Project No. 312490 and 330139).

Authors:

Sudarsana Reddy Kadiri Johan Sundberg Paavo Alku	

Title: ***CLOSURE OF THE POSTERIOR GLOTTIS DURING SINGING: TRUE OR NOT?***
Category: Basic Science

Abstract:

Objective: Objective: It is believed that complete closure of the posterior glottis is a prerequisite for professional singers. In particular, men are more likely to show vocal fold closure than women.Aim of the study is to analyse the closure of the posterior glottis during singing in professional singers (M & f) and non – singers(m & f).

Study Design: Prospective study

Methods: Methods: Professional singers (22m, 48f) and non – singers (10m, 10f). Singing f0 during HRCT scan and laryngoscopy. 3D-reconstruction of the laryngeal tissues and the air column. Analysis of the posterior glottis of the direct laryngoscopy and 3D-reconstruction

Results: Results: The 3D reconstruction showed a complete closure of the posterior glottis, in 20/32 men (62.5%) and 30/58 women (52%); in the group of professional singers: 17/22 men (77%) and 26/48 women (54%); in the group of non-singers: 3/10 men (30%) and 4/10 women (40%).

Conclusion: Complete closure of the posterior glottis seems not to be a criterion for a professional singer's voice. Compared to the non-singers, professional singers have better closure of the posterior glottis.

Authors:

Claudio Storck Jan Thommen Florent Heritier Fabian Unteregge Flurin Honegger	

Title: ***HALF A CENTURY OF RESEARCH ON SINGING-VOICE REGISTERS: KNOWLEDGE AND MYSTERIES***
Category: Basic Science

Abstract:

Objective: We're celebrating the 50th anniversary of the Annual Symposium: Care of the Professional Voice. In this paper we will review the advances for half-a-century in voice science on the topic of singing-voice registers and what remains to be explored.

Methods: We will address the following questions :

- what tools have been used to assess voice registers in singing over the time ? What other tools would we dream of ?

- what do we know and do not know about the underlying laryngeal mechanisms and vocal-fold related biomechanics ?

- Do registers present specific vocal tract shapes and tuning actions ?

Results: The talk will cover the wide range of singing expressions, from classical to non-classical and world music.

Authors:

Nathalie Henrich Bernardoni	

Title: ***GENERATING ALTERNATIVE FACTS? - BIOACOUSTIC FUNDAMENTAL FREQUNCY ESTIMATION IN A WELL EDUCATED GAMBLE***
Category: Basic Science

Abstract:

Objective: Fundamental frequency (f_o) is one of the most commonly reported attributes of the voice. In animal vocal communication, f_o is one of the key attributes for discriminating the call types that make up a species' vocal repertoire. For reasons of experimental feasibility, fo data is typically extracted from acoustic signals produced in more or less "realistic" situations, which introduces a certain amount of ambiental noise into the acquired signals (e.g., simultaneous calls of conspecifics). A common method for f_o extraction in bioacoustic research is the default autocorrelation (AC) "pitch" extraction provided in the Praat voice analysis software.

Methods: Here, we evaluate this approach , i.e., Praat AC f_o computation from acoustic signals, using 1078 calls from twelve New World monkeys at La Senda Verde wildlife sanctuary (a private non-profit organization established in 2003 in the subtropical region east of the Bolivian Andes), representing six species. All calls were documented with simultaneous acoustic and electroglottographic (EGG) recordings, allowing us to compare results from these different methods. f_o was analyzed with Praat's AC algorithm, systematically varying the "voicing threshold" and "octave cost" parameters.

Results: The 50th percentiles, i.e., medians of EGG-based f_o data per species, were between 11 % and 153 % lower than the f_o computed from the corresponding acoustic signals, suggesting a considerable influence of the background noise levels, registered at 54 to 67 dB(C). Systematic variation of Praat's "voicing threshold" and "octave cost" parameters showed an equally dramatic influence on the computed f_o. Tests with synthesized EGG signals suggest that these two parameters are expected to influence the computed f_o data in the presence of voice irregularity (a-periodicity) and subharmonics, respectively.

In summary, our results suggest that previously reported animal bioacoustic f_o data, if based on acoustic signals and computed with Praat's "out of the box" approach, should be interpreted with care. If possible, a physiological correlate of laryngeal voice production (such as the EGG signal), bypassing background noise issues, should be used as the basis of f_o evaluation. Further research is needed to quantify the interaction of the examined Praat AC algorithm parameters with various degrees of a-periodicity and subharmonics.

Acknowledgements:

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Authors:

Christian Herbst Vicky Ossio Marcelo Levy Jacob Dunn	

Title: ***OBJECTIVE ACOUSTIC ANALYSIS AND COMPARATIVE ANALYSIS OF DYNAMIC LARYNGOSCOPY OF MALE TO FEMALE TRANSGENDER BEFORE AND AFTER WENDLER GLOTTOPLASTY***
Category: Medical

Abstract:

Objective: To evaluate the feminine voice and vocal cord characteristics of male to female transgender (MtF) after Wendler glottoplasty surgery.

Methods: The objective acoustic analysis method was used to compare the objective acoustic parameters before and after surgery. The F0 and the speaking fundamental frequency (SFF) was used to assess the degree of pitch improvement. jitter (%) and shimmer (%) a was used to evaluate hoarseness. The dynamic laryngoscope was applied to compare the ratio of the maximum open phase crack width and effective vibration length in the vocal cord vibration cycle 6 months before and after surgery.

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Results: The F0 was 160.7 Hz, and 216.2 Hz before surgery, and 6 to 12 months after surgery.The improvement of the F0 was significant at 2 to 4 months after surgery (P <0.05). The SFF was 152.1 Hz, 202.1 Hz before surgery, 6 to 12 months after surgery, respectively. There were significant differences in SFF in both periods (P<0.05). The jitter (%) a value decreased slightly, and the shimmer% increased slightly. There was no significant difference. The maximum amplitude ratio before and after surgery was 1: 1.01. The effective vibration length ratio before and after surgery was 1: 0.81

 Voice health education + wendler vocal cord truncation surgery reduced the effective vocal cord length to 81% before surgery, which effectively improves the F0 and SFF, indicating that the amplitude was consistent during normal pronunciation, and the treatment is effective.

Authors:

Gelin li Qian Hou	

Title: ***THE RELATIONSHIP BETWEEN CHRONIC COUGH AND LARYNGOPHARYNGEAL REFLUX***
Category: Medical

Abstract:

Objective: Chronic cough is multifactorial in origin, may affect quality of life adversely, and often poses a diagnostic challenge for physicians. Laryngopharyngeal reflux (LPR) is one common contributing factor for chronic cough, but the mechanism by which reflux causes cough remains unclear. Research investigating the relationship between chronic cough and LPR has focused largely on reflux from the perspective of gastroenterology, rather than otolaryngology. The purpose of our study was to investigate the relationship between chronic cough and LPR by using the objective results of 24-hour pH impedance studies.

Methods: We conducted a retrospective chart review of all patients who presented to the voice center of the senior author (RTS) with a chief complaint of chronic cough and no previous diagnosis of reflux. Patient demographics, past medical history, laboratory data, and exam findings during the initial visit from 2015-2020 and at follow up were analyzed.

Results: Our findings suggest that LPR may be a prevalent contributing or etiologic factor for chronic cough. The expected improvement after initiating reflux treatment is 60% at 3 months. Cough resolved completely in 10% of patients at 4 months. Non-responders may have other contributing causes of cough, including esophageal dysmotility, mycoplasma, pertussis, and other contributors. Further studies are needed to confirm or refute these findings.

Authors:

Ghiath Alnouri Heather Yeakel Bailey Balouch Swetha Vontela Robert Sataloff	

Title: ***LARYNGEAL AERODYNAMICS ANALYSIS OF SPASMODIC DYSPHONIA***
Category: Medical

Abstract:

Objective: To analyze the aerodynamic characteristics of adduction and abduction type spasmodic dysphonia (SD), and to explore the role of laryngeal aerodynamics assessment in the identification of spasmodic dysphonia.

Methods: 21 patients with spasmodic dysphonia were enrolled and divided into ADSD group (18 cases) and ABSD group (3 cases) according to SD type. Another 30 patients with normal voice were assigned to normal group (30 cases). Laryngeal aerodynamic parameters: supglottal pressure (SGP), phonation threshold pressure (PTP), phonation threshold power (PTW) and glottal resistance (GR) and vocal efficiency (VE) were collected. Statistical analysis was performed to compare the discriminability of these parameters.

Results: SGP, GR, VE and PTP in adduction group were all greater than those in abduction group and normal group, and the differences between the three groups were statistically significant (P<0.05). PTW of the male abductor group was greater than that of the adduction group and the normal group, and the difference between the three groups was statistically significant (P<0.05); PTW of the female abductor group was greater than that of the adduction group and the normal group, and the difference between the three groups was not statistically significant (P>0.05). ROC curve analysis showed that the area under the curve of SGP, GR and VE between the adduction and abduction groups was 0.5, and the difference was statistically significant (P<0.05).

Spasmodic dysphonia significantly affects the laryngeal aerodynamic function. The aerodynamic parameters SGP, GR and VE can effectively distinguish the adduction and abduction types of spasmodic dysphonia, with good specificity and sensitivity.

Authors:

Xinlin Xu Peiyun Zhuang	

Title: ***The Prevalence of esophageal Disorders among Voice Patients with Laryngopharyngeal Reflux- a Retrospective Study***
Category: Basic Science

Abstract:

Objective: Laryngopharyngeal reflux (LPR) is very common. It has been estimated that at least half of otolaryngology patients with laryngeal and voice disorders have LPR. The close anatomic and functionally related processes of phonation and deglutition suggest need for further study of esophageal disorders as possible clinical cofactors in LPR patients. The goal of this study was to determine the prevalence of esophageal disorders among voice patients with intractable laryngopharyngeal reflux (LPR) who have undergone 24 pH impedance and esophageal manometry.

Methods: A retrospective chart review was performed of patients with LPR-associated dysphonia in the absence of subjective dysphagia who presented between January 1, 2007 and June 31, 2019 and underwent 24 pH impedance and esophageal manometry studies after inadequate response to lifestyle modifications, high dose of PPIs, H2 blockers, alkaline water and Gaviscon (GlaxoSmithKline, Warren, NJ, USA) . The comorbidities, medications, Strobovideolaryngoscopy findings, 24 pH impedance and esophageal manometry results were analyzed.

Results: Esophageal dysmotility may be a significant cofactor in voice patients with refractory LPR on appropriate reflux medications and lifestyle modifications. Further research is advised.

Authors:

Ghiath Alnouri Parastou Azadeh Ranjbar Dylan Vance Jin Park Aishwarya Suresh	Robert Sataloff

Title: ***THE EFFECT OF MARIJUANA ON THE VOICE: A PILOT STUDY***
Category: Medical

Abstract:

Objective: Marijuana is derived from the cannabis sativa plant originating in central and southeast Asia. In recent years, there was increasing popularity and use of marijuana in addition to the legalization of its recreational use in eleven states. However, the effect of marijuana on the voice is still unclear. The purpose of this study was to determine the perceived impacts marijuana has on voice by surveying patients from a voice center. The inquiry included smoking, vaping, edible marijuana, and cannabidiol (CBD) oil.

Methods: An anonymous, web-based questionnaire was sent to adult voice center patients. The survey was distributed using The Research Electronic Data Capture (RED-Cap) tool, hosted by Drexel University. The survey was designed to collect relevant demographic data, past laryngeal history, marijuana use history, and beliefs about effects of marijuana on voice.

Results: Marijuana may have negative effects on the voice.

Authors:

Bailey Balouch Ghiath Alnouri Robert Sataloff	

Title: ***NORMATIVE SPEECH DATA IN PROFESSIONAL OPERA SINGERS- A RETROSPECTIVE STUDY***
Category: Medical

Abstract:

Objective: The term "singer" refers to a population of individuals who perform musical songs or related artistic material using their voices. Research has indicated that, as a population, singers' voice parameters differ from the non-singer population. Given the fact that diagnosed voice pathologies are more prevalent in the singer population, normative speech data in singers are necessary for diagnosis and for outcome analysis.

Methods: Medical records of students at an elite opera conservatory who came into the senior author's (RTS) office for a baseline evaluation were reviewed retrospectively. All subjects had no voice complaint and had not undergone voice surgery. Subjects with vocal fold mass and scar were excluded. All subjects had undergone objective voice measurements by one of three board certified speech-language pathologists using the KAYPENTAX CSL (computerized Speech Lab) protocol. Mean, standard deviation, median and range were compared with normative values provided by KAYPENTAX CSL.

Results: Our findings indicate that singers may have different normative voice parameters. However, further research is needed to confirm or refute these findings, and similar studies are needed for singers in other genres.

Authors:

Ghiath Alnouri Robert Sataloff	

Title: ***PARADOXICAL VOCAL FOLD MOVEMENT: A RETROSPECTIVE ANALYSIS***
Category: Medical

Abstract:

Objective: Paradoxical vocal fold motion (PVFM) is a disorder in which the vocal folds adduct inappropriately during inspiration resulting in episodic dyspnea and sometimes respiratory distress. Diagnosis is obtained through careful history, physical examination, flexible laryngoscopic examination with provocative maneuvers, and laryngeal electromyography. The pathogenesis and clinical findings of this disorder are not known. to determine characteristics of patients with confirmed PVFM and to evaluate efficacy of current treatments.

Methods: A retrospective chart review of the patients with PVFM who presented at a quaternary care laryngology office between January 1, 2007 and August 31, 2019 was performed. Comorbidities, laboratories tests, imaging, 24 hr pH impedance testing and laryngeal EMG results were analyzed. Dyspnea Index (DI) questionnaire before and after treatment was used to evaluate the efficiency of treatments for PVFM.

Results: Botulinum toxin, voice therapy and LPR treatment regimen is currently the most effective management for patients with paradoxical vocal fold movement disorder. More research is needed to determine the etiology of this disorder.

Authors:

Ghiath Alnouri Robert Sataloff	

Title: ***VOCAL FOLD PARESIS AND VOICE OUTCOMES FOLLOWING VOCAL FOLD MASS EXCISION***
Category: Medical

Abstract:

Objective: To our knowledge, the relationship between the severity of vocal fold paresis and surgical outcomes following vocal fold mass excision has not been investigated. In this study, we correlate post-operative strobovideolaryngoscopy findings and VHI-10 scores with the severity of vocal fold paresis seen on pre-operative laryngeal EMG. Approximately 100 patients who underwent microsurgical excision of benign vocal fold masses in the last 5 years are included in the study. Pre- and post-operative strobovideolaryngoscopy (SVL) recordings are evaluated by three blinded raters with an average of 15 years in otolaryngology to determine the inter- and intra-rater reliability of their findings. A secondary analysis will be performed to compare SVL findings of the raters to laryngeal EMG findings, the gold standard for vocal fold paresis diagnosis, to better understand its precision and accuracy of SVL in diagnosing SVL, as current studies have reached no clear consensus on this topic. The primary endpoint of this study is to determine whether vocal fold paresis has any impact on voice outcomes following surgical excision of vocal fold masses and to determine whether the severity of paresis correlates with worsening surgical outcomes. Surgical outcomes will be measured by post-operative VHI-10 scores, SVL findings, and objective voice measurements when available.

Methods: see above

Results: Pending

Authors:

GHiath Alnouri Robert Sataloff Swetha Vontela	

Title: ***"Chip of Beauty" and Voice Changes***
Category: Medical

Abstract:

Objective: The objective of this study is to evaluate the appearance of the vocal folds of women professional actresses or singers, who have hoarseness and use the hormonal implant through videolaryngostroboscopy.

Methods: All medical records of patients who work as professional singers or actresses who consulted with complaints of dysphonia or just to evaluate vocal folds and who are using intradermal hormonal implants will be reviewed at the otorhinolaryngology outpatient clinic from HUPE from January 2017 to December 2019.

 All patients underwent videolaryngostroboscopy using a rigid laryngoscope or a flexible nasolaryngoscope that was recorded for later review. All exams were performed by the senior author. (AMC) and reviewed by a second team otorhinolaryngologist.

Results: A total of 10 records of actresses and singers using intradermal hormonal implants were evaluated for the presence of laryngeal lesions.

The average age was 33.5 years. All patients had complaints of dysphonia at the ENT consultation. The most prevalent lesions found in the vocal folds were cysts (5), nodules (1) and pseudocysts (1). All vocal folds had mild Reinke's edema. Four patients were smokers and all had RFS> 7 indicating suspected reflux.

The mean of the fundamental frequency was 188 Hz. In patients with injury it was 199 Hz and in those without injury it was 165 Hz. The Application of the Mann-Whitney Test demonstrated that there was no significant difference between the groups.

Hormonal implants can cause dysphonia in singers and actresses. The use of these implants should be avoided in patients who use their voice professionally

Authors:

Andrea Campagnolo Michael Benninger Jaqueline Priston Aida Assunção	

Title: ***STROBOSCOPIC VOCAL FOLD SCAR SEVERITY AND PRE- AND POST-OPERATIVE VOICE***
Category: Medical

Abstract:

Objective: It is anecdotally known that scar can form at the base of benign vocal fold masses as part of the development of the pathology. However, the effect of scar at the base of masses on voice has not been studied.

Methods: Data was collected on 101 patients who underwent excision of benign vocal fold masses from 2014 to 2020. Pre- and post-operative Voice Handicap Index (VHI) scores and singing VHI (SVHI) scores were used to measure the patient's evaluation of their own voice quality. Pre- and post-operative strobovideolaryngoscopy recordings were evaluated by three blinded raters to rate presence and severity of scar beneath masses. Inter-class coefficient and Cohen's kappa were used to analyze inter-rater reliability and intra-rater reliability. An independent t-test and one-way ANOVA was used to compare scar presence and scar severity to VHI and SVHI scores. Wilcoxon signed-rank test was used to determine the median difference in scar severity prior to and after mass excision.

Results: Neither stroboscopic scar evaluation nor operative scar correlated to pre- or post-operative VHI-10 scores. The change in VHI scores following surgery was not statistically significant. Scar severity did not correlate to pre- or post-operative VHI scores. These findings that VHI scores do not correlate with scar can be helpful clinically by indicating another primary etiology for voice handicap. There was a significant median decrease in scar severity ($p = 0.031$; $z = -2.159$), with only 14.7% of cases worsened following mass excision, indicated that mass excision likely has a positive effect on scar.

Authors:

Swetha Vontela Ghiath Alnouri Martha Vishnuvardhan Robert Sataloff	

Title: ***OTOLARYNGOLOGY-RELATED GOOGLE SEARCH TRENDS DURING THE COVID-19 PANDEMIC***
Category: Medical

Abstract:

Objective: To assess trends of Google Search queries for symptoms and complaints encountered commonly in otolaryngology practices during the coronavirus disease 2019 (COVID-19) pandemic when in-person care has been limited.

Methods: In this cross-sectional study, data on Google Search queries in the United States for 30 otolaryngology-related terms were obtained from Google Trends. The means of relative search volume from the COVID-19 period (March 29, 2020 through May 16, 2020) were compared to similar periods from 2016-2019 using a t-test of two independent samples.

Results: In total, 16.6% of search terms had significant increases in relative search volume during the COVID-19 period, with the largest percentage increase for “can’t smell” (124.4%, p=.006), followed by “allergies” (30.3%, p=.03), “voice pain” (26.1%, p=.008), and “ears ringing” (19.0%, P<.001). Of all search terms, 26.7% had significant decreases in relative search volume, including the largest percentage decrease for “laryngitis” (59.8%, p<.001), followed by “thyroid nodule” (54.4%, p<.001), “thyroid cancer” (45.6%, p<.001), and “ENT” (34.9%, p<.001). This study demonstrates that Google search activity for many otolaryngology-related terms during the COVID-19 pandemic has increased or decreased significantly as compared to previous years. With reduced access to in-office otolaryngology care in the United States during the COVID-19 pandemic, these are important considerations for otolaryngology practices to meet the needs of patients who lack access to care.

Authors:

Matthew Pier Ghiath Alnouri Robert Sataloff	

Title: ***CUSTOM ANTERIOR NECK COILS FOR IMPROVED MAGNETIC RESONANCE IMAGING OF THE LARYNX***
Category: Medical

Abstract:

Objective: Upper airway stenosis impairs breathing and voicing in children and adults. Treatment often includes surgical interventions that cause reduced vocal function. For pre- and post-treatment imaging, CT yields high resolution of the airway-tissue interface but presents radiation risks. MRI is an alternative, but is limited in terms of reduced image quality and longer scan times. This study is to demonstrate improvements in MRI image quality and scan time by using neck coils specifically tailored for laryngeal imaging.

Methods: A custom neck coil was developed that closely conforms to the anterior neck anatomy and can be used in conjunction with vendor commercial coils which are also used for head support and immobilization. Because of variation in neck diameter and length, three coil sizes were developed, each with seven, decoupled channels distributed around the anterior neck surface. MR images of the larynx were obtained using three configurations: custom coil, commercial head and neck coil, and commercial and custom coils.

Results: For the same scan time, image quality using the custom coil was significantly higher than with the commercial coil. Image quality using both coils was better than either coil alone, but the added benefit of both coils was less significant. While dedicated coils for laryngeal MRI exist commercially, significant improvements in image quality and scan time are possible by tailoring MR coil configurations to the laryngeal airway. It is expected that these improvements will facilitate realization of MRI as a non-radiative alternative for imaging upper airway stenosis and other voice disorder patient populations.

Authors:

Rock Hadley Grayson Tarbox Scott Thomson	

Title: ***INFLUENCE OF REDUCED SALIVA PRODUCTION ON PHONATION IN PATIENTS WITH ECTODERMAL DYSPLASIA***
Category: Basic Science

Abstract:

Objective: Patients with ectodermal dysplasia (ED) suffer from an inherited disorder in the development of the ectodermal structures. Besides the main symptoms, i.e. significantly reduced formation/expression of teeth, hair and sweat glands, a decreased saliva production is objectively accounted. Besides difficulties with chewing/swallowing, ED patients frequently report on the subjective impression of rough and hoarse voices. A correlation between the reduced production of saliva and an affliction of the voice has not yet been investigated objectively for this rare disease.

Methods: Following established measurement protocols (ELS), a study has been conducted on 42 patients with ED and 47 controls (no ED, healthy voice). Additionally, the vocal fold oscillations have been recorded by high-speed imaging (4 kHz) and analyzed by segmentation-based algorithms. The generated acoustic signal is evaluated by objective and subjective measures. The individual impairment is documented by a standardized questionnaire (VHI). Additionally, the amount of generated saliva is measured for a defined time period.

Results:

ED patients displayed a significantly reduced saliva production compared to the control group. Furthermore, the auditory-perceptual evaluation yielded significantly higher values for the voices of male ED patients compared to male controls, even though the majority (67%) indicated none or minor impairment in the self-evaluation. In spite of that, a cluster center analysis could not demonstrate a statistically significant correlation between the perceived voice quality and the amount of saliva.

Conclusions: In this preliminary study, the quantity of saliva has been used as indicator for the quantity of laryngeal mucus due to easier/non-invasive accessibility. However, the composition and consistence of the two fluids differ, which prevents an unambiguous interpretation. Moreover, ED represents are relatively rare disease, impeding statistically valid findings. Further investigations on the composition of laryngeal mucus and saliva and their correlation are required.

Authors:

Marion Semmler Maria Ensthaler Franziska Pelka Olaf Wendler Stefan Kniesburges	Anne Schützenberger

Title: ***OPENHSV, AN OPEN PLATFORM FOR LARYNGEAL HIGH-SPEED VIDEOENDOSCOPY***
Category: Medical

Abstract:

Objective: High-speed videoendoscopy is an important tool to study laryngeal dynamics, to quantify vocal fold oscillations, to diagnose voice impairments at laryngeal level and to monitor treatment progress. However, there is a significant lack of an open source, expandable research tool that features both, latest hardware and data analysis.

Methods: State-of-the-art high-speed camera and microphone are interfaced using a user-friendly graphical user interface implemented in Python. Video and audio data are recorded in synchrony. Image segmentation of the glottal area is performed using efficient deep neural networks to automatically derive glottal area waveform and glottal midline. Previously described, shown clinically relevant quantitative video and audio parameters were implemented and are automatically computed. Healthy individuals were examined, recorded video and audio data were analyzed to demonstrate applicability of the system.

Results: We propose OpenHSV, an open research platform based on commercially available hardware and open code written in Python. OpenHSV outperforms existing systems in image quality (unbiased NIQE score = 13.19). In a preliminary clinical study, 28 healthy subjects were recorded. Quantitative parameters for audio and video data were computed and lie in a typical range for healthy individuals: Audio signals show a mean CPP of 18.596 dB, video data results in Opening, Rate and Speed Quotients close to 1. With that, we provide a clinically validated, open source tool that offers an end-to-end solution, i.e. featuring both, data acquisition and analysis. We envision that OpenHSV is a valuable research tool in understanding voice physiology.

Authors:

Andreas Kist Stephan Dürr Anne Schützenberger Michael Döllinger	

Title: ***Why has my upper register disappeared? Prevalence of voice problems in popsingers and other semiprofessional voice users***
Category: Medical

Abstract:

Objective: There are many singers , which are working as self-accompanied solo artists in band line-ups in concert or as street performers. Most are not singers of classical repertoire; they belong to the field of contemporary music, with wide range of non-classical vocal styles, including pop, rock, and country music (yodeling)in locationes like pubs, clubs, hotel function rooms, and open-air settings. They become more and more a high public profile and public appeal. The purpose of this study was to investigate the prevalence of voice disorders among popsingers and other semiprofessional voice users to discover the risk factors associated with voice disorders.

Methods: We have have done a retrospective study of a population of 40 pop-rock singers and other semiprofessional voice users like entertainers and yodelers, who visited our voiceclinic in salzburg. They completed a questionnaire at the beginn of the examination and the end of the therapy and unterwent a diagnostic programm with videostroboskopie, phonetogramm, ph-measurement and accoustic annalyzing. The questionnaire included demographic questions like: length of vocal training, type of voice use, voice knowledge and questions about vocal symptoms (RSI, AHI, Singing VHI),risk factors for voice disorders, presence, severity, and types of vocal pathologies

Results: The prevalence of voice disorders among the semiprofessional Pop- and Rock singers and the other semiprofessional voice users seems to be different to the prevalence rate of voice disorders among professional classical singers (Acute Assessment of high professional Singers, Schlömicher / Weikert 1995) The results of this study raise the importance of educating that group about the voice function, voice training and vocal hygiene, in order to prevent development of voice disorders.

KEYWORDS:

Pop singers; Entertainers, Yodelers , Risk factors; Vocal symptoms; Voice disorders; Voice knowledge

Authors:

Josef Schlömicher-Thier Reinhard Schmid Cordula Hüsers	

Title: ***SAFE MEDICAL AND THERAPEUTIC EVALUATION OF VOICE PATIENTS DURING THE COVID PANDEMIC***
Category: Medical

Abstract:

Objective: Patients who are scheduled to see a voice care provider may not complain of any COVID symptoms and normal office screening protocols will not pick up asymptomatic COVID patients. Providers of voice care, by the nature of their vocation, are at higher risk of exposure to aerosolized secretions. The objective of this presentation is to describe a safe approach to the assessment and treatment of voice patients during the COVID pandemic including the approach to the physical exam, videostroboscopic technique, in office procedures, speech assessment and therapy.

Methods: We will present protocols developed at UConn health for voice patient evaluation including patient screening, patient flow, PPE requirements, air exchange rates in exam rooms, room cleaning and reduction of viral load with nasal and oral diluted Iodine application. Videostroboscopy with vent masks will be discussed. Data supporting the efficacy and tolerability of these protocols will be reviewed. Modifications to speech therapy assessments with attempts to reduce the use of aerosolizing procedures will be discussed including speech therapy via video visits. The additional cost of time and equipment necessary for these protocols will be presented.

Results: Voice patients who may be asymptomatic carriers of COVID can be evaluated and treated safely with modifications of our usual evaluation protocols. The protocols presented will help to mitigate risk to providers and staff.

Authors:

Denis Lafreniere Starr Cookman Samantha Frank Belachew Tessema Todd Falcone	Janet Rovalino Patricia Doyle

Title: ***INFLUENCE OF LOUDNESS AND PITCH ON SUPRAGLOTTIC HYPERFUNCTION IN FEMALE SUBJECTS WITH DYSPHONIA AND NORMAL VOICE***
Category: Medical

Abstract:

Objective: The present study aims at exploring the effect of pitch, loudness, and phonatory task on the degree of supraglottic activity in female subjects with voice disorders and normal voice.

Methods: Twenty-four female volunteer participants were included (14 normal and 14 dysphonic). All participants underwent to flexible laryngoscopy with specific voice tasks (see below). Rigid videostroboscopy was also performed to confirm laryngeal diagnosis. During the flexible endoscopic examination, each participant was instructed to perform sustained vowels [i:], [a:], and [u:]. They were asked to produce each phonatory task at three loudness levels (low, medium, and high). Subjects were also asked to produce the sustained vowels at three different pitches for each loudness level (low, medium, and high). Using a 100 mm visual analog scale for each sample, two blinded laryngologists were asked to assess the following endoscopic variables: (1) medial laryngeal compression, anterior-posterior laryngeal compression, vertical laryngeal position, and pharyngeal compression.

Results: Dysphonic subjects showed a significantly higher degree of pharyngeal compression compared to vocally normal individuals. Both loudness level and pitch have an impact on pharyngeal compression. Vertical laryngeal position was also higher in dysphonic subjects. No significant differences were found between groups for medial and anterior-posterior laryngeal compression.

It seems that the most sensitive variable to identify voice condition is pharyngeal compression. Variables such as pitch and loudness level should be control when performing laryngeal endoscopy.

Authors:

Rosario Uribe Florencia Perlwitz Alison Valenzuela Josefina Jimenez Raimundo García	Juan Del Lago Marco Guzman

Title: ***SHORT-TERM VOICE IMPROVEMENT AFTER REPEATED OFFICE BASED PLATELET RICH PLASMA INJECTION IN PATIENTS WITH SCAR SULCUS AND ATROPHY***
Category: Medical

Abstract:

Objective: Treatment of voice disturbance in patients with vocal atrophy, scar, and sulcus vocalis is challenging. Platelet rich plasma (PRP) is rich in growth factors and is a potential autologous source for regenerative medicine. We hypothesized that office based injections of PRP may serve as a source of improve wound healing in patients with scar sulcus and vocal atrophy.

Methods: Between February 2019 and August 2020, 31 office based injections of PRP were performed in 13 patients with established scar, sulcus, and vocal atrophy (11 scars, 1 sulcus, and 1 atrophy). PRP was prepared using 20 cc blood draw and double centrifugation method. Injection was performed using post-transcervical as well as indirect technique directly into the vocal fold margin (10 transcervial, 21 transoral). Volume PRP use was 0.5-.7 cc per side. Injections varied from 1-3 injections at monthly intervals. Videostroboscopy, voice handicap index, and objective analysis of voice using Ceptral Peak Prominence (CSID score) were done.

Results: Median follow-up is 12 months. No, patients were made worse by the procedures. The voice handicap index (VHI-10) before injection was 36, VHI-10 after was 23(p>.01). The mean CSID score for CAPE-V sentence was 47 before injection, CSID score after injection was 30 (p>.01). Nine of the patients thought the intervention was worthwhile to repeat while the other four thought there were improvements but did not feel significantly improved.

Conclusion

Office PRP injection into the vocal fold may be an alternative to growth factor in patients with scar, sulcus and atrophy.

Authors:

Peak Woo	

Title: ***H2O2 CONCENTRATION IN EXHALED BREATH CONDENSATE INCREASES AFTER PHONOTRAUMA: A PROMISE OF NONINVASIVE MONITORING?***
Category: Medical

Abstract:

Objective: The concentration of H2O2 in exhaled breath condensate (EBC) is a technique used to monitor inflammation and oxidative damage in the airway. The present study aimed at observing the production of the H2O2 concentration in EBC after induced phonotrauma.

Methods: A total of twenty-nine vocally healthy adults were included and randomized to an experimental and a control group. Subjects from experimental group underwent a 1-hour vocal loading procedure. At baseline, immediately after loading, after the 4-hour, and 24 hours post-baseline, 1.5 ml of EBC was obtained. Samples were also obtained from control subjects (non-vocal loading) at the same four time points as the experimental group. All samples were storage at -80 °C. The concentration of H2O2 was determined using a spectrophotometric method based on the oxidation of Iron in an acid medium (FOX reagent). Data were fitted by means of Mixed-Effects Model with Time measures nested within subjects.

Results: A significant interaction was found for the Pre/Post 4h contrast when comparing Control group and Experimental group (p=0.049). A Tukey post-hoc contrast grouping means across measures showed only one homogeneous group for the control condition and two groups for the experimental condition: one including Pre, Post and Post 24H and another one consisting only of Post 4H.

Phonotrauma causes an increase in the concentration of H2O2 obtained from EBC at four hours, which is compatible with the generation of an inflammatory process in the vocal folds.

Authors:

Marco Guzman Oscar Araneda Christian Castro Karol Acevedo Camilo Moran	Constanza Pacheco Camilo Quezada

Title: ***USE OF SURFACE ELECTROMYOGRAPHY (SEMG) AS A DIAGNOSTIC MEASURE OF MUSCLE TENSION DYSPHONIA: AN EVIDENCE-BASED SYSTEMATIC REVIEW***
Category: Basic Science

Abstract:

Objective: To determine what is the evidence of applying surface electromyography (sEMG) as a diagnostic measure of muscle tension dysphonia compared to other reference standards, and what is the quality level of these evidence.

Methods: Two independent reviewers searched six databases for articles published between January 1980 and August 2020, with specified search terms. The selected articles were systematically evaluated by two independent raters using a modified critical appraisal of diagnostic evidence (m-CADE) form.

Results: Nine articles were selected from 546 studies for evaluation. Five articles showed a relatively high score of m-CADE points, and were evaluated with suggestive validity and compelling importance. Two articles were evaluated with suggestive validity and importance. The remaining two articles were assessed as having less suggestive or equivocal validity and importance. Studies varied in methodological issues of sEMG measurement and data analysis, including electrode position, tasks for sEMG data collection, outcome measure, and reference for normalization.

The results provide some evidence that the surface electromyography has the potential for diagnostically measuring muscle tension dysphonia. However, the evidence is still not sufficient to determine the diagnostic accuracy of sEMG. More evidence is required in future studies with an improvement of evidence-based quality, including reliability and validity of sEMG and reference standards, as well as control of subjective and spectrum bias.

Authors:

Feifan Wang Edwin M.-L. Yiu	

Title: ***SINGING DURING THE PANDEMIC: IMPULSE DISPERSION OF AEROSOLS***
Category: Medical

Abstract:

Objective: Group singing events have been linked to several outbreaks of infection during the CoVID-19 pandemic, This link between singing and infection rates supports the possibility that aerosols are partly responsible for person-to-person infection. The aim of this study is to investigate the impulse dispersion of aerosols during singing and speaking in comparison to breathing and coughing.

Methods: Ten professional singers (5 males and 5 females) of the Bavarian Radio Chorus performed 9 tasks including singing a phrase of Beethoven‘s 9th symphony, to the original German text. The inhaled air volume was marked with small aerosol particles produced via a commercial e-cigarette. The expelled aerosol cloud was recorded with three high definition TV cameras from different perspectives. Afterwards, the dimensions and dynamics of the aerosol cloud was measured by segmenting the video footage at every time point.

Results: While the median expansion was below 1m, the aerosol cloud was expelled up to 1.4m in the singing direction for individual subjects. Consonants produced larger distances of aerosol expulsion than vowels. The dispersion in the lateral and vertical dimension was less pronounced than the forward direction. After completion of each task, the cloud continued to distribute in the air increasing its dimensions. Consequently, we propose increasing the current recommendations of many governmental councils for choirs or singing at religious services from 1.5m to the front and 1m to the side to a distance between choir singers of 2m to the front and 1.5m to the sides.

Authors:

Matthias Echternach Sophia Gantner Gregor Peters Tobias Benthaus Caroline Westphalen	Bernhard Jakubaß Liudmila Kuranova Michael Döllinger Stefan Kniesburges

Title: ***Diagnosis and Analysis of Vocal Fold Movement Disorder Based on Deep Learning***
Category: Basic Science

Abstract:

Objective: Proposing a new method of stroboscopic laryngoscope combined with deep learning to realize simple, non-invasive, and accurate diagnosis of vocal fold movement disorders (VFMD), and to distinguish the arytenoid dislocation (AD) and vocal fold paralysis (VFP).

Methods: We selected 70 strobolaryngoscopy videos of patients with unilateral VFMD diagnosed in our hospital from 2015 to 2019, and 110 strobolaryngoscopy videos of healthy subjects for deep learning. 9 key points are calibrated on the strobe laryngoscope image to characterize vocal fold movement. The 9 key points are: the apex of bilateral arytenoid cartilage, the junction of bilateral vocal folds and arytenoid cartilage, anterior commissure of the vocal fold, the front and rear edge points of bilateral ventricular band, and are automatically detected by the improved deep learning model M-VGG16. The motion trajectories of 9 key points are transformed into 7 change curves with medical characteristics for quantitative evaluation of the movement of the vocal folds; the key point detection and medical feature extraction in the strobe laryngoscope video are converted into 39 statistics; the multi-layer perceptron are used to analyze the converted statistics to diagnose VFMD and differentiate the AD and VFP.

Results: Results: Compared with traditional complicated and invasive diagnostic methods, the accuracy rate for identifying VFMD is 100%, and the accuracy rate for distinguishing AD and VFP is 87.5%.

Conclusion: The combination of strobe laryngoscope and deep learning can quantitatively evaluate vocal fold movement, and realize non-invasive, simple and accurate diagnosis of VFMD and differential diagnosis of AD and VFP.

Authors:

Yanli Ma Xuwei Fan Caidan Zhao Peiyun Zhuang	

Title: ***INITIAL DATA ON LONG-TERM EFFECTS OF VIBRO-TACTILE STIMULATION IN PEOPLE WITH SPASMODIC DYSPHONIA***
Category: Medical

Abstract:

Objective: Spasmodic Dysphonia (SD) is a focal dystonia that causes voice breaks and a strained-strangled voice quality. Previously, a one-time administration of vibro-tactile stimulation (VTS) to the larynx improved speech quality in 69% of the participants with SD. This ongoing clinical trial examines the prolonged effect of laryngeal VTS in SD. We here report initial data of 8 SD participants who applied VTS at-home for 4 weeks and underwent laboratory assessments before and after the intervention

Methods: Participants, randomly assigned to two groups, received VTS either at 100Hz or 40Hz. Smoothed cepstral peak prominence (CPPS) as a marker of voice quality was obtained from the phonatory signal of 10 voiced sentences. Its change (ΔCPPS) between pretest and post-test was derived. A positive ΔCPPS > 2db indicates a meaningful improvement in voice quality.

Results: Results: ΔCPPS was compared prior to receiving VTS and after 4 weeks of in-home VTS. For the 100Hz VTS group (N=5) ΔCPPS ranged from -1.63 to 2.82 (1 responder > 2db). For the 40 Hz VTS group (N=3) ΔCPPS ranged from of 0.96-2.73db (1 responder > 2db).

Conclusion: When considering a possible build-up of effectiveness of VTS application over time, only 2 out of 8 (25%) patients were clear responders. There is initial evidence that 40 Hz VTS may lead to positive changes in the voice quality in SD. This may indicate that stimulation of tactile mechanoreceptors above the voice box may be sufficient to induce meaningful changes in voice quality in SD.

Authors:

Divya Bhaskaran Naveen Elangovan Arash Mahnan Jinseok Oh Peter Watson	Juergen Konczak

Title: ***COMPARING AUDIO AND THROAT ACCELEROMETER SIGNALS AS A FUNCTION OF SUBGLOTTAL PRESSURE IN DIFFERENT PHONATION TYPES***
Category: Basic Science

Abstract:

Objective:

Differences in phonation type are produced by the voice source and could be reflected in the neck-surface vibration, easily recorded by an accelerometer. Here we analyze, as a function of subglottal pressure, the relation between neck-surface vibration and the voice source as derived by inverse filtering the audio signal.

Methods:

Presently seven singers (four males) have been recorded while performing diminuendo sequences of /pV/ syllables at different fundamental frequencies, with neutral, breathy and pressed quality. Audio was recorded with a head-worn omnidirectional microphone approximately 5 cm from the mouth. Subglottal pressure was derived from oral pressure during /p/, measured by a pressure transducer attached to a thin plastic tube that the subject kept in the corner of the mouth. Neck-surface vibration was captured by an accelerometer attached to the throat placed under the thyroid prominence. All recordings were made in a sound-treated studio in the Phonetics Laboratory, Department of Linguistics, Stockholm University.

Results:

Preliminary results suggest that the level of the accelerometer signal is strongly correlated with the maximum flow declination rate and that the level of the fundamental of the accelerometer signal is strongly correlated with the level of the voice source fundamental. As the latter varies systematically with phonation type, the results suggest that information on phonation type can be derived from a neck-surface accelerometer signal.

Authors:

Johan Sundberg Marcin Włodarczak Mattias Heldner	

Title: ***LARYNGOPHARYNGEAL REFLUX SYMPTOMS, DYSPHONIA AND VOCAL TRACT DISCOMFORT IN NON-PROFESSIONAL (AMATEUR) CHOIR SINGERS***
Category: Medical

Abstract:

Objective: Laryngopharyngeal Reflux (LPR) represents a common cause of dysphonia and vocal tract discomfort among singers. However, most previous research focused predominantly on Gastroesophageal Reflux Disease (GERD) and almost exclusively on professional singing. This study seeks to evaluate the prevalence of dysphonia, vocal tract discomfort and LPR in a series of non-professional choristers, in comparison with a sample of the general population.

Methods: Amateur choir singers (392) and control subjects (456) were recruited. Data regarding clinical and demographic characteristics, training and experience in singing (only for singers) and history of GERD and LPR were acquired. Three outcome instruments were also administered: Reflux Symptom Index (RSI), Vocal Tract Discomfort Scale (VTDS), Voice Symptom Scale (VoiSS).

Results: Most singers reported singing on a weekly basis, but only half of them received some sort of training, mainly from private teachers. Healthier habits (less smoking and drinking, less frequent late-night dinner) were highlighted in choristers. GERD symptoms were less frequent among singers, while no differences were demonstrated with regards to LPR (RSI) between the two groups. Contrariwise, higher impairments in terms of dysphonia (VoiSS) and vocal tract discomfort (VTDS) were detected among choristers. Furthermore, VoiSS and VTDS scores appeared to be significantly influenced by singing-related variables.

In conclusion, higher self-perception of vocal functioning and inappropriate training may lead to higher voice and vocal tract impairments in amateur choristers, in comparison with the general population. Conversely, healthier lifestyle habits and moderate singing activities may be beneficial for these singers in lowering GERD symptoms and protecting against LPR.

Authors:

Carlo Robotti Francesco Mozzanica Silvia Capobianco Alessandro Selvagio Antonio Di Sabatino	Giulia Bertino Marco Benazzo Antonio Schindler

Title: ***Comparative Study of Acoustic Analysis of Tenors and Sopranos Classical and Non-Classical***
Category: Medical

Abstract:

Objective: Objetive: Establish normal acoustic values in tenors and sopranos of classical and non-classic singers. Establish differences in acoustic values in tenors and sopranos (classical singers, non-classical singers, singers with tension muscle dysphonia and non-singers).

Methods: Observational, cross-sectional, descriptive and comparative study.

Normalized study through the composition of 4 groups: classical singers, non-classical singers, singers with tension muscle dysphonia and non-singers. Singers from 22 to 50 years old and vocal training of at least 5 years with without any history of vocal pathology. Analyze voice samples with KayPentax computerized speech laboratory (model CSL 4500) and the Analysis of Dysphonia in Speech and Voice (ADSV).

Results: Results: Preliminary findings suggest:

Classical Tenors: Mean Cepstral Peak Prominence Fo: 150.85 Hz, Low/High Spectral Ratio: 35.40 dB, CPP: 15 dB

Non Classic Tenors: Mean Cepstral Peak Prominence Fo: 160 Hz, Low/High Spectral Ratio: 36.80 dB, CPP: 16 dB

Classical Sopranos: Mean Cepstral Peak Prominence Fo: 250 Hz, Low/High Spectral Ratio: 33.40 Db, CPP: 12 dB

Non Classical Sopranos: Mean Cepstral Peak Prominence Fo: 270 Hz, Low/High Spectral Ratio: 35.20 Db, CPP: 13 dB

Additional data collection and analyses are ongoing.

Conclusions: So far with the data collected; the acoustic values in classical tenors and sopranos are different from popular tenors and sopranos because of their vocal technique.

Authors:

Carlos Manzano María de la Luz Arenas Rafael Alarcón Marco Guzman Antonio Ysunza	Miguel Angel Villasís Wendy Castro

Title: ***UNUSUAL DISEASE COURSE OF ABDUCTOR SPASMODIC DYSPHONIA***
Category: Medical

Abstract:

Objective: We describe an unusual case and natural disease course of abductor spasmodic dysphonia in a young woman who experienced symptom resolution and subsequent recurrence without intervention.

Methods: This is a case report of a 35-year-old woman with no medical history who was initially referred in July for evaluation of sudden hoarseness. Her symptoms began three months prior to her initial visit after she suddenly lost her voice at work. The severity required a one-and-a-half-month absence from work. On evaluation, she demonstrated intermittent mildly rough vocal quality. Testing for dystonia was negative for breaks with either voiced or voiceless phonemes. Voice therapy was recommended but declined. On follow-up visit three months later, she reported that her vocal symptoms completely resolved in August, with subsequent severe recurrence at the end of October. Testing for laryngeal dystonia this time revealed frequent breathy voice breaks consistent with abductor spasmodic dysphonia.

Results: While laryngeal dystonia symptoms are usually progressive, we report a rare case of a natural course of spontaneous spasmodic dysphonia resolution without treatment and subsequent severe recurrence over a 3-4 month period. A paucity of case reports with similar findings exist in the literature, suggesting a need for further exploration of this unique type of disease course.

Authors:

Jared Sperling Nausheen Jamal	

Title: ***TREATMENT OUTCOMES OF BENIGN LESIONS OF VOCAL FOLD IN CHILDREN***
Category: Medical

Abstract:

Objective: Treatment of benign lesions of vocal fold in children, including voice therapy and phonomicrosurgery, is still controversial. This study will analyze the outcomes of different treatments.

Methods: Children who were diagnosed with vocal fold nodules, polyps, edema and had follow-up in Otolaryngology Department of Beijing Tongren Hospital in 2010~2020 were included. They were divided into conservative and surgical group, and reviewed for demographics, medical history, voice assessment and laryngoscopy. The outcomes of treatments were described as improvement, unchanged and aggravation.

Results: Eighty children(48 boys; 32 girls; 9.8±4.1years) were included. 53(66.3%) children received conservative treatment, and the follow-up median time was 8 months(3weeks~64 months). Dysphonia was mostly moderate(66.0%) before treatment and mild(58.5%) after treatment. The median VHI score after treatment(13,0~81) was significantly decreased than before(22,2~79) . In vocal symptom, there were 34(64.2%) improved, 11(20.8%) unchanged, and 8(15.1%) aggravated. The lesions were 37(69.8%) improved, 10(18.9%) unchanged, and 6(11.3%) aggravated. Among the improved, 11 cases showed the characteristics of puberty:the height increased rapidly, with the pitch decreased in 4 boys.

The follow-up median time of 27 surgical children was 4 months(1~58 months). The mean dysphonia was moderate(74.1%) before surgery and mild(51.9%) after surgery. The median VHI score was significantly decreased from 23(1~84) to 2(0~42) after treatment. 21(77.8%) children were improved and 6(22.2%) had recurrence after surgery.

Both treatments can improve most of the benign lesions of vocal fold in children. The improvement by conservative treatment may be related to the development of adolescents. Part of surgical children had recurrence. The recurrence rate needs longer follow-up.

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Authors:

Xueyan Li Liyu Cheng Wen Xu	

Title: ***ARE THERE DIFFERENCES IN THE CRANIAL BASE OF HUMANS AND APES?***
Category: Basic Science

Abstract:

Objective: It has been proposed that there are differences in the angles of the skull base between humans, other hominid species and apes and these might account for the ability of humans to develop complex speech. The purpose of this study was to use a more sophisticated measuring device to compare midline skull base angles, and in addition, measure angles related to insertion of skull base musculature, to assess if there are differences between these species.

Methods: 126 human adult, 29 adolescent, 19 children and 13 fetus skull were compared to 32 ape skulls (10 pongo, 6 pan and 12 gorilla) and a subset of casts of non-human hominid casts were evaluated. Cranial base measurements were taken using an eMicroscribe 3d G2 digitizer. Midline and muscle insertion measurements were obtained.

Results: Results: There were statistical differences in both the midline angles of the skull base (humans, 119^o; apes, 130^o) and in the Skull base angles related to points of muscle insertion (humans, 113^o; apes, 124^o), with humans exhibiting a more acute angle than the apes.

Conclusion: The proposed acute angle differentiation of the midline skull base between humans and apes was confirmed with an alternate measurement method. In addition, the angles related to the insertion of the pharyngeal suspension muscles were also different. Whether these angular differences are the primary reason for the lower position of the larynx in humans and the potential for more complex speech is still in debate.

Authors:

Michael Benninger Kaylin Benninger Lyman Jellema Timothy Haffey	

Title: ***"Polypoid Degeneration in Turbinates and Vocal Folds Due to Respiratory Allergies and their Treatment***
Category: Medical

Abstract:

Objective:

Respiratory allergies provoke inflammation and polypoid degeneration in the nose, sinuses and larynx.

In the professional voice users these pathologies are influencing voice production.

The vocal folds can have oedema, polyps and haematomas due to respiratory allergies and vocal use.

Methods: In a group of 250 phoniatrical patients with voice pathologies we found 55% of benign lesions like nodules, cysts, polyps, queratosis.

From this 55%, 40% were patients with both pathologies due to respiratory allergies. Inferior turbinates with polypoid degeneration and polyps or polypoid degeneration also in the vocal folds were present.

The allergies tests were performed through quantitative Rast (Radio Allergo Sorbent Test) in blood. In the examination 65 different allergens 50 respiratory and 15 of the most frequent food allergens were tested.

60 % of these patients had endoscopical indirect phonosurgery of vocal folds and

radiofrequency treatment for turbinates. At the same time, they had at least one year of desensitization treatment for allergies.

Before and after phonosurgery 95% of the patients had voice therapy and 70% after turbinates radiofrequency treatment.

Voice placing, respiratory improvement and flexibility of voice in loudness and range were trained in voice therapy. Dynamic voice routines, semioccluded exercises were practiced by all patients.

Results: Conclusion

The respiratory allergies damage voice production and they need to be examined and treated in a complete schema.

Authors:

Eugenia Chávez	

Title: ***BOTOX INJECTION TO THE LATERAL CRICOARYTENOID MUSCLE IN A TRANSGENDER WOMAN WITH TREMOR: A CASE STUDY***
Category: Medical

Abstract:

Objective: Gender congruence is a goal for many transgender women. To achieve this, some go through intensive voice therapy addressing multiple aspects of vocal communication. Fewer have surgery with the goal of increasing pitch. For many, both intensive voice therapy and vocal surgery are either impractical or impossible. We postulate that botulinum toxin, commonly used in neurological conditions such as vocal tremor and vocal dystonia, when injected in the area of the lateral cricoarytenoid (LCA) muscles, may reduce glottal closure and result in a breathier and perceptually more feminine vocal quality compared to an individual's vocal baseline. Here we report the acoustic, aerodynamic, stroboscopic, auditory perceptual, and patient perceptual findings of bilateral LCA injections in a transgender woman with cervical dystonia and mild vocal tremor.

Methods: The patient received two rounds, greater than 3 months apart, of EMG guided botulinum toxin injections to bilateral LCA muscles. Acoustic and aerodynamic measures were completed at multiple time points before and after each injection. Auditory perceptual measures, stroboscopic examinations, and patient self-assessment tools were also completed.

Results: Preliminary findings include the patient reporting a more breathy and feminine voice quality after LCA injections. Pitch range restriction limited the patient's ability to drop into her lowest vocal range, which she also perceived as a positive effect. Aerodynamic findings include reduced maximum phonation time and increased peak and expiratory airflow in weeks following the injections. Stroboscopic, acoustic, and ratings of the auditory perceptual findings will also be reported. LCA directed Botox injections may be a useful method for temporary vocal feminization in some transgender patients. This case study lays the foundation for future prospective work.

Authors:

Patrick Kiessling Semirra Bayan Diana Orbelo	

Title: ***FACTORS INFLUENCING PURSUIT OF BOTULINUM TOXIN INJECTION FOR LARYNGEAL DYSTONIA PATIENTS***
Category: Medical

Abstract:

Objective: The purpose of this study is to examine some of the factors influencing the decision-making of spasmodic dysphonia (SD) patients in pursuit of Botulinum toxin A (BTX) injections. Despite BTX being the gold standard treatment, several drawbacks may prevent patients from starting and continuing BTX injections. Prior studies have identified factors such as the cyclical nature of side-effects, unpredictable treatment response, and the need for prolong use. However, some important factors such as demographics, socioeconomic status, comorbid psychiatric conditions, and other logistical issues may have been overlooked in prior studies. We aim to identify and examine these factors in more detail.

Methods: We performed a retrospective observational study of patients with the diagnosis of SD or other less common forms of laryngeal dystonia for whom BTX injections would be a viable option. A total of 25 patients from Oct 1, 2018 to June, 2020 were included in the study. A detailed chart-review was performed to determine the reason for pursuing or not pursuing BTX injections.

Results: Results TBD.

The results of statistical analysis were pending at time of abstract submission. Factors leading patients to pursue or dissuade patients for undergoing botulinum toxin injections can vary and be as diverse as the patient population. However, anticipating barriers may allow laryngologists to utilize face-to-face time with patients to discuss and allay fears.

Authors:

Mausumi Syamal Babak Sadri Hope Kincaid	

Title: ***REFERENCES VALUES FOR THE CURRENT PERCEPTION THRESHOLD IN THE PHARYNX BASED ON A STUDY OF A HEALTHY POPULATION***
Category: Medical

Abstract:

Objective: Objective:The current perception threshold (CPT) has been widely used in the field of sensory nerve quantitative detection. The application of CPT in pharyngeal sensory abnormalities has rarely been studied, and there is a lack of reference values for this application. This study aims to establish a normal reference range for CPT in the pharynx based on a study of a healthy population.

Methods: Methods: The CPT values of the palatoglossal arch, posterior 1/3 of the lingual body and hard palate were measured in 60 healthy individuals at 2000, 250, and 5Hz. The influencing factors were analyzed, and reference values for the CPT were established.

Results: Results: 33 males and 27 females were included. The mean age was 38±21.25 years (range 23-72 years). There was no correlation between the CPT value and gender. Age was only correlated at 250Hz level in the hard palate. The CPT values of the palatoglossal arch were 324.95 ± 82.422 at 2000Hz, 66.90 ± 38.622 at 250Hz, and 13 ± 14.93 (7.83-22.75) at 5Hz. The CPT values of the posterior 1/3 of the lingual body were 359.17 ± 76.299 at 2000Hz, 86.92 ± 35.151 at 250Hz, and 19 ± 15.73 (13.03-28.75) at 5Hz. The CPT values of the hard palate were 157.5 ± 61.75 (124-185.75) at 2000Hz, 57.63 ± 28.785 at 250Hz, and 22 ± 25.73 (11.03-36.75) at 5Hz.

Conclusions: We established a normal reference range of CPT values in the pharynx from measurements obtained from healthy population. The CPT values of the pharynx in healthy people are not related to gender. The CPT values of the hard palate for 250Hz stimulation are related to age, and there are no relationships between the CPT values and age for other fre[quencies and locations

Funding: Beijing Municipal Administration of Hospitals Clinical Medicine Development of Special Funding Support, Code. XMLX201848

Authors:

Wei Chang Ran Zhang Wen Xu	

Title: ***IMPACT OF FACIAL MASK ON AUDITORY-PERCEPTUAL AND ACOUSTIC CHARACTERISTICS OF VOICE AND SPEECH - PRELIMINARY FINDINGS***
Category: Medical

Abstract:

Objective: Objectives: This study examined the impact of wearing a facemask on auditory-perceptual and acoustic parameters of voice and speech signals.

Methods: Methods: Sixteen adults without current voice problems recorded standardised speech tasks with and without wearing either a surgical mask or a KN95 mask. Voice samples were perceptually judged by 12 speech language pathologists for dysphonia levels, speech sound clarify, and mask identification. Audio recordings were acoustically analysed for mean spectral levels at 0 -1kHz and 1 - 8kHz regions, harmonics-to-noise ratio (HNR), smoothed cepstral peak prominence (CPPS), and relative vocal intensity.

Results: Results: Auditory-perceptual judgements of dysphonia were not significantly different across mask and no-mask conditions (p = 0.151). Wearing a facemask significantly impact speech sound clarity with KN95 mask impacting more than surgical mask (p = 0.000). Listeners correctly identified that a mask was present in 67.8% and 51.8% of responses for KN95 and surgical mask, respectively (p = 0.002). There was significant attenuation effect on mean spectral level at 1 - 8kHz region for connected speech, but there was no significant effect of the masks on mean spectral levels at 0-1kHz. There was no significant effect of masks on mean spectral levels of vowel. HNR was higher in the mask-wearing conditions than the no-mask condition. CPPS and vocal relative intensity were not affected by wearing a mask.

Conclusions: Wearing a surgical mask or KN95 mask affected both auditory-perceptual and acoustic characteristics of the speech signals with the KN95 mask showing greater impact than surgical mask.

Authors:

Duy-Duong Nguyen Patricia McCabe Antonia Chacon Catherine Madill	

Title: ***Comparison of Two Voice Therapy Models***
Category: Speech Language Pathology

Abstract:

Objective: The current study compared Conversation Training Therapy (CTT) and the Global Voice Prevention Model (GVPM) in the prevention of voice problems. CTT uses the concept of “clear speech” in conversation to indirectly adjust voice production. The GVPM facilitates changes in voice production by determining the voice production technique or techniques that facilitates the best “new” vocal output(s), a bottom-up treatment hierarchy, production of “new” and “old” voice at each step of the hierarchy, and any additional methods that augment and support the target vocal output.

Methods: Using a counterbalanced alternating treatments single-subject design with multiple baselines, the authors compared CTT and GVPM in seven vocally healthy women. Graduate students studying speech-language pathology at West Chester University provided the therapy. We met once a week for an hour across eight weeks. Four weeks were dedicated to each model.

Results: Acoustic, perceptual, and aerodynamic measures were captured at pre and post for five days in the morning and in the evening using the smartphone/tablet application VoiceEvalU8. In addition, acoustic measures were collected before and immediately after each of the eight sessions. Survey data from the participants and the clinicians were also recorded at the conclusion of the eight sessions. Throughout the eight sessions, informal interviews were conducted to inquire about perceptions of the two therapy models.

Conclusions: Preliminary results suggested that the participants and clinicians prefer the GVPM.

We will present the two therapy models with videos, design of the study, and results obtained from VoiceEvalU8, survey data, and informal interviews.

Authors:

Elizabeth Grillo Meghan Farrell Marianna Flowers Katherine Gale Heidi Liebenberg	Caroline McLaughlin Tiffany Michael

Title: ***APPLICATION OF MACHINE LEARNING TO THE DETECTION OF VOICE DISORDERS: A PILOT STUDY***
Category: Speech Language Pathology

Abstract:

Objective:

Auditory-perceptual and acoustic analyses, despite being frequently adopted in clinical voice assessments, possess reliability and validity issues.

In light of these limitations, the use of deep learning (also known as deep neural network) was brought to interest in the field of voice science. A deep neural network (DNN) is an artificial neural network with multiple layers which can perform feature extraction and selection automatically for achieving desired output. The purpose of this study is to investigate the application of neural network model to the discrimination between dysphonic and non-dysphonic voice samples.

Methods:

120 voice samples will be obtained from 60 dysphonic and 60 non-dysphonic Cantonese-speaking subjects. Subjects will be required to sustain /a:/ at three Cantonese level tones (i.e. Tone 1, 3, and 6) for 5 seconds. In the training phase, 50 dysphonic and 50 non-dysphonic samples will be input to the neural network model for the detection and learning of dysphonic and non-dysphonic features. After the completion of the training phase, the DNN model will analyze 20 additional voice samples by using the previously learnt features, so as to discriminate the dysphonic voice samples from the non-dysphonic ones. The dysphonic voice samples discriminated using the neural network model will be compared to those discriminated using auditory-perceptual analysis.

Results: Results TBD

Findings on discrimination accuracy of the neural network model and the clinical implication of deep learning in voice disorders will be discussed in the presentation.

Authors:

Ka Man Li	

Title: ***EXPIRATORY MUSCLE STRENGTH TRAINING FOR TREATMENT OF CHRONIC COUGH***
Category: Speech Language Pathology

Abstract:

Objective: EXPIRATORY MUSCLE STRENGTH TRAINING AS TREATMENT FOR CHRONIC COUGH.

Objective: . Patients with long term chronic cough often complain of breathing difficulties and hoarseness as secondary symptoms. Expiratory muscle strength training (EMST) has been suggested as a behavioral method for treating chronic cough refractory to medical management. The purpose of this prospective study was to determine if treatment focusing on muscle strength training improves cough.

Methods: Methods: Twenty Four subjects with chronic cough six months or longer who failed medical therapies were recruited for a four-week program of breath training. Patients with previous laryngeal surgery, neurological disorders or COPD were excluded. Patients followed an exercise regimen using the EMST 150 breath trainer consisting of 5 sets of 5 repetitions of a maximum exhalation for 5 days over 4 weeks. Patients completed self-assessment measures of cough and voice and aerodynamic measures of maximum inspiratory and expiratory pressures (MIP and MEP), mean air flow during phonation and maximum phonation time were obtained prior to and following the four week program.

Results: Results: After the four-week regimen, the CSI decreased in 17 of 19 patients and the MEP increased significantly in 18 of 19 patients. Patients reported up to 75% improvement in their cough. Those patients who reported a voice disorder also reported improved voice on the VHI-10.

Conclusion: Breath training has the advantage of simplicity in the treatment of chronic cough in patients unresponsive to medical therapy. Patients who succeed with breath training to control chronic cough may also find improved voice.

Authors:

Priya Krishna Thomas Murry Brianna Crawley Kassandra Quibin Jodi Datema	

Title: ***Beauty and attractiveness in the human voice***
Category: Speech Language Pathology

Abstract:

Objective: The objective of this study was to investigate the difference between vocal beauty and vocal attractiveness by determining whether perceptual ratings of vocal beauty and vocal attractiveness could be dissociated in a cohort of normal raters without a diagnosed sexual desire disorder.

Methods: Methods: 25 gay male participants were presented with randomly-chosen samples from the Geneva Voices and Faces Database, and were asked to rate each sample in terms of beauty, attractiveness for a relationship of short duration, and attractiveness for a relationship of long duration. Responses were recorded on a visual analog scale (0-100) using a touch-screen interface. Statistical analyses were done using two-way Analysis of Variance (ANOVA) tests and independent student's t-tests. P values were considered statistically significant at the P < 0.05 level.

Results: Participants rated male voices significantly higher in terms of beauty, attractiveness for a relationship of long duration, and attractiveness for a relationship of short duration (p<0.001). Participants rated female voices significantly higher for beauty than for attractiveness for relationship of long or short duration (p<0.001).

In a cohort of gay male raters without a diagnosed sexual desire disorder, vocal beauty and vocal attractiveness ratings of male and female voices are two related but distinct perceptual constructs that can, under certain circumstances, be dissociated. In general, gay men rated male voices equivalently for beauty, short-term, and long-term attractiveness, while the same ratings for female voices showed a significant difference between ratings of beauty and ratings of short-term and long-term attractiveness.

Authors:

Brian Petty Amanda Gillespie Sandeep Shelly Adam Klein	

Title: ***A SCOPING REVIEW OF THE EFFECTIVENESS OF VOICE THERAPY TO TREAT OLDER ADULTS WITH PRESBYPHONIA***
Category: Speech Language Pathology

Abstract:

Objective: Presbyphonia identifies vocal changes due to anatomical and physiological changes of the larynx occurring during the aging process. Voice therapies for presbyphonia have been shown to positively improve their vocal functions as well as their quality of life. The aims of this study were to review current voice techniques and approaches to treat presbyphonia, to identify outcome measures used for the efficacy of voice therapy, and to provide voice clinicians with an overview of evidence-based voice therapy for aging voice.

Methods: A literature search was conducted in CINAHL, MEDLINE, PubMed, Web of Science, and Embase database with two main concepts: (1) presbyphonia and (2) voice therapy. Furthermore, relevant journals were searched by hand. Selection criteria included original studies published in English or Korean between 2000 and 2020. Following the initial search, duplicates were deleted and the remaining articles were screened by the authors independently based on inclusion and exclusion criteria. In addition, the quality appraisal of studies was assessed using a modified version of Downs and Black's checklist.

Results: Out of 271 publications retrieved in the database and searched by hand, 124 studies were screened with titles and abstracts after deleting duplicates. Sixty-one items are now under the second review with full texts and the assessment of quality appraisal by the authors independently. Results of this review will be discussed in relation to current knowledge about treating presbyphonia and suggestion of future research to improve the understanding of voice treatment for presbyphonia.

Authors:

Hyunhwa Lee Richard Morris	

Title: ***Physiological Effect of Voice Therapy for Aged Vocal Fold Atrophy Revealed with EMG Study***
Category: Speech Language Pathology

Abstract:

Objective: Objectives: Age-related voice change is characterized as weak, harsh, and breathy. These changes are caused by histologic alteration of the lamina propria of the vocal fold mucosa and atrophy of the thyroarytenoid muscle as well as decreased respiratory support. Treatments for aged atrophy include surgical approaches such as framework surgery and injection laryngoplasty, but effects of them have been limited. There are several clinical studies for presbylarynx dysphonia, and they showed the effectiveness of voice therapy. However, it hasn't been verified physiologically what voice therapy has worked for presbylarynx. The purpose of this prospective study was to demonstrate the clinical effectiveness of voice therapy for rehabilitating presbylarynx dysphonia, using vocal functional assessments and a firing rate variability of thyroarytenoid muscle on laryngeal electromyography (LEMG).

Methods: Methods: Ten patients who were diagnosed as aged vocal fold atrophy aged from 60 to 87 years (M=72) underwent approximately 12 weeks course of voice therapy mainly using vocal function exercises (VFE). Stroboscopic examination, aerodynamic assessment, acoustic analysis, voice handicap index (VHI) - 10 and LEMG were performed at pre and post voice therapy. Normalized mucosal wave amplitude (NMWA) were measured by image analysis on the stroboscopic examinations. Mean firing rate during steady phonation on LEMG was also assessed.

Results: Results: Maximum phonation time, subglottic pressure, jitter, shimmer, NMWA and VHI-10 significantly improved after voice therapy. Mean firing rate on LEMG also significantly improved.

Conclusions: The data suggests that voice therapy may produce improvement on vocal function and thyroarytenoid muscle activity for aged vocal fold atrophy patients.

Authors:

Mami Kaneko Yoichiro Sugiyama Shigeru Hirano	

Title: ***PITCH BIOFEEDBACK WITH A SMARTPHONE FOR TRANSGENDER WOMEN: A PILOT STUDY***
Category: Speech Language Pathology

Abstract:

Objective: Speech feminization for trans(gender) women should focus on speech characteristics that contribute the most to female gender perception, such as pitch and resonance. This study mapped smartphone applications that can provide biofeedback on pitch for this population and compared results with software program Praat.

Methods: 4 applications were selected which can measure fundamental frequency (f_o): Voice Pitch Analyzer, Voice Tools, Voice Analyst and Vocular. Voice samples of 6 cis(gender) men, 6 cis women and 6 trans women were collected, including a sustained vowel and phonetically balanced text. To compare differences in pitch measured by an Android smartphone and Praat, parallel forms reliability was examined by calculating intraclass correlation coefficients (ICCs). Measurements were performed twice on each subject to verify test-retest reliability, which was determined with ICCs as well. User-friendliness of the applications has been examined through a survey, completed by 3 speech-language pathologists.

Results: Parallel forms reliability showed very good correlation in Voice Tools and Voice Pitch Analyzer, both for sustained vowel and text level and for all groups. In Voice Analyst, f_o in vowel (cis women) and text (cis men) measurements have respectively good and fair correlation and Vocular showed moderate correlation of f_o for sustained vowel (cis women). Very good ICCs were observed for test-retest reliability between first and second measurement for both vowel and text, for all apps. Concerning user-friendliness, Voice Analyst and Voice Pitch Analyzer received the highest scores. Based on this pilot study, clinical significance of implementation of these smartphone applications within speech therapy could be investigated.

Authors:

Clara Leyns Eveline Vanhoof Marjan Cosyns John Van Borsel Evelien D'haeseleer	

Title: ***PHONATION RESISTANCE TRAINING EXERCISES (PHORTE) WITH AND WITHOUT EXPIRATORY MUSCLE STRENGTH TRAINING (EMST) FOR PATIENTS WITH PRESBYPHONIA: A NON-INFERIORITY RANDOMIZED CLINICAL TRIAL***

Category: Speech Language Pathology

Abstract:

Objective: Presbyphonia negatively impacts quality of life in patients with age-related voice changes. A proof-of-concept study showed promise for high vocal intensity exercise to treat presbyphonia, which became the basis for a novel intervention for age-related voice changes known as Phonation Resistance Training Exercises (PhoRTE). Expiratory Muscle Strength Training (EMST) has also been proposed as an additional intervention to target and strengthen the aging respiratory system; however, EMST has undergone limited evaluation as an adjunct treatment for elderly patients undergoing voice therapy for presbyphonia. This study determined if the addition of EMST to PhoRTE voice therapy (PhoRTE + EMST) is at least as effective at voice improvement as PhoRTE alone.

Methods: Prospective, randomized, controlled, single-blinded, non-inferiority clinical trial. Participants aged 55 years or older with a diagnosis of vocal fold atrophy were randomized to complete PhoRTE therapy or PhoRTE + EMST. The primary outcome was change in Voice Handicap Index-10 (VHI-10). Secondary outcomes included the Aging Voice Index, maximum expiratory pressure, and acoustic and aerodynamic measures of voice. Repeated measures linear mixed models were constructed to analyze outcomes at a significance level of a = 0.10.

Results: Twenty-six participants were recruited for the study, and 24 participants were randomized to either treatment arm. Sixteen participants completed the entire study. Both treatment arms showed statistically significant and clinically meaningful improvements in VHI-10 (PhoRTE mean [M] = -8.20, P < 0.001; PhoRTE + EMST M = -9.58, P < 0.001), and PhoRTE + EMST was noninferior to PhoRTE alone (P = 0.069). Both groups experienced a statistically significant pre-post treatment decrease (improvement) in AVI scores (PhoRTE M = -18.40, P = 0.004; PhoRTE + EMST M = -16.28, P = 0.005). PhoRTE+EMST had statistically significantly greater changes in maximum expiratory pressure compared to PhoRTE alone (PhoRTE M = 8.24 cm H2O, PhoRTE + EMST M = 32.63 cm H2O; P= 0.015). Some secondary acoustic and aerodynamic outcomes displayed trends toward improvement. This study demonstrates that voice therapy targeting high vocal intensity exercise (eg, PhoRTE) and EMST can play a role in improving voice outcomes for patients with presbyphonia.

Authors:

Michael Belsky Shelly Sandeep Scott Rothenberger Aaron Ziegler Bari Hoffman	Edie Hapner Jackie Gartner-Schmidt Amanda Gillespie

Title: ***VOICE CHANGES IN TRANSMASCULINE INDIVIDUALS FOLLOWING CIRCUMLARYNGEAL MASSAGE AND LARYNGEAL REPOSTURING***
Category: Speech Language Pathology

Abstract:

Objective: This study measured the effect of circumlaryngeal massage and laryngeal reposturing on acoustic and perceptual characteristics of voice in transmasculine individuals.

Methods: Fifteen transmasculine individuals (M = 27.3 yrs) underwent one session of circumlaryngeal massage and laryngeal reposturing with a speech-language pathologist. Voice recordings were collected pre-training, post-massage, and post-reposturing. For each participant and timepoint, f_o and relative f_o (RFF; an acoustic correlate of laryngeal tension) were measured. Formant frequencies were used to estimate vocal tract length (VTL). Masculinity of paired voice samples were rated by eight listeners, with ratings analyzed via Thurstone's law of comparative judgment. Repeated measures one-way analyses of variance measured the effect of timepoint on f_o and estimated VTL. Post hoc t tests compared differences between timepoints. Relationships between changes in f_o and estimated VTL and changes in RFF were measured with Spearman's correlation coefficients. Factors related to self-evaluation of voice were evaluated qualitatively.

Results: There was a significant effect of timepoint on f_o (p=0.008, F=5.21) and estimated VTL (p=0.006, F=6.10). Post hoc testing identified significant differences in f_o between post-massage and post-reposturing (t=–3.36, p=0.006), and in estimated VTL between baseline and post-reposturing (t=3.40, p=0.006). There were no significant relationships between changes in RFF and changes in f_o or estimated VTL. The lack of such a relationship suggests that observed voice changes may not depend upon a reduction in laryngeal tension. Individuals reporting a difference between their ideal and current voices showed a greater decrease in f_o and estimated VTL. Auditory-perceptual results are in process.

Authors:

Kimberly Dahl Felicia François Daniel Buckley Cara Stepp	

Title: ***FITNESS INSTRUCTION AND VOCAL FUNCTION: SYNTHESIZING SCIENTIFIC LITERATURE ACROSS MULTIPLE DISCIPLINES TO INFORM CLINICAL PRACTICE*****.**
Category: Speech Language Pathology

Abstract:

Objective: Fitness instruction usually involves sustained phonotraumatic behaviors in suboptimal acoustic environments with increased cognitive and metabolic load. It stands to reasons that additional physiological mechanisms (such as metabolic mechanisms and cognitive load) may need to be considered for effective dysphonia-management in this population.

In terms of the specific physiological mechanisms under consideration, – apart from a reportedly high phonatory dose – simultaneous physical exertion can increase overall metabolic demand and cognitive load. When phonation and exercise compete for the same metabolic/aerobic resources, anaerobic pathways may be utilized in the working muscles required to sustain both activities. Anaerobic resource reliance may be indicative of inefficient voice production. Competing cognitive resources may decrease accuracy in each task individually (also resulting in inefficient voice production) or decrease generalization of dysphonia-management strategies during instruction (example: sustained resonant voice). Extended periods of physical exertion alone can alter thermoregulation and subsequently hydration state. Dehydration and decrements in vocal function have been linked in the literature. Lastly, qualitative data from this population describe suboptimal psychosocial environments (lack of managerial and peer support) potentially resulting in unmitigated dysphonia symptomology.

In this presentation, we will synthesize the current literature on these identified physiological mechanisms (i.e., phonatory dose, dehydration, metabolic mechanisms, cognitive load, psychosocial factors) in the context of muscle physiology. Understanding potential mechanisms at play could aid in extending population-specific recommendations for clinical practice.

Methods: Cross-disciplinary literature review

Results: n/a

Authors:

Anumitha Venkatraman Robert Fujiki Preeti Sivasankar	

Title: ***Listeners' Attitudes towards Young Women Using Glottal Fry***
Category: Speech Language Pathology

Abstract:

Objective: The purpose of this study is to identify employers' perceptions of young female speakers presenting with glottal fry. Specific questions include: (a) if a glottal fry in young female speakers will lead to negative perceptions and impact their hirability, and (b) if there are generational differences regarding perceptions of glottal fry use in young women.

Methods: Sixty participant responsible for hiring at their business or company throughout the Southern region of the United States completed a survey that was developed to capture employers' perceptions of young women who use glottal fry. The survey included voice samples of young women with varying levels of glottal fry and 14 semantic differential items to identify perceptions of employers toward young women with glottal fry. The semantic differential items were derived from the hiring constructs literature to target mental capability, personality tendencies, and applied social skills. Additional questions pertaining to hirability were also captured at the end of the survey.

Results: Descriptive inferential analysis revealed that employers perceived individuals using intermittent and continuous glottal fry negatively compared to the individual with no glottal fry. Employers indicated they were less likely to hire individuals who use a continuous glottal fry compared to individuals with no glottal fry or intermittent glottal fry. Overall, the presence of glottal fry negatively impacts employers' perceptions of young women and their perceived hirability. These results further highlight the importance of the relationship between vocal quality and listener perceptions.

Authors:

Natalie Foulks Chaya Nanjundeswaran Miriam vanMersbergen Brenda Louw C. Allan Gorman	

Title: ***Clinician and Gender-Expansive Consumer Perspectives on Gender-Affirming Voice Services***
Category: Speech Language Pathology

Abstract:

Objective: A significant portion of the gender-expansive community experiences gender-related voice issues. However, barriers exist to accessing gender-affirming voice care, and most voice research excludes the gender-nonbinary/nonconforming population. Our study aims to examine gender-expansive consumer engagement and compare/contrast consumer and speech-language pathologist (SLP) perspectives on gender-affirming voice services. A secondary aim assesses possible voice impairments in gender-expansive individuals.

Methods: Two surveys were distributed via listservs for SLPs and flyers and social media posts for gender-expansive consumers. Surveys included items regarding experience with and accessibility of gender-affirming voice services and clinician competence. Consumers and clinicians answered the same questions from their respective positions. Consumers additionally completed the VHI-10.

Results: Forty-eight consumer and 54 clinician responses were collected. Twelve consumers were gender-nonbinary/nonconforming. VHI-10 responses were in the abnormal range for 61.4% of consumers, and 68.8% indicated desire to receive gender-affirming voice services, including 58.3% of gender-nonbinary/nonconforming respondents. However, only 6.25% considered themselves as having a voice disorder and 29.2% reported their voice impairs communication. In contrast, 24.1% of clinicians felt gender-expansive individuals have a voice disorder and 51.2% felt they have an impaired communication ability. Consumers indicated positive perceptions of voice services/providers but the majority reported barriers to access. SLPs indicated mixed confidence in accessibility of services. Both groups perceived a cost barrier. This study demonstrates the desire and need for gender-affirming voice services and is the first to include gender-nonbinary/nonconforming individuals' perspectives. Understanding how consumer and clinician perspectives differ can help focus provider efforts in improving access to and visibility of gender-affirming voice services.

Authors:

Dominic Moog Lauren Timmons Sund	

Title: ***IDENTITY AS A FACTOR IN VOICE DISORDERS AND VOICE CONCERNS***
Category: Speech Language Pathology

Abstract:

Objective: This research aims to study the relationship between 1) strength of orientation to personal or social identity; and 2) group membership in a vocally healthy, dysphonic, or voice modification population of people who are cis-gender or transgender or non-binary. Hypotheses are that participants who are cis-gender and dysphonic will be strongly oriented to social identity while participants who are transgender or non-binary and seeking voice modification services will be strongly oriented to personal identity. This study will be a foundation for future exploration of the intersection between identity, benign voice disorders, and outcomes of voice rehabilitation.

Methods: Voice professionals (e.g., speech-language pathologists, voice teachers) were emailed an invitation to participate in an online survey and encouraged to pass the link to individuals of their choosing. The survey was built using Qualitrics and captured demographic information including age, gender, vocal health, and satisfaction with current voice. Then, the participants completed three successive online surveys, the Social and Personal Identities Scale (SIPI; Nario-Redmond et al., 2004), the Aspects of Identity Questionnaire (AIQ-IV, Cheek & Briggs, 2013), and the Vocal Congruence Scale (VCS; Crow, van Mersbergen, & Payne, 2019). The SIPI and the AIQ-IV have been validated with multiple populations. Validation of the VCS is ongoing.

Results: To date, 67 individuals have responded to the survey. Analyses are ongoing. Results TBD.

It is anticipated that results will shed initial light on the critical role of identity in voice and voice modification, historically discussed but thus far without theoretical framework or experimental approach.

Authors:

Marianna (Annie) Rubino Katherine Verdolini Abbott	

Title: ***PERFORMERS' PERCEPTIONS OF VOICE CHANGE WITH ORAL STEROID TREATMENT OF VOCAL FOLD EDEMA***
Category: Speech Language Pathology

Abstract:

Objective: Acute vocal fold edema (VFE) is a consequence of illness, allergy, or voice overuse. WhileVFE typically resolves with voice rest and treatment of predisposing causes, oral steroids are often considered for performers with imminent performance demands. Previous study has shown improvements in videostroboscopic, acoustic/aerodynamic, and audio-perceptual assessment, with few adverse outcomes, but there lacks study reviewing performers' perceptions of vocal change during treatment. This study aims to examine performers' self-perceptions of vocal function with steroid treatment.

Methods: Fifty-five performers diagnosed with VFE who chose treatment with a 6-day methylprednisolone taper were prospectively assessed. They completed the Evaluation of the Ability to Sing Easily (EASE) and reported on voice use, performance obligations, performance ability and satisfaction daily. Findings were compared between days 1 and 6 using paired t-tests and the nonparametric Wilcoxon signed-rank test.

Results: Nearly all subjects completed scheduled performances without interruption. All EASE subcales decreased (Vocal Function 29.78 to 20.59; Pathologic Risk Indicator 26.60 to 17.33; Vocal Concerns 6.10 to 4.20). These differences were statistically significant (p<0.0001) and greater in subjects with scheduled performances. Findings demonstrated significant improvements in several facets of performers' function.

Significant improvements in vocal function were observed following glucorticoid treatment. Future studies should include a control group for confirmation. It is important that laryngeal examination occur before consideration of glucorticoids. This should be repeated when dysphonia persists, or when patients seek repeated treatment, as there may be risk of adverse outcomes, and continued steroid use may mask chronic pathology that is best treated by other means.

Authors:

Christine Murphy Estes Keith Chadwick Babak Sadoughi Katerina Andreadis Scott Sussman	Lucian Sulica

Title: ***RECOVERY PATTERNS AFTER VOCAL LOADING USING PRESSED VOICE QUALITY IN NORMAL ADULTS***

Category: Speech Language Pathology

Abstract:

Objective: Objective: The effect of several vocal loading tasks (effort or stress produced on the vocal mechanism) as a result of altered frequency, intensity & duration has been studied earlier. This study aimed to estimate the impact of vocal loading and recovery patterns using pressed voice quality (non-conventional method) in adults.

Methods: Method: Twenty healthy adults (10 males & 10 females) read a standard passage using different pressed voice qualities (squeaky high pitched, harsh/raspy voice & third task of alternating between squeaky and harsh voice) for 30 minutes. Voice samples were recorded using MDVP and analysed using PRAAT software. MPT, s/z ratio, GRBAS & self-perceptual evaluation using VFI were obtained prior to, post vocal loading & one week after the loading task. ANOVA and paired t-test were used to compare the impact of vocal loading (pre, post & recovery) on vocal measures. Intra-class correlation was done to estimate the inter-rater reliability for perceptual voice rating.

Results: Results: Significant changes in quality of voice were observed (more roughness & strain) in the perceptual measures. Variation in loudness maintenance (shimmer values) was evident although other acoustic measures were not significant. The self-perceptual evaluation indicated significant differences as a result of vocal loading. After one week of post vocal loading, all parameters returned to near baseline, indicating recovery after vocal loading.

Conclusion: The findings facilitated to understand the changes in vocal measures using a non-conventional vocal loading task. These outcomes can be applied to assess vocal endurance and susceptibility to develop voice problems in mimicry artists/impersonators.

Authors:

Bhuvaneshwari Senthilkumar Aishwarya Nallamuthu Prakash Boominathan	

Title: ***CHANGES IN VOCAL MEASURES IN CALL CENTRE OPERATORS DURING ONE WORKING DAY***
Category: Speech Language Pathology

Abstract:

Objective: Call Centre Operators (CCOs) are often compelled to use their voice for prolonged duration making them susceptible to develop voice related problems. The study aimed to document vocal changes amongst CCOs throughout one working day and at the beginning of the next day, interspersed with a recovery time.

Methods: Fifty CCOs, from domestic and international sectors participated. Voice evaluation included acoustic, perceptual, aerodynamic and self-perceptual measures. These vocal measures were obtained in their work environment at three different points of the day (before the commencement of the shift, during break time & after the end of shift). Recovery measurements were obtained before their next shift. ANOVA was used to compare the vocal measures at different measurement points.

Results: Results: Dryness of throat and voice breaks was commonly reported. Increase in F₀ was noted in both sexes (significant differences in males). MPT and s/z values worsened as the day progressed but became better during recovery measurement. Perceptual variation in voice from normal to hoarse/strained quality and increased VFI scores at the end of the work-day indicated the impact of vocal loading. However, these changes were temporary and reverted back to baseline measure after recovery, suggesting voice rest as an option to recover voice after a daylong of job-related vocal activity.

Conclusion: The subtle changes in voice due to vocal loading in CCOs in a naturalistic working environment were documented. This signified the need to create awareness in identifying early signs of voice problems and facilitate healthy voice practices in CCOs.

Authors:

Sahana Rajaram Aishwarya Nallamuthu Prakash Boominathan	

Title: ***IN-FIELD RELATIVE FUNDAMENTAL FREQUENCY VIA NECK-SURFACE VIBRATION IN PATIENTS WITH VOCAL HYPERFUNCTION AND VOCALLY HEALTHY CONTROLS***
Category: Speech Language Pathology

Abstract:

Objective: The goals of this study are to measure in-field relative fundamental frequency (RFF) via a noise-robust, neck-surface accelerometer (ACC) during ambulatory voice monitoring and to determine if in-field analysis results produce comparable results to in-lab differences in RFF measures between patients with phonotraumatic (PVH) and non-phonotraumatic (NPVH) vocal hyperfunction and vocally healthy controls.

Methods: During a week of ambulatory voice monitoring, participants wear an ACC connected to a smartphone during their waking hours. Each morning, they are prompted to rate their vocal status and produce three consecutive /afa/ gestures—vowel-fricative-vowel strings used for RFF measurement. Participants are then alerted at hourly intervals to indicate whether their overall vocal status has changed since their last response and, if so, to repeat the /afa/ gestures. The ACC signal is analyzed via a validated algorithm to obtain RFF for ten onset and ten offset cycles per gesture. Weeklong RFF statistics are computed per participant.

Results: Based on initial descriptive analyses, patients with PVH show an expected trend of lower mean RFF compared to healthy controls. Patients with NPVH exhibited higher than expected mean RFF for certain offset cycles and Onset Cycle 1, warranting further investigation. The results of analysis of variance models for all RFF values and participant groups will be presented. Preliminary results demonstrate the feasibility and clinical validity of applying in-field RFF analysis during ambulatory voice monitoring, extending the utility of the RFF measure beyond the context of controlled laboratory environments.

Authors:

Katherine Marks Laura Toles Liane Houde Alessandra Verdi Matti Groll	Robert Hillman Daryush Mehta

Title: ***Cognitive Mechanisms in Pediatric Voice Therapy***
Category: Speech Language Pathology

Abstract:

Objective: In this preliminary study, the relationship between cognitive abilities and behavioral results of voice therapy for children with vocal fold nodules was examined.

Methods: Six children diagnosed with nodules, ages 4;05-9;02 underwent a series of cognitive tests from the NEuroPSYchological Assessment (NEPSY-II) (Korkman et al., 2007) spanning three cognitive domains: attention and executive functioning, sensorimotor functioning, and memory and learning. Children completed a standard course of "Adventures in Voice" therapy (Verdolini Abbott et al., 2015). During therapy, children were trained in "resonant voice" (Verdolini-Marston et al., 1995), shown to have therapeutic value for this population (Hartnick et al., 2018). Recordings of the vowel /a/ pre and post treatment were analyzed acoustically using the Cepstral Spectral Index of Dysphonia (CSID) (Awan, 2011; Awan et al., 2013) and perceptually using visual analog scales (VAS) for both severity and resonance.

Results:

Results indicated connections between multiple cognitive functions and voice outcomes. Specifically, cognitive flexibility and sensorimotor abilities correlated favorably with CSID scores. Both VAS-severity and VAS-resonance scores correlated with measures of auditory attention, inhibition, cognitive flexibility, sensorimotor abilities, and auditory long-term memory. Overall, results indicated that good performance on cognitive tests corresponded to improvements in acoustic and perceptual measures of voice.

As expected, age correlated with all cognitive subtests and voice outcome measures except for CSID. This reflects a natural trend of maturation in cognitive abilities with increasing age. However, in the current project, cognitive abilities were measured in isolated subtests, without capturing integration of cognitive functions. Future larger-N studies will build on present findings.

Authors:

Hagar Feinstein Ümit Daşdöğen Melissa Libertus Shaheen Awan Rhona Galera	Joseph Dohar Katherine Verdolini Abbott

Title: ***DEVELOPMENT OF AUDITORY-PERCEPTUAL SKILLS IN GRADUATE STUDENTS THROUGH CONSISTENT TRAINING***
Category: Speech Language Pathology

Abstract:

Objective: Objective: Optimal auditory-perceptual competency is a foundational skill in voice care. Proper training is warranted to ensure suitable preparation for application of perceptual means in evaluation and ongoing assessment of voice. The purpose of this presentation is to provide background regarding consistency of training perceptual methods to assess and treat voice.

Methods: Methods: Ratings of voice quality using auditory-perceptual measures were estimated prior and post systemized education in voice science and disorders using a standardized auditory-perceptual assessment tool, the Consensus Auditory Perceptual Evaluation of Voice (CAPE-V). Participants from a cohort of graduate students in speech-language pathology were asked to analyze 24 voice samples by estimating voice quality characteristics. Sixteen voice samples were categorized according to various degrees of dysphonia (i.e., mild, moderate, severe); the remaining eight voice samples included were classified as normal.

Results: Results: Statistically significant outcomes supported the hypothesis of changes upon designated training in auditory-perceptual professional skills. Additional considerations about differences in student ratings towards a target perceptual rating were attempted through examination of reliability within participants and with expert ratings. Expanded exploration of data entailed comparing results with objective parallel outcomes from the cepstral/spectral index of dysphonia (CSID) which quantifies the level of dysphonia in a sample. The CSID is based on the CAPE-V assessment scale and has been shown to correlate with the perceptual assessment of raters.

Conclusions:Clinicians oftentimes hesitate in determining perceptually-based voice characteristics, which may imply underexposure to the related subject. Findings of this introductory study suggest that perceptual methods can be effectively learned.

Authors:

Maria Claudia Franca Valerie Boyer Prativa Tripathee	

Title: ***IS THERE AN IDEAL DURATION TIME TO PERFORM THE LATEX TUBE?***
Category: Speech Language Pathology

Abstract:

Objective: SOVTE has been widely used in the voice clinic. Estimates of time to perform the technique with a flexible latex tube are still unknown. This study aimed to investigate the immediate effect of flexible latex tube on the water on amateur singers after one, three, five and seven minutes, considering: a) the singers' self-assessment regarding voice and vocal effort; b) acoustic parameters; and c) auditory-perceptual parameters of voice quality.

Methods: Method: 29 amateur singers (14 women and 15 men) performed the exercise with the latex tube (35cm X 0.9cm) in a one-minute series and three two-minute series. The data collection was made before and immediately after each series using sustained vowel [a].

Results: Results: Women and men were considered separately. Vocal self-assessment showed a statistically significant increase in negative feelings after seven minutes of exercise for women. Auditory-perceptual analysis indicated voices were perceived more often as “equal” comparing pre exercise with first minute series and more often as “better” in the third and fifth minutes comparing with pre exercise only for women. The other parameters did not show significance. Conclusion: The exercise with flexible latex tube in amateur singers promoted improvement in vocal quality after three and five minutes for women. Also, the women presented significant negative sensations after seven minutes. The immediate effect in the analyzed parameters was not observed in men.

Authors:

Mariana Bassetto Ana Carolina Constantini	

Title: ***The Sound of the Voice: An Interactive Play between the Ears and the Eyes?***
Category: Speech Language Pathology

Abstract:

Objective:

Objective: People with dysphonia are judged more negatively than their peers with normal vocal quality. These negative attitudes increase with increased severity of dysphonia. The purpose of this study is to investigate whether dysphonic speakers are judged more negatively - based on the perceptual and objective vocal characteristics - in comparison with age and gender-related subjects without dysphonia.

Methods:

Ten judges with no experience in the evaluation of the voices were asked to rate 10 subjects with dysphonia and 4 subjects without dysphonia in three different conditions. The first condition was the evaluation of the voice based on auditory samples. The second condition was the rating of the appearance and behavioural attitudes of the subjects based on visual information. The third condition was the rating of the subjects based on audiovisual information.

Results:

Results: In the first condition (auditory samples), significant correlations were found between the perceptual and objective vocal quality and the behavioural attitude. A more negative attitude (less intelligent, energetic, attractive, healthy,) was correlated with a more severe dysphonia. In the second condition, no significant correlations were found between the visual appearance and the attitude of the subjects. In the third condition, statistically significant correlations were found between the Dysphonia Severity Index and the cognitive attitudes illness and weakness.

Conclusion: The results of this study confirm the findings of previous studies, indicating that people hold relatively consistent negative attitudes towards people with voice disorders (more specifically with lower Dysphonia Severity value and higher G ratings).

Authors:

Kristiane Van Lierde Evelien D'Haeseleer Imke Kissel anke adriaansen	

Title: ***DEVELOPING EDUCATIONAL HEALTH MODULES TO IMPROVE VOCAL WELLNESS IN MASK-WEARING OCCUPATIONAL VOICE USERS***
Category: Speech Language Pathology

Abstract:

Objective: Objective: Facial masks have become commonplace during the COVID-19 pandemic. The beginning phase of our work found a significant change in voice acoustics and increase in self-perceived vocal effort in mask-wearing occupational voice users (i.e., healthcare professionals), as well as limited use of vocal health strategies. To address these problems, the second phase of our project aimed to develop educational resources to improve vocal wellness and optimize communication in mask-wearing workers.

Methods: Methods: Module development focused on identifying i) accurate, ii) accessible, and iii) actionable steps to improve vocal wellness in the workplace. First, we completed interviews with voice-specialized speech-language pathologists to gain further insights on vocal hygiene for mask wearers. Second, we created three audio/visual modules that were assessed for understandability and actionability via the Patient Education Materials Assessment Tool. Finally, we piloted the resultant modules with community members to acquire data on their ability to learn the content and implement vocal health strategies in the workplace.

Results: Results: Our work resulted in three educational modules: "The Impact of Masks on Communication," "Communication Strategies and Vocal Protection for Mask Users," and "Implementing Vocal Wellness Strategies in the Workplace." The modules identified and described key vocal health and communication tips (e.g., vocal naps, lip trills, clear speech).

Conclusion: We developed a set of free-to-use, educational modules to promote vocal wellness among mask-wearing occupational voice users. Future steps include an outreach campaign to help bring awareness to vocal health and provide tools to improve communication and vocal wellness among all mask-wearing community members.

Authors:

Victoria McKenna Renee Gustin Tulsi Patel Mariah Emery Courtney Kendall	Nicholas Kelliher Rebecca Howell

Title: ***IMPAIRED PITCH MATCHING IN A PROFESSIONAL SINGER AFTER COCHLEAR IMPLANT: A CASE STUDY***
Category: Speech Language Pathology

Abstract:

Objective: Determine whether a singer with impaired pitch accuracy/pitch perception can improve vocal performance through visual feedback and pitch memorization to compensate for impaired perception-production loop and impaired auditory processing for music.

Methods: Single case study "Charles": 73 y/o male semi-professional pop/jazz singer with bilateral sensorineural hearing loss s/p right cochlear implant with significant impairment of pitch perception/reduced pitch accuracy in singing. Significant quality of life deficit resulted. Training protocol was implemented to determine if the patient could improve pitch matching accuracy using visual feedback from electronic tuner app. Additional strategy was later added using pitch memorization and interval training.

Results: Baseline measurement of pitch matching accuracy using CI alone (e.g. without contralateral hearing aid): 7.7%. Training protocol was designed using electronic tuner app (insTuner) to provide visual feedback. With electronic tuner app, patient was able to achieve up to 85% accuracy in producing target pitch.

Charles was able to reliably produce F#2 using memorization and sensory feedback. He was then able to find target pitches by interval from the memorized pitch.

Charles demonstrates difficulty with music typical of CI recipients. Visual feedback and sensory feedback/memorization allowed him to apply musical knowledge to find starting pitch of songs. Improvement in pitch accuracy gave him the confidence to return to performing.

There are obvious limitations of single case study which was focused on therapeutic effectiveness vs research approach. However, the successful outcome of this case may form a basis for developing a more systematic protocol for retraining pitch in singers who receive cochlear implant.

Authors:

Leda Scearce Noelle Roth Calhoun Cunningham	

Title: ***TISSUE MOBILIZATION DURING DOUBLE SOURCE OF VIBRATION SEMIOCCLUDED VOCAL TRACT EXERCISES: A NECK AND FACE-SURFACE ACCELERATION STUDY***
Category: Speech Language Pathology

Abstract:

Objective: This study primarily aimed at observing the possible tissue mobilization on facial, neck, and chest tissues caused by different double source of vibration semioccluded vocal tract exercises (DSV-SOVTEs). Another goal was to examine the degree of self-perceived sensation of massage-like.

Methods: Sixty participants produced a series of several DSV-SOVTEs: (1) phonation with a silicon tube submerged 2 and 8 cm below water surface, (2) Acapella Choice PEP device, (3) lip trills. (4) tongue trills. Self-perceived massage-like sensation was also assessed. Tissue mobilization signal was captured by four accelerometers placed in four different body regions: (1) over the cheek, (2) over the neck, (3) over the thyroid cartilage, and (4) over the suprasternal notch.

Results: There is a differential effect of all DSV-SOVTE on tissue mobilization. All four observed dependent variables (tissue oscillation frequency, amplitude jitter and shimmer) showed significant interactions. In general, amplitude and frequency of tissue oscillation increases with the loudness level. Self-perceived massage-like sensation showed a highly significant difference between DSV-SOVTEs.

All DSV-SOVTE are capable to move tissues. Type of exercises, loudness level and body region produce an effect on all tissue oscillation variables. Acapella device produce the largest amplitude of vibration, lowest frequency and more regular oscillation of tissue. Water resistance therapy showed the most irregular tissue oscillation. Control of these variables is apparently relevant to obtained the best effect in patients.

Authors:

Marco Guzman Karol Acevedo Christian Castro Camilo Moran Camilo Quezada	

Title: ***IMMEDIATE AND SHORT-TERM EFFECTS OF STRAW PHONATION IN AIR OR WATER ON VOCAL FOLD VIBRATION AND SUPRAGLOTTIC ACTIVITY OF ADULT PATIENTS WITH VOICE DISORDERS VISUALIZED WITH LARYNGOVIDEOSTROBOSCOPY***

Category: Speech Language Pathology

Abstract:

Objective: The first purpose of this study was to investigate and compare the short-term effects of a semi-occluded vocal tract (SOVT) therapy session consisting of straw phonation in air or straw phonation in water on the vocal fold vibration and supraglottic activity of adult patients with voice disorders, visualized with laryngovideostroboscopy. The second purpose of this study was to investigate and compare immediate changes in the patients' vocal fold vibration and supraglottic activity during straw phonation in air or water, visualized with laryngovideostroboscopy.

Methods: Twelve adult patients with dysphonia (8 females, 4 males; mean age: 52 years) were assigned randomly to one of two groups: straw phonation in air or straw phonation in water. Immediately before and after a voice therapy session of 15 minutes, participants underwent a rigid laryngovideostroboscopy to determine the short-term effects of the straw phonation session on vocal fold vibration and supraglottic activity. At the posttherapy examination, a flexible laryngovideostroboscopy was added to the protocol to determine immediate changes occurring during straw phonation. All video samples of the performed examinations were evaluated randomly and blindly by three otorhinolaryngologists to assure interrater reliability. Ten percent of the videos were randomly repeated to assure intrarater reliability. The Voice-Vibratory Assessment with Laryngeal Imaging (VALI) form was used for these visual-perceptual evaluations.

Results: Data collection has been completed. Data analysis is currently being performed, and the results and conclusions will be available by the time of the symposium.

Authors:

Iris Meerschman Kristiane Van Lierde Evelien D'haeseleer Ghiath Alnouri Jacob Burdett	Jesse Palmer Bridget Rose Philip Doucette Robert Sataloff

Title: ***CHARACTERIZATION AND BIOMECHANICAL DEFINITION OF THE PHASES OF THE GLOTTIC CYCLE IN VOICE PATHOLOGY VERSUS NORMALITY GROUP***
Category: Basic Science

Abstract:

Objective: Objective. Correct screening for voice pathology is essential for the early and effective treatment of dysphonia. The objective of this work is to test the efficacy in the study of voice pathology by one of the tools proposed for the biomechanical study. Likewise, it is intended to extract the most significant correlates that allow establishing the general profile of dysphonia.

Methods: Methods. The study was carried out using a normal sample of 171 subjects and a pathology sample of 162 subjects. All patients underwent an ENT study that included clinical examination and image capture by fibroscopy. Voice recording and extraction of biomechanical parameters was performed using the Online-Lab tool licensed from Voice Clinical Systems.

Results: Results and Conclusions. Values with statistical significance are obtained that allow defining F0 in the pathology group, two production models associated with the modification of F0 are identified. Likewise, the values of obtained in the correlates of tension and glottic force are relevant, it is appreciated that the pathology of the organic voice is associated with an exhaustion and weakness reflected in the parameters of tension and glottic force. There are significant statistical values that point towards an increased open phase, regardless of the presence of GAP, and a longer duration of the return phase (closing). Biomechanics of the voice allows to characterize the dynamics of the free edge, allowing a more precise diagnosis and providing relevant information for the treatment.

Authors:

Roberto Fernández-Baillo Isabel Cardoso López	

Title: ***EFFECT OF DYSPHONIC SPEECH ON INTELLIGIBILITY IN PRIMARY CLASSROOMS***
Category: Basic Science

Abstract:

Objective: School children need clear auditory signals and low background noise to learn. When classroom acoustics are poor, teachers often compensate by raising their voices, usually with limited effect against background noise, and, long-term, this makes vocal overuse the primary cause (60%) of the high prevalence of voice problems in teachers. This study extends an important pairing of problems related to student learning: classroom acoustics and teachers with voice disorders. It provides important insights into the enormous variability in speech intelligibility in classrooms by characterizing students' intelligibility when students receive degraded auditory input. The degraded auditory input results from the intersection of classroom acoustics and poor teacher voice quality.

Methods: Speech intelligibility tests were performed in primary schools with normal hearing students using words produced by an actor with normal voice quality and simulating a dysphonic voice. The speech was played by a Head and Torso Simulator. Artificial classroom noise and classrooms with different reverberation times were used to obtain a range of Speech Transmission Index from 0.2 to 0.7 (from bad to good).

Results: Results showed a statistically significant decrease in intelligibility when the speaker was dysphonic with a maximum of 15% intelligibility loss.

Authors:

Pasquale Bottalico Silvia Murgia	

Title: ***Age and gender differences in Dutch intonation***
Category: Speech Language Pathology

Abstract:

Objective: This study investigated whether intonation is influenced by age and gender and obtained normative data for the intonation of Dutch speaking cis women and cis men in Flanders, Belgium, per age group.

Methods: 105 cis women and 102 cis men were included and equally spread in five age groups by gender. Semi-structured voice samples of connected speech were elicited using a prosody questionnaire. An objective acoustic analysis was performed to determine and compare four intonation parameters (general intonation shift, general pitch range, final intonation shift and pitch variation index) between age and gender groups. The intra- and inter-rater reliability was calculated using the Intraclass Correlation Coefficient (ICC)

Results: Women used a higher percentage of general upward and downward intonation shifts than men. Men generally used more flat intonation shifts than women. A larger mean value was observed in women as compared to men for each of the continuous intonation parameters per sentence type. In terms of age, differences in continuous intonation parameters were found between younger and older age groups, in which the younger age groups showed smaller mean values for all parameters.

Conclusion: Women use a more expressive intonation than men. In terms of age, older persons showed a more expressive intonation in a number of sentences compared to younger persons. The prosody questionnaire and the normative data from this study can be used to determine speech therapy goals.

Authors:

Evelien D'haeseleer Clara Leyns Tilde Feryn Sarah De Baer Kim Bettens	Paul Corthals

Title: ***INTELLIGIBILITY IN AURALIZED CLASSROOMS: THE EFFECT OF DYSPHONIA***
Category: Basic Science

Abstract:

Objective: Voice disorders reduce speech intelligibility. This study evaluated the effect of noise, voice disorders, and room acoustics on vowel intelligibility.

Methods: Twenty-nine college students listened to 11 vowels in /h/-V-/d/ format. The speech was recorded by three adult females with dysphonia and three adult females with normal voice quality. The recordings were convolved with two oral-binaural impulse responses with 0.4 s and 3.1 s of reverberation time.

Results: The intelligibility and the listening easiness were significantly higher in quiet condition, when the speakers had normal voice quality and in low reverberated environments, while the response time of the listener was longer in noise condition.

Authors:

Silvia Murgia Tomas Sierra Keiko Ishikawa Pasquale Bottalico	

Title: ***SYSTEMATIC REVIEW OF LITERATURE ON TELEPRACTICE AND SPEECH-LANGUAGE PATHOLOGY IN TIMES OF COVID-19 PANDEMIC***
Category: Speech Language Pathology

Abstract:

Objective: To characterize the scientific evidence related to the use of technologies used during telepractice by speech-language pathologies in times of COVID-19.

Methods: A systematic review of the literature was carried out following the steps of the PRISMA methodology. The keywords were defined using the DeCS of the Virtual Health Library (VHL). The included database was ScienceDirect, PubMed, Medline, and Web of Science. Duplicates were eliminated through the Zotero software. Then, titles and abstracts were read and those that met the inclusion criteria were included (language: English, Spanish and Portuguese; explicitly mention of telepractice in speech therapy). After, the "Quality assessment tool for quantitative studies" was used to assess the quality of the publications.

Results: 10 publications were included, of which 6 were guidelines, and 4 presented results of research including humans. Among those 4 publications, quality assessment was perform finding that all publications were rated as weak evidence. The analysis of authorship and origin of the publications indicates that most of the articles included come from Asia. Finally, the use of technologies and applications as well as platforms to facilitate communication and care for users with a history of COVID-19 was reported.

Authors:

María Rincón-Pinilla Jeison Hernández-Contreras Claudia Herrera Guzmán Angie Peña-Campagnoli Gina Florez Lancheros	Lady Cantor Cutiva

Title: ***Cortical and Acoustical Correlates of Vocal Clarity When Adopting to Internal vs. External Focus of Attention***
Category: Speech Language Pathology

Abstract:

Objective: Objective: This study investigates the cortical and acoustical correlates of internal vs. external focus of attention in voice learning. Literature suggests that the external focus of attention improves both performance and learning. However, previous studies have confounded locus of attention (internal vs. external) with type of attention (biomechanical vs. movement effects) for learning results. This project intends to unravel this confound in a voice learning task, directing participants' focus of attention either internal-biomechanical or external-biomechanical movement outcomes.

Methods: Methods: The design is a randomized, between-subject design. Participants are instructed to produce "clear voice," focusing on either (a) anterior oral vibrations (internal focus) or (b) the sound in the room (external focus). Subjects will alternate between the voice task and a cognitive task (Tower of Hanoi game). Dependent variables used to examine the effect of cognitive load on task performance include measures derived from the long-term average spectrum of voice (LTAS/LTA Power Spectrum), (CQ_{EGG}), and functional near-infrared spectroscopy – (fNIRS) (changes in concentration of prefrontal region oxyhemoglobin (HbO) and deoxyhemoglobin – (HbR) in the prefrontal cortex).

Results: Results/Conclusion: It is anticipated that instructions around an internal, outcomes-oriented locus of attention will yield results equivalent to those for the external oriented locus of attention, as subjects' attention will be directed to movement outcome in both conditions. Findings to this effect would provide preliminary evidence that, findings from past studies on the benefits of an external focus of attention in motor learning are actually attributable to attention to movement outcome, regardless of attentional location.

Authors:

Katherine Verdolini-Abbott Nancy Getchell Reza Koiler Elham Bakhshipour Shaheen Awan	Ümit Daşdöğen

Title: ***Immediate effects of a semi-occluded water-resistance ventilation mask on objective and subjective vocal outcomes in musical theater students***
Category: Speech Language Pathology

Abstract:

Objective: Traditional semi-occluded vocal tract exercises (SOVTEs) are restricted to single phoneme tasks due to the semi-occlusion at the mouth, which hinders full articulation, continuous speech and singing. Innovative SOVTEs should overcome this limitation by creating the semi-occlusion outside the oral cavity.The purpose of this study was to investigate the immediate effects of a semi-occluded water-resistance ventilation mask, that allows for continuous speech and singing, on objective and subjective vocal outcomes in musical theater students.

Methods: A pre-/post-test randomized controlled trial was used. Twenty-four musical theater students (16 women and 8 men with a mean age of 21 years) were randomly assigned into a study group and a control group. The study group received a vocal warm-up session with the innovative water-resistance ventilation mask (tube attached to the mask outside the mouth), whereas the control group received the traditional water-resistance approach (tube inside the mouth). Both sessions lasted 30 minutes and were similar with respect to vocal demand tasks. A multidimensional voice assessment including objective and subjective outcomes was performed pre- and post-training by an assessor blinded to group allocation.

Results: Both the innovative water-resistance ventilation mask and the traditional water-resistance exercise seem effective vocal warm-up exercises for musical theater students. The additional articulatory freedom of the mask might increase the phonatory comfort and the practical implementation of SOVTEs in the daily vocal warm-up of (future) elite vocal performers. The hypothesis of a higher transfer to continuous speech or singing in the mask condition has not been supported by the current study.

Authors:

Iris Meerschman Kristiane Van Lierde Yvonne Redman Lidia Becker Ayla Benoy	Imke Kissel Clara Leyns Julie Daelman Evelien D'haeseleer

Title: ***RESPIRATORY PARTICLE EMISSION DURING VOICE ASSESSMENT AND THERAPY***
Category: Speech Language Pathology

Abstract:

Objective: We published a single-subject study Respiratory Particle Emission During Voice Assessment and Therapy Tasks in a Single Subject in Journal of Voice, which indicated that voice therapy and acoustic tasks combined generated more particles than baseline and speech. However, respiratory particle emission can significanlty vary by person. The objective of this study is to measure particle emission for additional participants using a refined testing protocol.

Methods: Data collection is ongoing. Respiratory particle emission will be measured using an optical particle sizer (particle sizes 0.3-10μm). Participants will perform acoustic and aerodynamic assessment tasks and a variety of voice therapy tasks in three conditions: 1) 15cm from device 2) 1m from device 3) 1m from device while wearing a surgical mask. Particle counts will be compared across conditions and participants. Data collection during acoustic and aerodynamic assessment will be expanded compared to our prior study, and HEPA filtration will be used between conditions to optimize the room environment for particle counting.

Results: Results TBD. A total of 4 to 5 subjects will be included in the final analysis. In the previous single-subject study, therapy and acoustic tasks combined produced more particles than baseline and speech in condition 1. Highest peaks of normalized total particles occurred during classical singing and expiratory muscle strength training. Particle count was significantly lower when the device was 1m from the subject compared to 15cm, suggesting physical distancing may reduce immediate clinician exposure to respiratory particles. Particle concentration did not accumulate over time.

Authors:

Lauren Timmons Sund Michael Johns Elisabeth Ference Wihan Kim Yael Bensoussan	Karla O'Dell

Title: ***THE EFFECT OF SOUND FIELD AMPLIFICATION SYSTEMS ON VOCAL DOSE IN TEACHERS***
Category: Speech Language Pathology

Abstract:

Objective: Voice intensity (SPL), fundamental frequency (F₀), voicing time (D_t), cycle dose (Dc), and distance dose (Dd) are components of vocal dose. The study aimed to investigate the impact of sound field amplification systems (SFAS) on these components in teachers with and without voice disorders.

Methods: Twenty female teachers underwent the long-term voice dosimetry with Vocal Holter Med (PR.O.Voice Srl) during everyday teaching activities. The acoustic measurements were carried out in five schools and 19 classrooms representing the different acoustical environments. The SFAS Certes PentaClass was installed in classrooms. Voice dosimetry was provided in two different conditions - without the use of SFAS (1-2 days) and with SFAS (1-3 days). Voice Acoustic Quality Index (AVQI) Index and Voice Handicap Index-30 were calculated for all participants.

Results: Ten teachers had voice disorders (AVQI > 2.99). Teachers with voice disorders had higher SPL and lower F₀ during lessons compared to teachers without voice problems (p < .001). SFAS statistically significantly decreased mean F₀ in teachers with healthy voices (–2.4 Hz), and mean D_t (–4.09 %), SPL (–1.5 dB), F₀ (–4.14 Hz) in teachers with voice disorders. Results regarding cycle dose and distance dose TBD. SFAS reduced voice intensity in classrooms with longer reverberation time.

SFAS has a positive effect on the decrease of F_{0,}SPL, and D_t in teachers with voice disorders and decreases fundamental frequency in teachers without voice complaints.

Authors:

Baiba Trinite Dina Barute	

Title: ***CONVERSATION TRAINING THERAPY TO TARGET VOICE AND COMMUNICATION FOR TRANS WOMEN***
Category: Speech Language Pathology

Abstract:

Objective: Conversation Training Therapy (CTT) was developed to assist therapeutic carryover to conversational speech and to address inconsistencies with motor learning theory posed by voice treatment hierarchies (Gartner-Schmidt et al., 2016). CTT is a non-hierarchical approach that trains target voice production in the context of participant-led conversation using "clear speech." The application of CTT in participants diagnosed with benign vocal fold lesions or primary muscle tension dysphonia has suggested increased generalization of target voice production (Gillespie et al., 2019). The goal of this study is to adapt a CTT protocol to address voice and communication goals for trans women and to evaluate the effects of CTT on trans women's voice patterns including average speaking fundamental frequency, smoothed cepstral peak prominence, voice satisfaction, and perception of voice femininity.

Methods: A mixed methods multiple-baseline design across five adult trans women with no reported history of gender-affirming voice therapy or phonosurgery will be conducted in three phases: baseline, intervention, and one-week post-intervention. Therapy participants will receive five weekly telehealth sessions during intervention. Acoustic data from spontaneous speech and reading tasks will be collected remotely via the mobile application VoiceEvalU8 (Grillo, 2017). Participants will rate voice satisfaction and self-perception of voice femininity on a digital visual analog scale (VAS) in addition to completing the Trans Woman Voice Questionnaire in each phase. Thirty naive listeners will rate their perception of voice femininity for de-identified, randomized speech samples from all study phases on the same VAS.

Results: Results TBD

Authors:

Mitchell Peck Eng Sarah Schneider Anusha Sundarrajan	

Title: ***A Voice Rehabilitation Protocol with the Semioccluded Ventilation Mask in Subjects with Symptoms of Vocal Fatigue and Phonatory Effort***
Category: Speech Language Pathology

Abstract:

Objective: The present study was designed to assess the efficacy of a six-session physiologic voice therapy program with the semioccluded ventilation mask (SOVM) in a group of subjects with voice complaints (vocal effort and fatigue).

Methods: Thirty-four participants with functional dysphonia were randomly assigned to one of two treatment groups: (1) voice treatment with physiologic voice therapy plus vocal hygiene program (n = 17), and (2) vocal hygiene program only (n = 17). Laryngoscopic assessment was performed in all subjects to confirm laryngeal diagnosis. Before and after voice therapy, participants underwent aerodynamic assessment. The Voice Handicap Index (VHI), Vocal Tract Discomfort Scale (VTDS), and self-assessment of resonant voice were also performed. The treatment included six voice therapy sessions. For the experimental group, the exercises consisted of a sequence of seven phonatory tasks performed with the SOVM. Comparison for all variables was performed between experimental group and control group.

Results: Statistical analysis showed significant improvements for experimental group for VHI (decrease), VTDS (decrease), and self-perception of resonant voice quality (increase). Significant decrease for experimental group was observed in subglottic pressure and phonation threshold pressure.

Physiologic voice therapy based on the SOVM with connected speech exercises seems to be an effective tool to improve voice in subjects diagnosed with voice complaints. Apparently, improvements are reflected in both subjective and objective outcomes. A reduction in phonatory effort and perceptual aspects of vocal fatigue are the main subjective improvements. A decrease in air pressure-related variables seems to be the most important objective change after voice therapy.

Authors:

CARLOS CALVACHE MARCO GUZMAN Fernanda Pacheco Nicole Ugalde Vasti Ortiz	Juan Del Lago Marcelo Bobadilla

Title: ***The Role of Vocal Production in Performance of Gender Identities***
Category: Speech Language Pathology

Abstract:

Objective: It is well-documented that people can masculinize or feminize their voice. However, there is a paucity of information on how speakers conceptualize vocal patterns of a particular gender and evaluate voice changes based on their own gender schema. Studying how actors conceptualize such vocal change by exploring ways they prepare for, perform, and evaluate their voice production patterns may illuminate this aspect of gender affirming voice therapy.

Methods: Eight voice actors were recruited for this mixed-method study. Actors were audio and video recorded performing reading passages from the Harry Potter books and during pre- and post-performance interviews. Reading performances averaged 30 minutes and included 50 utterances from each of four characters (two male, two female). Interviews averaged 30 minutes and covered actors professional training and background, and their preparation for and reflection on performances. Character utterances will be extracted from the audio recordings and acoustically analyzed for average F0, F0 range, intensity range, spectral slope, and speech rate, and analyzed discursively for number of words and syllables, grammatical form, and discourse function (statement, questions, exclamation).

Results: Acoustic findings will be displayed by characters and actors, and by discursive forms of performed utterances. Thematic analysis of the interview data will examine how actors describe and evaluate their vocal patterns in relation to gender identities, what vocal models they draw on for their performances, and what reactions they hope to elicit from listeners. Results TBD

Authors:

Samantha Rieches Emilie Naidoff Julie Hengst Keiko Ishikawa	

Title: ***OPTIMIZING ACOUSTICAL AND PERCEPTUAL ASSESSMENT OF VOCAL TREMOR FOR TELEPRACTICE***
Category: Speech Language Pathology

Abstract:

Objective: Previous research indicated that voice teletherapy is comparable to in-person voice therapy for a variety of disorders and therapeutic approaches. However, teletherapy outcome measures were obtained using in-person assessments. Furthermore, published guidelines are limited for remote voice assessment. The purpose of this study was to evaluate the accuracy of remote audio recordings of vocal tremor and to optimize assessment procedures for telepractice and teletherapy outcomes research.

Methods: A kinematic model of the vocal folds and wave-reflection of the vocal tract were used to simulate vocal tremor across a range of vowels (/ɑ/, /ə/, /i/), fundamental frequency (f_o) modulation extents (0-10%); and degrees of vocal fold adduction (normal, breathy, and pressed voice qualities). Samples were presented using a MacBook connected to an audio-digital interface, which routed signals to a second MacBook for local recordings using Audacity and Zoom to represent client-end recordings. Signals were also transmitted to a third MacBook via Zoom for remote recordings using Audio Hijack to represent the clinician-received signal. The extent and rate of f_o and intensity modulation and smoothed cepstral peak prominence (CPPS) were analyzed using Praat scripts. Data were analyzed using repeated-measures ANOVAs.

Results: There was a significant effect of recording on intensity modulation extent ($p = 0.031$) and CPP ($p = 0.000$). CPPS was significantly higher in Audacity recordings than Zoom and Hijack recordings. Local high-quality audio recordings are preferable for measurement of intensity modulation extent and CPP. Because CPPS relates to listener-perception of breathiness, local high-quality audio recordings are also preferable for perceptual assessment.

Authors:

Rosemary Lester-Smith Charles Jebaily Brad Story	

Title: ***Immediate Effects of a Semi-Occluded Water-Resistance Ventilation Mask on Objective and Subjective Vocal Outcomes in Patients with Dysphonia***
Category: Speech Language Pathology

Abstract:

Objective: Background. Traditional semi-occluded vocal tract exercises (SOVTEs) are restricted to single phoneme tasks due to the semi-occlusion at the mouth, which hinders full articulation, continuous speech and singing. Innovative SOVTEs should overcome this limitation by creating the semi-occlusion outside the oral cavity.

Objective. The purpose of this study was to investigate the immediate effects of a semi-occluded water-resistance ventilation mask, that allows for continuous speech and singing, on objective (voice range, multiparametric voice quality indices) and subjective (auditory-perceptual, self-report) vocal outcomes in patients with dysphonia.

Methods: A pre-/post-test randomized sham controlled trial was used. Adult patients diagnosed with dysphonia were assigned randomly to one of four groups: (1) a group that received a voice therapy session with the innovative water-resistance ventilation mask (tube attached to the mask outside the mouth), (2) a group that received a voice therapy session with the traditional water-resistance approach (tube inside the mouth), (3) a group that received a voice therapy session with the ventilation mask (without tube) and (4) a group that received a sham treatment. A multidimensional voice assessment including objective and subjective outcomes was performed pre- and post-therapy by an assessor blinded to group allocation.

Results: Results TBD. The experiment is currently being performed and the results and conclusions will be available by the time of the symposium.

Authors:

Imke Kissel Iris Meerschman Anke Adriaansen Kristiane Van Lierde Evelien D'haeseleer	

Title: ***Experiences of speech-language pathologists in the rehabilitation of unilateral vocal fold paralysis***
Category: Speech Language Pathology

Abstract:

Objective: Background. Unilateral vocal fold paralysis (UVFP) is a voice disorder resulting in severe dysphonia and decreased quality of life. Traditionally, the first treatment option for UVFP is voice therapy. However, little is known about the clinical experiences of speech-language pathologists (SLPs) regarding the rehabilitation of UVFP.

Objective. This study aims to examine SLPs' experiences in the rehabilitation of the voice after UVFP.

Methods: Flemish SLPs will complete a questionnaire on their clinical and personal experiences with UVFP. The SLPs' treatment approach, preferred vocal techniques, outcomes of voice therapy, confidence in treating UVFP and possible obstacles will be measured.

Results: Results TBD. The experiment is currently being performed and the results and conclusions will be available by the time of the symposium.

Authors:

Imke Kissel Iris Meerschman Anke Adriaansen Evelien D'haeseleer Kristiane Van Lierde	

Title: ***The glottal gap phenomenon. A limitation for female vocal performance?***
Category: Speech Language Pathology

Abstract:

Objective: This study measures the voice characteristics in women with a posterior glottic gap, the impact of voice therapy (consisting of multiple therapy sessions) and the evolution of voice characteristics in women with a posterior glottic gap measured with subjective and objective measurements and subjective questionnaires.

Methods: The test group consisted of 12 participants with glottic insufficiency who received voice therapy twice a week for 4 weeks. A voice assessment consisting of questionnaires subjective and objective vocal outcomes was performed pre- and post-therapy.

Results: This study showed a significant improvement in the subjective outcomes of the following auditory-perceptual parameters: 'grade', 'breathiness', 'asthenicity', 'strained' and 'instability' and objective outcomes: DSI, Voice Range Profile, more particularly lowest intensity, intensity range, highest frequency and frequency range and acoustic parameters, namely jitter and variation in fundamental frequency. No significant improvement was seen in terms of the AVQI and the self-assessment (VHI). Due to the COVID pandemic in the beginning of 2020 no sham therapy was provided.

Results: This study showed a significant improvement in the subjective outcomes of multiple auditory-perceptual parameters and multiple objective outcomes. No significant improvement was seen in terms of the AVQI and the self-assessment (VHI).

In this study voice therapy was found to have a positive significant effect on certain subjective and objective parameters in women with a posterior glottic gap. Further research can be useful involving a larger sample, control group and longer duration of therapy.

Authors:

Kristiane Van Lierde Imke Kissel anke adriaansen Liselotte De Boulle Evelien D'Haeseleer	

Title: ***The relation between vocal fatigue, depressivity and somatoform disorders***
Category: Speech Language Pathology

Abstract:

Objective: Patients with dysphonia often experience vocal fatigue. Our understanding of contributing factors like somatoform disorders or depression is limited. The aim of this work is to investigate the relation between symptoms of vocal fatigue and depression, considering somatization with affective dysregulation.

Methods: In a prospective study, 60 patients (35 women, 18 men, 7 n.a.) with depressive disorders (mean age = 50 years, SD = 13.5) were investigated. Outcome measures were the German Vocal Fatigue Index (VFI-D), the Beck's Depression Inventory (BDI II), and the Toronto Alexithymia Scale (TAS-20).

Results: Mean overall VFI-D was 23,5 (SD=16.9), mean BDI II 30,0 (SD=15.1), and mean TAS-20 was 53,6 (SD=13.6). Spearman rank-order coefficient (r^s) between VFI-D and BDI II was .33 (p= 0.0124), to TAS-20 (r = .33, p= 0.0134). The VFI-D part I and the BDI II correlated mildly (r =.4, p=0.0011). The VFI-D part II and the Tas-20 correlated mildly (r =.3, p= 0.0146). VDI-D part III did not correlate to BDI II (r=.0, p= 0.9018) and TAS-20 (r=.1, p= 0.2741). Scatter plots show only loose connections.

In our sample, vocal fatigue and avoidance behavior (VFI-D part I) were associated with the severity of depression (BDI II). Tensions in the neck area (VFI-D part II) were associated with somatization with affective dysregulation (TAS-20). Improvement of symptoms with rest (VFI-D part III) clearly distinguish vocal fatigue from the others. However, whilst being loosely correlated with severity of depression and alexithymia, vocal fatigue is a multifactorial event that cannot reliably predicted by either of the others.

Authors:

Lydia Stappenbeck Deborah Janowitz Bernhard Lehnert	

Title: ***Impact of Pediatric Dysphonia on the Relationship Between Vocal Control and Coordination of the Articulatory and Vocal Systems***
Category: Speech Language Pathology

Abstract:

Objective: Although voice therapy is the recommended treatment for children with dysphonia, outcomes are varied. Understanding the developing systems critical for intelligible speech (e.g., voice, articulatory) is essential to create effective therapies. This study examined the impact of dysphonia on the relationship between vocal control and the coordination of articulatory and vocal systems.

Methods: Speech samples from a database (Bunton & Story, 2016) were analyzed from twenty-five children (mean age = 4.6 years, range: 2.6 – 6.6 years, 15 females). Cepstral peak prominence (CPP) measures from running speech were used to create two groups: (1) CPP < 10 (mild dysphonia, N = 13, CAPE-V overall severity = 18.8), (2) CPP > 10 (typical, N = 12, CAPE-V overall severity = 7.9). Linear regressions evaluated if age, average voice onset time (VOT) for voiceless stops, and vocal variability (standard deviation of f_o) predicted the variability of VOTs (coefficient of variation). VOT variability provides information on speech motor control, influenced by articulatory and/or laryngeal control.

Results: Age, vocal variability, and average VOT predicted VOT variability for the dysphonic (p = 0.004, R² = 67.7) and typical (p = 0.02, R² = 57.2) groups. In the dysphonic group, decreased VOT variability was driven by increased age (p = 0.005) and increased vocal variability (p = 0.05). No single factor was a significant predictor for the typical group. This work shows that children with and without mild dysphonia have different factors that predicted VOT variability; pediatric dysphonia may impact the interaction of voice and speech motor control.

Authors:

Elizabeth Heller Murray Andie Chao	

Title: ***VOCAL LOADING IN SPEECH LANGUAGE THERAPISTS ASSESSING AERODYNAMIC PARAMETERS - A COMPARATIVE STUDY***
Category: Speech Language Pathology

Abstract:

Objective: To investigate the vocal loading in Speech Language Pathologist's using aerodynamic parameters.

Methods: Study design: Cross sectional study design

Method: The present study aimed at comparing the vocal loading effect among two groups. Group I involved non SLP's and Group II comprised of SLP's who provided intensive speech therapy for 4-5 hours per day for six months. Voice samples of the control and experiment groups were taken. Production of the alternating syllable /pa/ was recorded for measuring the aerodynamic parameters. Descriptive statistics was used to obtain the mean and Standard deviation to analyse flow, flow pressure, pitch, pressure, pressure flow, SPL and Mann Whitney test was performed to analyse resistance and conductance.

Results: Results: Mean increase in the airflow rate, laryngeal conductance, frequency and SLP was obtained for and significant decrease in conductance and resistance were obtained by Mann Whitney U test suggesting an effect on the voice for group II participants.

Conclusion: The present study highlights the importance of voice conservation among SLP's and the need for voice care. The present study has only focused on the aerodynamic parameters. Hence there is a need for further targeting various other voice parameters, the intensity of therapy session and the voice change which can serve as a guideline in preserving vocal hygiene in Speech language therapists.

Authors:

Priyanka Nayak Usha Manjunatha Dr. Jayashree Bhat	

Title: ***DESCRIPTION OF VOICE PRODUCTION PATTERN IN REINKE'S EDEMA BASED ON BIOMECHANICAL ANALYSIS***

Category: Speech Language Pathology

Abstract:

Objective: Reinke's edema is a common disease of the vocal folds. Although videolaryngoscopy is essential to evaluate the severity of the disease, no information about voice quality is provided by it. Our objective is to evaluate if biomechanical analysis is able to identify the voice production pattern in Reinke's edema, as well as to validate the biomechanical analysis as a tool for its identification.

Methods: The study was performed with a sample of 188 women from 26 to 74 years old separated in 3 groups: Control group: 52 participants; Reinke's edema Group: 39 patients; Other Vocal Fold Pathologies: 97 patients. All the participants were evaluated by videolaryngoscopy and the biomechanical analysis tool App Online Lab® by Voice Clinical Systems®.

Results: It is observed that a decrease in F0 (Pr01), an increase in the mucosal wave in the opening phase (Pr18), a shortened closure phase (Pr04) and the presence of mass effect (Pr20) are the main features that characterize Reinke's edema compared to the control group with broad statistical significance (p<0,001). These results allow to establish that the screening based on the joint presence of the decrease in F0 (Pr01) and the increase in the mucosal wave effect (Pr17/Pr18) presents high sensitivity and specificity indices: Control group vs. Reinke's edema, Specificity: 0.85, Sensitivity: 0.85; Reinke's edema vs. Other Vocal Fold Pathology, Specificity: 0.93, Sensitivity: 0.85. Biomechanical analysis of voice allows us to recognise the voice production pattern in women with Reinke's edema.

Authors:

Isabel Cardoso Ángel Rodríguez-Paramás	

Title: ***Objective Assessment of Tonicity of Neck, Facial, Suprahyoid, and Infrahyoid Muscles and Body Posture in Subjects Diagnosed with Voice Disorders and Normal Voices***
Category: Speech Language Pathology

Abstract:

Objective: The present study aimed to objectively compare mechanical properties of neck, facial, suprahyoid, and infrahyoid muscles and body posture between subjects diagnosed with voice disorders and normal voices.

Methods: 80 subjects were recruited in total (20 with normal voices, 20 with slight dysphonia, 20 with moderate dysphonia, and 20 with severe dysphonia). All participants signed an informed consent and underwent to voice recordings and objective assessment of muscle tonicity, elasticity, and stiffness with MyotonPro ®. Neck, facial, suprahyoid, and infrahyoid muscles were included in assessment procedures. Body posture was also objectively assessed with photometry. All acoustic samples were perceptually assessed by two blinded judges to determine if voices are normal, slight, moderate, or severe dysphonic. Pearson correlation was performed between dependent variables to observe possible associations. Multivariate regression models were also performed. ICC was carried out to assess intra e inter rater reliability.

Results: Results: Good intra e inter rater reliability was reported. No significant differences were found neither for mechanical properties nor for body posture variables objectively measured when comparing normal and dysphonic voices (slight, moderate and severe). Positive correlation was found between tonicity and stiffness for most of assessed muscles.

Conclusion: it seems that through myotonometry no association between muscle tonicity, elasticity, and stiffness should be expected. Lack of association between voice quality and body postures should not be expected neither. Therefore, it could not be accurate to state that increased muscle tonicity and an inappropriate body posture are one of the main causes of voice disorders.

Authors:

Karol Acevedo Marco Guzman Andres Flores Camilo Moran Christian Castro	Camilo Quezada Rosario Castro

Title: ***SELF-REPORTED VOICE CONCERNS IN A NONCLINICAL SAMPLE OF MILITARY SERVICE MEMBERS***
Category: Speech Language Pathology

Abstract:

Objective: Military service members (SMs) often communicate in challenging listening environments, making a clear, audible voice an essential job requirement. This study surveyed SMs during an annual wellness checkup to determine the prevalence of communication challenges in an active-duty population.

Methods: This prospective IRB-exempt protocol involved a tablet-based survey. Items addressing voice use and symptoms were provided in two phases. All participants indicated the frequency with which their voice felt hoarse or fatigued. Responses indicating vocal concerns more than once annually triggered additional questions about voice use. In Phase 2 of the study, they were directed to the Voice Handicap Index 10 (VHI-10); scores >11 indicated abnormality.

Results: In Phase 1, 34% of 621 SMs endorsed vocal hoarseness or fatigue >1/yr, and 23% of these reported that their voice problems interfered with job duties or personal life. In Phase 2, 39% of 893 SMs (276 men, 73 women) reported such frequent voice concerns. The average VHI-10 score for these 349 respondents was 6.5/40; 55 SMs (39 men, 16 women) scored >11. Further analyses will explore whether voice concerns interact with age, gender, and military-specific occupational hazards like noise or blast exposure, traumatic brain injury or history of deployment. Overall, the prevalence of abnormal voice impact is on par with the general adult population, but its importance is heightened in the military because of potential interference with operational readiness and mission performance. [The views expressed are those of the authors and do not reflect official policy of the Department of Defense or U.S. Government.]

Authors:

Trevor Perry Jennifer Myers Laura Cord Douglas Brungart Nancy Solomon	

Title: ***EFFECTS OF GARGLE PHONATION IN PATIENTS WITH MUSCLE TENSION DYSPHONIA***
Category: Speech Language Pathology

Abstract:

Objective: Objectives: Gargle phonation is a frequently used voice therapy tool that has received minimal attention in behavioral voice therapy literature. Gargle phonation has been described as having a self-perceived positive effect on voice in both those with and without voice disorders and as having immediate effects on the electrical activity of extrinsic laryngeal muscles. Systematic study of gargle phonation in clinical patients is warranted. Therefore, the aim of this study was to examine the effects of gargle phonation in patients with muscle tension dysphonia (MTD) compared to baseline and a sham procedure.

Methods: Methods/Design: A total of 30 individuals with MTD participated in a randomized prospective cross-over control trial. Half of the participants received gargle therapy first followed by sham water swallow therapy while the other half received therapies in reverse order. Participants rated the degree of vocal effort on an adapted and anchored Borg CR10 scale and recorded eleven vowels in the /b/-vowel-/d/ format, six sentences from Consensus of Auditory-Perceptual Evaluation of Voice, and two lists of the Hearing in Noise Test. Outcome measures included the self-rating of vocal effort, auditory-perceptual ratings of voice quality, smoothed cepstral peak prominence (CPPS), speech rate, and vowel space. These measures were obtained before and after treatments.

Results: Results/Conclusions: This study is ongoing. These pilot data will be analyzed and presented to examine the hypothesis that gargle phonation will reduce the perception of phonatory effort while increasing voice quality rating scores, CPPS, speech rate and vowel space.

Authors:

Diana Orbelo Sara Charney Semirra Bayan Keiko Ishikawa	

Title: ***ACOUSTIC, AERODYNAMIC, MORPHOMETRIC, AND PERCEPTUAL CHANGES DURING AND AFTER SEMI-OCCLUDED VOCAL TRACT EXERCISE: AN INTEGRATIVE REVIEW***
Category: Speech Language Pathology

Abstract:

Objective: The body of literature discussing the acoustic, aerodynamic, perceptual, and morphometric changes that occur during and after semi-occluded vocal tract exercise (SOVTE) has dramatically expanded within the past 20 years. The current study integrates the literature on SOVTE from the 1980s onward, reviewing the technique's clinically relevant effects in vocally untrained adults both with and without dysphonia. The study aims to give clinicians actionable information on how SOVTEs alter vocal function in both normal and pathological states.

Methods: The first author queried the PubMed database for combinations of search terms related to semi-occluded vocal tract exercise. In order to improve article identification, the author also adopted a hermeneutic framework in which the reference lists of each article selected for full-text screening were cross-referenced against the articles returned in the initial PubMed search. Articles identified by hermeneutic analysis that did not appear in the initial PubMed search were then screened individually. The second author independently verified adherence to the review's inclusion and exclusion criteria in both the initial search and data extraction phases.

Results: The initial PubMed search returned 780 articles, 116 of which passed the title and abstract screening phase. Hermeneutic analysis of citation lists returned an additional 24 studies, resulting in a total of 140 articles that qualified for full-text screening. 54 articles passed full-text screening and were included in the current review.

Semi-occluded vocal tract exercise increases the inertive reactance of the glottis, vocal tract, and air column, as well as introducing flow resistance at the level of the lips or velopharyngeal port. Each of these mechanisms yields downstream acoustic, aerodynamic, morphometric, and perceptual changes, including reductions in phonation threshold pressure and perceived phonatory effort, improved spectral characteristics of the acoustic signal, attenuation of vocal fold impact stress as indexed by various metrics such as maximum area declination rate, and alterations to the physical dimensions of the vocal tract. Although few studies examined the duration of these changes post-exercise, several RCTs support the assertion that SOVTE's effects can be sustained with regular practice over weeks or months, regardless of current vocal health status.

Authors:

Christopher Apfelbach Marco Guzman	

Title: ***VOICED WHISTLE: A NOVEL APPROACH TO DECREASE VOCAL HYPERFUNCTION***
Category: Speech Language Pathology

Abstract:

Objective: Hyperfunctional voice disorders exhibit hard glottal onset during initiation of voicing. Increased glottal contact is reflected by greater levels of Closed Quotients (CQ). Exercises targeting easy onset have been attempted as treatment options. Voiced Whistle (VW), a technique of adding voice during whistling, has shown to decrease CQ measures significantly. The goal of this study is to analyze the effect of VW on electroglottographic (EGG) measures and compare CQ across most commonly used technique (Straw Phonation).

this study in progress.

Methods: Methods:

Subjects: Subjects who can whistle and voice simultaneously were selected for this study. Five adult males and two adult females qualified for this study. One of the male subjects is also a patient with muscle tension. Effect of VW in hyperfunctional voice will be demonstrated using this subject's data.

Protocol:

 Subjects were instructed to perform tasks including (a) steady phonation on vowel /u/, (b) straw phonation, and (c) VW. EGG and acoustic recordings were made simultaneously during steady phonation.

Analysis: Electroglottographic waveforms from steady segments of each stimuli were analyzed. CQ measures and jitter% were recorded for each stimuli.

Results: Results and conclusions:

Preliminary results indicate a decrease in CQ during performance of VW. Comparison between straw phonation and VW will be reported during presentation. The efficacy of VW will be highlighted based on the results obtained from this study.

Authors:

Nandhu Radhakrishnan	

Title: ***DOES THE SOUND EXTRACTION METHOD AFFECT ACOUSTIC MEASUREMENT RESULTS IN PRAAT PROGRAM?***
Category: Speech Language Pathology

Abstract:

Objective: Praat Program has been widely applied to acoustically investigate voice disorders and therapy outcomes. The Praat command “Sound & Pitch: To Point Process (cc)” measures the number of pulses from a sound file. The pulses number is influenced by the sound object window used for the Point Process (PP), which may influence measurement outcomes. Objective: To investigate differences in outcomes between two methods of window analysis using Praat.

Methods: Methods: Recordings of a sustained vowel (SV) /a/ from 29 voice-disordered adults were analyzed twice. Selected measures were median fundamental frequency (F0), median intensity, F0 standard deviation (F0 SD), intensity standard deviation (dBA SD), jitter local (%), shimmer local (%), and mean harmonic-to-noise ratio (HNR, dB). In the first method (M1), section 0.6 to 1.1 seconds of the entire SV sound was analyzed directly from the Sound Window. Secondly (M2), the same section (0.6-1.1s) was excised, saved as a separate .wav file, and then analyzed applying the identical Praat script. Statistical analysis of comparison and correlation were applied.

Results: Results: There were significantly higher scores for F0 SD and dBA SD in M1 (p< .001). All other parameters showed no statistically significant differences between M1 and M2 (p> .58), but high correlation (p< .001). Conclusion: In M1 higher numbers of pulses were included, affecting the SD of F0 and intensity measurements. Since both measures have been recommended for voice assessments, reporting of the strategy to excise signal parts and Point Process method should be included when disclosing results.

Authors:

Marilia Sampaio Jörg Bohlender Meike Brockmann-Bauser	

Title: ***RELATIONSHIP BETWEEN THE ABILITY TO PERCEIVE FREQUENCY PATTERNS AND THE EXPRESSIVENESS OF TV JOURNALISTS: PRELIMINARY STUDY***
Category: Speech Language Pathology

Abstract:

Objective: The perception of frequency patterns in sequence is the auditory skill most often associated in the literature with the presence of behavioral dysphonia. However, this relationship is hardly explored concerning high-performance communicators.

Objective: to investigate the relationship between journalists' expressiveness and the ability to perceive the difference in sounds in terms of frequency, in the order in which they were presented.

Methods: Methods: 53 journalists working on a TV station went through the sound localization test and through the dichotic digit test, aiming at least to achieve 70% and 85% of right answers, respectively, what happened with 46 of them (22 women and 24 men). They were classified by 3 experienced speech therapists according to their level of expressiveness, being level 1, regular; level 2, good; and level 3, excellent. Each journalist was submitted to an online version of the Pitch Pattern Sequence Test, considering as normal the results above 70% of correct answers. The results were compared with the journalists' level of expressiveness.

Results: Results: 21 journalists were classified as expressiveness level 3, with 19% failing the PPS test; 20 showed level 2 of expressiveness, with 40% of failure at the PPS test; and 5 were classified as level 1, with 80% of failure in the test, thus suggesting a directly proportional relationship between performance on the PPS test and the level of expressiveness.

Conclusion: there seems to be a direct relationship between a journalist's ability to perceive frequency patterns in sequence and his/her expressiveness in communication.

Acknowledgements: Diana Faria, Claudia Côtes, Ana Maria Rossi Conceição Silva, Ana Maria Pereira Lopes Martinez, Maria Luiza Corsini Liz, for help w/ data collection.

Authors:

Ingrid Gielow Leny Kyrillos	

Title: ***PREFERENCES FOR GENDER-AFFIRMING VOICE MODIFICATION CLINICIANS***
Category: Speech Language Pathology

Abstract:

Objective: Meta-analyses in psychotherapy indicate that outcomes improve when clients' preferences are accommodated. This study is among the first to investigate preferences within speech pathology and among clients seeking gender affirming voice modification. In this investigation, gender diverse individuals weigh the relative importance of clinical features (i.e., empathy/acceptance, knowledge of current transgender language and issues, training/experience with transgender people) compared to match features (i.e., gender match, LGBTQ+ match) when selecting a speech pathologist. Potential moderating variables of gender, voice modification experience, and gender centrality are included.

Methods: Clinician preferences of 132 transgender adults across the United States were evaluated using a mixed methods research design. Quantitative data was obtained using a delayed discount methodology, which requires participants to sacrifice a percentage of treatment effectiveness to gain their most preferred clinician characteristic. Subsequently, qualitative data was obtained from twelve participants selected randomly from the original group. These follow-up interviews explored why participants held their reported preferences, defined abstract constructs, and measured intrarater reliability. Gender centrality was also measured in the survey and discussed in the interviews. Nonparametric signed-rank tests revealed significant preference differences, and multiple regressions indicated predicting variables.

Results: Clinical features were preferred over match features, with empathy/acceptance being most preferred overall. Interviews revealed preferences for remaining clinical features depended on their connection to empathy (e.g., lower preference for training, because empathy may be untrainable). Although participants had weaker preferences for identity match, interviews revealed most participants had generally positive views of gender match, in part because of their increased empathy for the client. Weaker gender match preferences resulted from alternate priorities or the perception that match is impractical within healthcare. Many interviewees were concerned about transphobia from LGB clinicians. Across all preferences, the only significant predictor was gender centrality. Higher gender centrality predicted stronger preferences for all match and clinical features.

Authors:

Desi Gutierrez Eileen Finnegan Anu Subramanian	

Title: ***AUDITORY SKILLS AS A PREDICTOR OF RATER RELIABILITY AND ACCURACY IN THE EVALUATION OF VOCAL QUALITY***
Category: Speech Language Pathology

Abstract:

Objective: To determine if auditory skills are predictive of interrater reliability and accuracy in auditory-perceptual evaluations (APE) of the general grade of vocal deviation (GG) and the degrees of roughness (DR) and breathiness (DB).

Methods: Twenty SLP students without previous training in APE participated. They underwent a central auditory processing (CAP) evaluation. They participated in two APE sessions assessing the GG, DR, and DB of 44 vocal samples. An intraclass correlation coefficient (ICC), accuracy, and a beta regression model were used.

Results: A difference was found in the average ICCs of the GG parameter between listeners with high and low temporal resolution and binaural interaction skills. Temporal resolution skills and binaural interaction affected the ICC of listeners in the GG evaluation, reducing the likelihood of reliability by 2.8 and 3.6 times, respectively. Figure-ground and temporal resolution skills predict accuracy for DR, while the auditory closure skills were a predictor of accuracy for DB. Decreased figure-ground and temporal resolution skills reduce the percentage of the judges' accuracy for DR by 1.7 times. A decrease in auditory closure skills reduces the possibility of accuracy for DB by 1.4 times.

Conclusion: Temporal resolution skills and binaural interaction are a predictor of reliability of GG listeners judgment. Listeners with low levels of temporal resolution skills and binaural interaction skills show less reliability in GG evaluations. Listeners with low levels of figure-ground/temporal resolution and auditory closure skills show less accuracy in evaluations of the DR and DB, respectively.

Authors:

Leonardo Lopes Maxsuel Paiva Marine Rosa Ingrid Gielow Priscila Silva	

Title: ***Differences and Reliability of Linear and Nonlinear Acoustic Measures as a Function of Vocal Intensity in Individuals with Voice Disorders***
Category: Speech Language Pathology

Abstract:

Objective: to compare acoustic measures based on linear and nonlinear models in different speaking voice intensity levels (soft, comfortable, and loud) and analyze the reliability of those measures as a function of voice intensity levels in subjects with voice disorders

Methods: 435 individuals (314 women, 121 men) with voice disorders participated in the study. In total, 17 acoustic measures were derived from the vowel /ɛ/ sustained at three intensity levels (soft, comfortable, and loud). Five were linear (standard deviation of fundamental frequency (f0), jitter, shimmer, harmonics-to-noise ratio (HNR) and smoothed cepstral peak prominence (CPPS)),and twelve were nonlinear measures, namely correlation dimension (D2), correlation entropy (H2), first minimum of the mutual information function (FMMI), relative entropy (ENTR-R), largest Lyapunov exponent (Lyap), determinism (DET), transitivity (TRANS), mean diagonal line length (L_{med}), Shannon entropy (ENTR-S), mean length of vertical structures, also known as trapping time (TT), laminarity (LAM) and recurrence period density entropy (RPDE). Intraclass correlation coefficient (ICC) was used to investigate reliability as a function of vocal intensity level.

Results: There were significant differences in all acoustic measures about vocal intensity level (>0.001). ICCs were very good for HNR (>0.61) and good for Lyap, DET, ENTR-S, L_{med}, RPDE, and TT (0.41-0.60).

Conclusion: All acoustic measures varied as a function of vocal intensity in voice disordered adults, while this relation was different for linear and nonlinear measures. Only the measures HNR, Lyap, DET, ENTR-S, L_{med}, RPDE, and TT had an acceptable (>0.04) reliability as a function of vocal intensity.

Authors:

Vanessa Florêncio Anna Almeida Patrícia Balata Meike Brockmann-Bauser Leonardo Lopes	

Title: ***Best Acoustic Measures to Discriminate Subjects with and without Vocal Quality Deviation***
Category: Speech Language Pathology

Abstract:

Objective: to identify acoustic measures with greater accuracy for discriminating individuals with and without vocal quality deviation and verify the correlation of these measures with the overall severity of vocal deviation (OS)

Methods: We used 52 samples from normal subjects and 489 from dysphonic patients. The OS was determined on a 100-point visual scale. We obtained 36 measures, including f0 and amplitude perturbations, inverse filter measure, spectral measure, nonlinear measures, and time-frequency analysis by Hilbert-Huang Transform (HHT). Quadratic discriminant analysis and accuracy, sensitivity, and specificity were used to investigate these measures' discriminatory power. Pearson's correlation coefficient was used to verify the correlation between acoustic measurements and OS.

Results: Only the combination of two measures (amplitude weighted by frequency and the energy of the fifth intrinsic mode decomposition) of the HHT presented an accuracy above 90%, with a moderate to strong correlation with the OS. The other measures presented performance classified as good, between 80 and 90% accuracy. A combination of the Cepstral peak prominence (CPP), amplitude variability index (AVI), and sPPQ (smoothed pitch period quotient) presented the second-best performance. However, these measures showed a weak to moderate correlation with the OS. CPP was the only isolated measure that had performance > 70%, with a moderate correlation with the OS.

Conclusions: Measures based on HHT present the best performance to discriminate subjects with and without vocal quality deviation and still have a moderate to strong correlation with OS. CPP demonstrate to be the best isolated acoustic measurement studied. This finding confirms all the recommendations of the current literature.

Authors:

Leonardo Lopes Samuel Abreu Vinícius Vieira Mara Behlau	

Title: ***On-site Instrumental Evaluation and Short Customized Training in Professional Vocal Risk Surveillance. Proposal of a Method.***
Category: Speech Language Pathology

Abstract:

Objective: Occupational Medicine normatives request prompt and brief diagnostic evaluations and rehabilitation trainings to be host in workplaces. It is both difficult to instrumentally check these populations in their workplaces and put up a proper rehabilitation path in the strict times the Employer may allow. Sometimes, normatives allow much shorter time than proposed in literature. The Authors present their on-site experience with a protocol of evaluation and treatment respecting time limits, yet customizable.

Methods: In a call centre of 250 operators, submission of VHI pointed out less than 50 of them claiming persistent physical handicap. They were submitted to on-site phoniatric evaluation with videolaryngoscopy and voice analysis. Results permitted to distinguish the operators claiming vocal fatigue into 3 subgroups of critical job suitability, liable to vocal training and rehabilitation. An experienced SLP worked out a multi-faceted short protocol, which permitted to respect times but also to customize it to each operator needs.

Results: Results permitted to reassess job suitability and address only a few to longer SL treatment. We think this approach, on-site medical instrumental evaluation and short but customized vocal training, may be shared in more and larger workplaces needing surveillance of professional vocal risks.

Authors:

Orietta CALCINONI Maria Paola MURGIA	

Title: ***AEROSOL GENERATION IN VOICE AND SPEECH: A SYSTEMATIC REVIEW***
Category: Speech Language Pathology

Abstract:

Objective: Objectives: To systematically review the evidence of aerosol generation across tasks involved in speech pathology voice, resonance and motor speech assessment and intervention, and inform practices to better manage generation of these aerosols to reduce transmission risk of such diseases as COVID-19.

Methods: Methods/ Design: A literature search was conducted across databases (Medline, Embase, Scopus, Web of Science, CINAHL, PubMed Central) and grey literature (ProQuest, The Centre for Evidence-Based Medicine (CEBM), COVID-Evidence and speech pathology national bodies). Eligibility criteria included types of aerosol generating activities, participant characteristics and clinical setting examined. Two independent reviewers were involved at each stage of data screening, extraction and analysis. The GRADE system was used to assess risk of bias and certainty of evidence. The Synthesis Without Meta-analysis (SWiM) guidelines were used to direct the reporting of findings.

Results: Results: Six behaviours were identified as aerosol generating. These were classified into three categories: vegetative acts (breathing, coughing), verbal communication activities of daily living (speaking, loud phonation), and performance-based tasks (prolonged phonation, singing). Certainty of evidence ranged from very low to moderate with variation in research design and variables.

Conclusions: This body of literature helped to both identify and categorise the aerosol-generating behaviours (AGBs) involved in speech pathology clinical practice. It confirmed the low level of evidence throughout the speech pathology literature pertaining to aerosol generation. As many AGBs are common human behaviours, these findings can be applied across health care settings and community interactions.

Authors:

Antonia Chacon Duy Nguyen Patricia McCabe Catherine Madill	

Title: ***VOICE CHANGE IN TRANSGENDER INDIVIDUALS: A PRELIMINARY STUDY***
Category: Speech Language Pathology

Abstract:

Objective: The present study sought to understand strategies that transgender individuals employ in the voice change process as well as any side effects that they experience.

Methods:

Thirty-three individuals who identify as male-to-female, female-to-male, intersex and gender nonconforming transgender persons completed a survey. The survey was aimed at determining whether these participants pursued a voice change, the means by which this was done and whether they self-identified any vocal quality problems during the process. A follow-up interview was also conducted.

Results: Approximately 75% of participants reported pursuing a voice change. The follow-up interview revealed that some of the voice change strategies employed by participants included phonotraumatic behaviors such as smoking and screaming to attain a lower-pitch. Other participants self-trained using pitch analysis software applications and self-help videos on social media. It Is evident from the results that access to healthcare could not be implicated in these findings. Rather, the basis of the problem appeared to be ignorance of the role of the speech-language pathologist in voice change process and a lack of understanding of the complexities of the human vocal mechanism. The findings of this study suggest that education on the vocal mechanism, vocal hygiene habits and the role of speech-language pathologist in the voice change process is warranted in transgender communities.

Authors:

Afua Agyapong Jacqueline Jones-Brown Elijah Nicholas	

Title: ***EXPLORING NOVEL CONSTRUCTS OF COMMUNICATIVE CONGRUENCE AND DYSPHORIA IN THE GENERAL POPULATION***
Category: Speech Language Pathology

Abstract:

Objective: Drawing from psychological literature and reports from the Transgender and Nonbinary Communities, we propose two theoretical constructs of likely relevance to communication behaviors, irrespective of gender identity. First, communicative congruence (CC), is the state in which one's sense of self/identity is accurately conveyed through their communication (voice, speech, and language). Second, communicative euphoria refers to how positively one feels about their communication; when one's experience of their communication is maximally negative, they experience the opposite of euphoria, communicative dysphoria. Carl Rogers, the founder of humanistic psychology, first proposed that people whose identity matches their lived experience achieve a sense of congruence, which leads to positive psychological outcomes, while incongruence results in negative psychological outcomes. Likewise, a modern comprehensive theory of personality, the Cybernetic Big 5 Theory, also states that a mismatch between one's self-concept and experiences leads to psychological entropy. This psychological entropy results in "emotional, motivational, cognitive, and behavioral dysregulation." We seek to systematically investigate the concepts of CC and communicative euphoria. We further hypothesize that a relationship exists between CC and self-reported symptoms of depression.

Methods: We aim to have 150-200 subjects in the research study; recruitment is ongoing. Participants filled out demographic and personality questionnaires and the Center for Epidemiologic Studies Depression Scale (CES-D), a validated depression scale, either in person or online.* Then participants produced and recorded brief speech samples. Each participant's speech samples were played back to them while they rated their CC and communicative dysphoria via visual analog scales. Participants were also provided a free-response section to add additional comments for their ratings.

Results: Preliminary data (n = 91*) are normally distributed for self-perception of communicative incongruence/congruence (M = 67.34, SD = 22.06) and dysphoria/euphoria (M = 57.58, SD = 15.28). A simple linear regression shows that CC significantly predicts euphoria b = .95, t(89) = 8.18, p < .001. CC also explains a significant proportion of variance in euphoria, R² = .43, F(1, 89) = 66.91, p < .001. A statistically significant relationship exists between CC and the CES-D b = -.17, t(89) = -2.91, p < .005. We will conduct a qualitative analysis of participants' free responses to inform our interpretation of the data. We will discuss potential implications for both voice therapy patients and clinicians. Future directions for this line of inquiry will also be discussed.

Note:

* We have pivoted this study to be conducted online due to the pandemic. We are confident that by June 2021 we will report data from over 150 speakers.

Authors:

Brett Welch Leah Helou	

Title: ***GAMIFICATION OF VOCAL HYGIENE AND PREVENTING PHONOTRAUMA: FOCUSING ON HYDRATION: A QUALITATIVE STUDY***
Category: Speech Language Pathology

Abstract:

Objective: While prevention of phonotrauma can be done through education about voice hygiene, such as staying hydrated and avoiding damaging vocal behaviors, the best method for delivery is an open question. The primary purpose of this research is to decipher if vocal hygiene and prevention of phonotrauma can be taught effectively through games. Investigating the effectiveness of using games to teach vocal hygiene and voice disorder prevention is important for establishing evidence-based intervention.

Methods: Two board games created by graduate students at the University of Northern Iowa, Anti-Dehydration Station and H2Oasis, were tested for their effectiveness in educating players in voice hygiene. Players completed a survey related to each game.

Results: Results: Participants reported increased knowledge and awareness of hydration and vocal hygiene/health whether they played Anti-Dehydration Station and/or H2Oasis.

Conclusions: The results for this study of both Anti-Dehydration Station and H2Oasis are favorable. Participants reported increased knowledge and awareness of hydration and vocal hygiene/health whether they played Anti-Dehydration Station and/or H2Oasis.

Authors:

Julie Herrig Hannah Wieditz Lisa Kopf	

Title: ***SOCIO-ECONOMIC CONSEQUENCES OF VOICE DISORDERS, SLEEP PROBLEMS, AND WORK-RELATED STRESS AMONG COLLEGE PROFESSORS***
Category: Speech Language Pathology

Abstract:

Objective: Socio-economic consequences of voice disorders, sleep problems, and work-related stress among college professors

Bibiana Omaira Rute Sanabria, Lady Catherine Cantor-Cutiva

Summary: Teachers are exposed to various working conditions, which determine their health-disease profile. Previous studies have reported that teachers have voice disorders, sleep problems, and work-related stress very often, which additionally have important socioeconomic consequences. Although the implications for quality of life have been reported, the economic consequences have not been as explored. Aim: Determine the socioeconomic consequences associated with voice disorders, sleep problems, and work-related stress among college professors.

Methods: Methods: The proposed study is a longitudinal design with a descriptive and correlational scope. Data collection will be developed during the first months of 2021. Participants will fill in a monthly questionnaire, which includes questions of sociodemographic, voice functioning, stress, sleep, absenteeism, use of medical services, and reduction of productivity.

Results: Expected results: We expect to understand the associated costs and the impact on quality of life of voice disorders, sleep problems, and work-related stress among college professors.

Authors:

Bibiana Rute Sanabria Lady Catherine Cantor Cutiva	

Title: ***VOCAL TRACT DISCOMFORT OF UNIVERSITY PROFESSORS ACCORDING TO SELF-REFERENCE OF VOCAL SYMPTOMS***
Category: Speech Language Pathology

Abstract:

Objective: University professors are spoken voice professionals and are susceptible to vocal risks, mainly due to the environmental and organizational work conditions in which they are exposed. There is little evidence on the level of vocal risk of this teaching class in specific. In addition, the perception of discomfort during voice production is a factor that can interfere in the performance of teachers' work activity, therefore, it should be investigated. The aim of this study was to analyze the perception of vocal tract discomfort in university professors according to the self-reference of vocal symptoms and to evaluate the existence of relationships between vocal symptoms and vocal tract discomfort.

Methods: Cross-sectional, observational and analytical study approved by the Research Ethics Committee (no. 1,708,786). 126 university professors participated and answered a sociodemographic questionnaire, the Voice Symptoms Scale (VoiSS) and the Vocal Tract Discomfort Scale (VTD). The VTD is a self-assessment instrument that seeks to identify the sensory perception of vocal tract discomfort according to the frequency (_F) and intensity (_I) of eight sensations, on a scale from 0 (never) to 6 (always). Professors were classified into two groups according to the VoiSS cut-off score: a vocally healthy group with a total score of 15 points or less (G1) and a group of vocal symptoms with 16 points or more (G2). Of the 126 teachers, 71 were women and 55 men, with an average age of 43 years. G1 was formed by 41 teachers (23 men and 18 women), and G2 by 85 (32 men and 53 women). The Mann-Whitney test was used to compare the groups and the Spearman correlation test was used to correlate the protocols. All analyzes were performed in the Statistical Package for the Social Sciences, version 25.0. For the interpretation of the magnitude of the correlations, the following classification was adopted: correlation coefficients <0.4 (weak magnitude), ≥ 0.4 to <0.5 (moderate magnitude) and ≥ 0.5 (strong magnitude). The level of significance adopted was 5% (p <0.05).

Results: The most mentioned sensations by both G1 and G2, both in _F and _I, were “dry” (G1_F: 1.32 ± 1.14, G1_I: 1.07 ± 1.04 / G2_F: 2.83 ± 1.41, G2_I: 2.60 ± 1.49), “sore” (G1_F: 0.59 ± 0.90, G1_I: 0.61 ± 0.81 / G2_F: 2.38 ± 1.33, G2_I: 2.26 ± 1.39) and “irritable” (G1_F: 0.68 ± 0.77, G1_I: 0.64 ± 0.78 / G2_F: 2.32 ± 1.36, G2_I: 2.35 ± 1.40). G2 reported vocal tract discomfort significantly greater than G1 for all sensations, both in frequency and intensity with p-value <0.001 for all comparisons. A strong positive correlation was found between VoiSS and VTD both in frequency (r = 0.705; p <0.001) and intensity (r = 0.688; p <0.001). University professors with greater reference to vocal symptoms have greater feelings of discomfort in the vocal tract. As vocal symptoms increase, so do the sensations of discomfort in the vocal tract in the studied population. Such findings reinforce the urgency of vocal promotion and prevention for this professional class, with a focus on understanding their vocal needs to assist them in their work activities.

Authors:

Michelle Guimarães Gabriel Depolli Djanira Fernandes Wilson Barbosa Junior Jonathan Fernandes	

Title: ***The perception of severe vocal dysphonia: attractiveness associated with age***
Category: Speech Language Pathology

Abstract:

Objective: In the present study, we were interested in investigating the impact of severe vocal disturbance on the perception of their attractiveness. The first purpose of this study was to examine possible perception listeners' attitudes toward people with healthy voices or with severe dysphonia and explore the potential estimates listeners' attitudes with regards to this expected social attractiveness. The second purpose was to associated age factor on the voice perception and social attractiveness. These two purposes contribute to providing evidence in the intervention of dysphonic patients in the communicative process in order to improve the quality of life of these patients.

Methods: Forty-one listeners evaluated voice samples of fifty recorded speakers, without vocal deviation (N =25) and severe vocal deviation (N = 25). The evaluation of voice was conducted by means of a survey, allotting 30 seconds per voice. For measure effects of our independent variables on trust, work, and talk, dichotomous dependent responses were subjected to regression analysis using the general linear model (GLM) and multiple linear regression (MLR) analyses were applied to obtain a voice perception model for social attractiveness. Both GLM and MLR were performed by using hierarchical linear regression (HLR) analyses.

Results: The current research found strongly negative attitudes were more present for voices with severe disorders than for healthy voices. Factor analyses were performed to analyze the listeners' attitudes towards the voices. The attitude related to trust and the desire not to converse with a speaker with severe dysphonia was significantly associated with the self-perceived arousal generated by the voices. The willingness to work with a dysphonic person decreased with the displeasure associated to the voice, more significant even than the effect of the voice condition (with and without severe deviation), arousal and valence. Further analyses were performed to address whether the variables: voice condition, arousal, valence, and pleasantness predicted the attractiveness towards the speaker. The voice condition and the perceivers' arousal impacted on both their attitude and the attraction towards the voice. These results suggest that social attractiveness solely based on acoustically presented voices could depend on the voice and psychological state associated with the attitude of the listeners towards the speaker. These results provide a valuable contribution to the vocal therapy considering the impact of listeners on the quality of life of speakers with severe dysphonia.

Authors:

Francisco Contreras-ruston Jordi Navarra	

Title: ***SIMILARITIES AND DIFFERENCES ACROSS VOICE CASE HISTORY QUESTIONNAIRES - A SCOPING REVIEW***
Category: Speech Language Pathology

Abstract:

Objective: Background: Case history assessments are ubiquitously performed across the health profession for diagnostic purposes. Questionnaires are considered a valuable tool within this process. There is currently no standardised tool available to collect such information in the assessment of voice disorders.

Objective: To systematically identify existing case history questionnaires available for general clinical practice and provide synthesis and analysis of the questions within.

Methods: Methods: A scoping review was conducted across published and unpublished literature using the PRISMA extension for scoping reviews framework. The broad search included research papers within six electronic databases, textbooks, online publishing sites, voice clinic websites and peak body websites. Search criteria were uniformly applied. Descriptive analysis and content analysis was conducted. At each stage, transparency and replicability was achieved through an independent review process.

Results: Results: Identified voice case history questionnaires were few (n=23) with 80% from unpublished sources. A total of 581 unique questions were identified. No one question was common across all 23 questionnaires. The most frequently asked questions, excluding demographics, included medicines taken (n=21), smoking (n=20) and alcohol (n=19). These questions were not reflected in the highest frequency categories: Health Status/Medical Conditions/Reports (n=200), Vocal Symptoms (n=88), Voice Use (n=51) despite these categories representing 58% of all questions asked. Within the highest frequency category, the subcategory of Systemic Diseases was the highest, representing 19% of all category questions.

Conclusions: This study illuminates the similarities yet many differences that exist across identified voice case history questionnaires in terms of number of questions, number of categories, preference for question-type and structure. It demonstrates the need for standardisation of a voice case history questionnaire which would potentially enable more accurate diagnosis and data comparison between voice clinics to aid future research.

Keywords: case history questionnaire, patient history questionnaire, voice assessment, voice disorder, scoping review

Authors:

Renee Krosch Patricia McCabe Catherine Madill	

Title: ***Performance evaluation of subharmonic-to-harmonic ratio (SHR) computation***
Category: Basic Science

Abstract:

Objective: Subharmonics are an important class of voice signals, relevant for speech, pathological voice, singing, and animal bioacoustics. They arise from special cases of amplitude (AM) or frequency modulation (FM) of the time-domain signal. Surprisingly, to date there is only one open source subharmonics detector available to the scientific community: Sun's subharmonic-to-harmonic ratio (SHR) [Sun, 2000, JVoice]. Here, this algorithm was subjected to a formal evaluation with two data sets of synthesized and empirical speech samples.

Methods: Both data sets consisted of electroglottographic (EGG) signals, i.e., a physiological correlate of vocal fold oscillation that bypasses vocal tract acoustics. Data Set I contained of 2560 synthesized EGG signals with varying degrees of AM and FM, fundamental frequency (fo), periodicity, and signal-to-noise ratio (SNR). Data Set II was made up of 25 EGG samples extracted from the CMU Arctic speech data base. For a "ground truth" of subharmonicity, these samples were manually annotated by a group of five external experts.

Results: Analysis of the synthesized data suggested that the SHR metric was relatively robust as long as the subharmonic modulation extent was below 0.35 and 0.7 for the FM and AM scenarios, respectively. In the CMU Arctic speech data samples, the SHR analysis reached a maximum sensitivity of about 87 % with a specificity of over 90 %, but only for adaptive algorithm parameter settings. In contrast, the algorithm's default parameter settings could only successfully classify about 9 % of all subharmonic instances.

The SHR is a useful metric for assessing the degree of subharmonics contained in voice signals, but only at adaptive parameter settings. In particular, the frequency ceiling should be chosen as five times the highest fo, and the frame length as at least five times the largest fundamental period of the analyzed signal. For subharmonic classification a threshold of SHR ≥ 0.01 is recommended.

Acknowledgements:

This work has been supported by an APART grant from the Austrian Academy of Sciences.

Authors:

Christian Herbst	

Title: ***Sex Hormones-Related Female Professional Voice User Handicap Scale (SHE-VoiHS)***
Category: Speech Language Pathology

Abstract:

Objective: Objectives: To create a validated patient-reported outcome measure (PROM) that quantifies perceived voice handicap with respect to female sex steroid hormonal status, henceforth the Sex Hormones-Related Female Professional Voice User Handicap Scale (SHE-VoiHS).

Methods: Methods / Design: Dimensions and items of SHE-VoiHS were drawn from two types of sources: vocal symptoms reported to be related to female sex steroid hormonal variations during the menstrual cycle, pregnancy and menopause, reported in previous in-depth interviews with several types of professional voice users and in previous comparative studies, and existing voice-related PRO measures, scrutinised for items concerning: (1) healthy voice function, voice disability, dysphonia and/ or handicap; (2) voice-related self-efficacy and ability to work and to communicate; (3) voice-related quality of life; (4) impacts of hormones on voice; and (5) women's general health and wellbeing. The result was a preliminary version of SHE-VoiHS, which included 47 items distributed in 6 dimensions: voice function (12 items); ability to work (10 items); economical (6 items); self-concept (6 items); emotional (6 items); and social communication (7 items). Its content validity was validated by a panel of 15 experts. SHE-VoiHS was then filled in online by 519 participants, accompanied by questions addressing current endocrinological reproductive status and history of amenorrhea. Instructions to the participants were: "This questionnaire aims at evaluating voice-related ability to work and to communicate in relation to current stage of female's endocrinological reproductive life. Select the option that best reflects the degree of your agreement to the following statements (1, totally disagree; 6, totally agree)". Severity of symptoms that may compromise overall wellbeing associated with the menstrual cycle, pregnancy and menopause were also assessed using a 6-point Likert scale (1, absent; 6, unbearable). In addition, questions concerning professional occupation were asked, together with demographic information, including age, educational level, English proficiency and professional experience. Chronbach's alpha and factorial analysis were carried out to test SHE-VoiHS's reliability and content validity. SHE-VoiHS scores were compared between reproductive and menopausal groups of professionals.

Results: Results: The results of the expert evaluation showed high scores for items representativeness (3.75) and clarity (3.44), with a content validity index of 0.95. Item scoring a Factorial Validity Index less than the average value (i.e., 65.44%), were either deleted or reallocated into different dimensions. The final factorial solution accounted for 60.3% of the total variance, with five latent variables and their corresponding explained variance being: professional (42.02%), resulting from the merge between two initial dimensions that fell into the same latent variable, i.e., ability to work and economical; functional (9.07%); social (8.06%); self-concept (4.44%); and emotional (4.77%). The Cronbach's alphas for the five dimensions were: professional, a = 0.890; functional, a = 0.878; social, a = 0.835; self-concept, a = 0.73; and emotional, a = 0.794. Although scores for perceived handicap were generally low (< 2.5), the menopausal group scored higher as compared to the reproductive group of professionals, the highest difference being at the emotional dimension: professional [menopausal SHE-VoiHS mean scores = 1.49; reproductive SHE-VoiHS mean scores = 1.3]; functional [menopausal SHE-VoiHS mean scores = 1.81; reproductive SHE-VoiHS mean scores = 1.59], emotional [menopausal SHE-VoiHS mean scores = 2.44; reproductive SHE-VoiHS mean scores = 1.9]; and self-concept [menopausal SHE-VoiHS mean scores = 1.50; reproductive SHE-VoiHS mean scores = 1.26].

Conclusions: SHE-VoiHS seems a promising PROM to quantify perceived voice handicap relative to sex steroid hormonal concentrations in female professional voice users. Menopause is the end of a female's reproductive stage during which sex hormones appear to impact more on perceived voice handicap.

Authors:

Filipa Lã Diego Ardura Nuria Polo Mauro Fiuza Ana Ramirez	

Title: ***PUTTING THE HUMAN TOUCH IN YOUR AI VOICE***
Category: Voice Pedagogy

Abstract:

Objective: To raise awareness of creators of AI platforms and the voice talents who voice them in the importance of infusing automated voice-driven vocal "essences" with real, actual human sound and empathy instead of a robotic sound. Allison Smith -- a voice talent heard on telephony platforms globally (and an Amazon Alexa upgrade voice) will share her perspective in automated voice applications and how they can be vastly improved by always remembering the "human touch".

Methods: The presentation will outline where we started with AI voices, where they are now, and what's ahead for automated voices. Sound files of examples will illustrate the vast progress that's been made in emulating the human voice on AI applications.

Results: Automated voices have progressed wildly in recent years; there's still massive room for improvement and advancement, to make them truly relatable, human, and identifiable.

Authors:

Allison Smith	

Title: ***Group Training For Singers: What We Can Learn From Dance and Acting Classes***
Category: Voice Pedagogy

Abstract:

Objective: This research seeks to compile and evaluate principles of group learning from acting and dance pedagogy. Within the field of voice pedagogy, group learning has taken a backseat to individual lessons while similar artistic fields continue to produce both competent amateurs and professional-level performers using a predominantly group learning format. The objective of this study is to compile a summary of best practice and practical ideas for the voice studio, as well as include a discussion of the challenges of group learning in voice-specific disciplines in both in-person and online lessons.

Methods: Multiple databases will be used in searching keywords such as "collaborative learning", "dance", and "acting" in combination with the words "group" and "pedagogy."

Results: Results TBD

Authors:

Elizabeth Bemis	

Title: ***MEASURING "LOCK AND RING" IN BARBERSHOP SINGING***
Category: Voice Pedagogy

Abstract:

Objective: Barbershop is close harmony singing characterized by homophonic, four note chords, precisely tuned so the voice harmonics combine to produce strong overtones. Lock and Ring defines the timbre of Barbershop which is shaped by the relative strengths of the overtones in the sound. The objective of this research was to develop a method for analyzing the strengths of harmonics in Barbershop quartets to identify timbral features idiomatic of Lock and Ring chords.

Methods: Spectral analysis was conducted on recordings of successful Barbershop quartets. Sustained chords of at least 1.0s duration, with all voices singing the same vowel, were selected. A steady state section of 0.5s was analyzed. Cumulative line spectra were computed giving the running total of the power contributed by each harmonic. The spectral centroid of each chord was calculated. The results were compared with predicted values for each chord and vowel derived from a synthesized quartet. Variables examined included chordal structure, chord root note and vowel sung.

Results: The results show that over 50% of the total energy in a chord is often carried in the harmonics above the highest fundamental frequency being sung by the individual voices. These findings confirm prominent high frequency energy is an important timbral characteristic of good 'Lock and Ring' in Barbershop. Spectral centroid and cumulative line spectrum have been shown to be effective tools in identifying acoustic features with promising potential to assess the impact of voice balance, vowel choice and chord structure on the timbre of an ensemble.

Authors:

Peter Cookson Helena Daffern	

Title: ***THE MANIFESTATION OF VOCAL FATIGUE: A SURVEY OF PROFESSIONAL, FEMALE OPERA SINGERS AND A SINGLE-SUBJECT STUDY OF ONE PROFESSIONAL OPERA SINGER***
Category: Voice Pedagogy

Abstract:

Objective:

1. To ascertain how vocal fatigue manifests itself in the vocal range of a sample of professional, female opera singers. 2. To assess changes in the vocal fold appearance of one professional, female opera singer after extended operatic singing.

Methods:

296 professional, female opera singers were recruited to participate in an anonymous research survey querying the temporary impact of vocal fatigue in professional, female opera singers. 46.28% of participants described themselves as singing mainstage roles at large, A-level opera houses. Singers were asked to report where in their vocal range they experienced the effects of vocal fatigue and could choose more than one response. In the second part of this study, one professional, female opera singer (the author) underwent two laryngeal videostroboscopic exams pre and post vocal loading. The exams were evaluated and compared independently by two blinded laryngologists.

Results: A large proportion of the professional, female opera singers surveyed reported increased difficulty navigating their lower middle range and lowest range after extended operatic singing. 42.91% reported a temporary impact on their lower middle range (C4-F4) as a result of vocal fatigue. 36.49% of participants experienced a temporary impact on their lowest range (below C4) and 19.59% reported a temporary impact on their higher range due to vocal fatigue. These results support the single-subject study, which found that after vocal loading, there was a decrease in glottal competence while singing in head voice in the lower middle range.

Authors:

Melissa Treinkman Michael Johns	

Title: ***THE INFLUENCE OF VOWELS ON A CAPPELLA CHORAL TUNING***
Category: Basic Science

Abstract:

Objective: The objective is to better understand the effect that different vowels can have on choral tuning in a cappella performance due the their 'intrinsic pitch'.

Methods: Tuning in choral singing is a vital part of the performance and poor tuning can completely change the listeners' perceptions of the overall musical experience for the worse. The major factor in tuning is the fundamental frequency of the notes being sung and these are related directly to the notes on the musical score. In a cappella choral singing, the most consonant or 'settled' tuning would be in just temperament (based essentially on harmonic matching). This paper considers the role that the spectrum can play in pitch perception with reference to changing the vowel through two cappella tuning experiments.

Two experiments were carried out:

the first involved a professional quartet of a cappella singers singing a note and changing the vowel sung against a just tuned sung chord on a fixed vowel

the second involved the same experimental paradigm but the sung vowels were created using the driver software for the Vocal Tract Organ.

Results: Results indicate that the fundamental frequency is changed with a change in vowel and that there is consistency across a quartet of professional a cappella singers. However, the change is not fully consistent with previous findings about the intrinsic pitch of vowels in the literature and these differences will be discussed. There are direct implications for choral a cappella performance in the context of singing different vowels.

Authors:

David Howard FREng	

Title: ***SUNG VOWEL CLARITY WITH RESPECT TO PITCH DISTRIBUTION IN RECITATIVE AND ARIA***
Category: Basic Science

Abstract:

Objective: This paper relates to the pitch distribution differences in compositions that make use of recitative and aria. In Recitative, the story is being told and the words are sung only once so the text needs to be understood, whereas in Aria, the text is relatively short compared to the overall length of the piece itself and it is repeated a number of times. The paper explores the hypothesis that the pitch range employed in aria is generally higher than that employed in recitative. When vowels are sung by sopranos on pitches above C5 (f0 is above approximately 512 Hz), they become progressively less discernible in terms of their discrimination to the listener. The research question here was: did composers understand and make allowance for this effect in practice in the way they scored Recitative and Aria in terms of the pitch range employed for each?

Methods: Recitative and Aria scores by GF Handel are analysed in terms of their pitch distribution to establish whether or not such allowances were made in his compositions for the pitch ranges selected in examples of his recitative and aria settings in terms of vowel discernability with varying voice pitches. The working hypothesis is that pitch distribution in Recitative has to be lower than that for Aria to aid listener understanding of the text (sung once in recitative but repeated in Aria).

Results: Initial data appears to show the predicted effect – there is more analysis to be done to complete the story (results TBD).

Authors:

David Howard FREng	

Title: ***RESONANT VOICE: PERCEPTUAL AND ACOUSTIC ANALYSIS AFTER LESSAC KINESENSIC TRAINING***
Category: Voice Pedagogy

Abstract:

Objective: To investigate whether actors' voices post-Lessac Kinesensic Training - LKT can be perceptually identified as more resonant, and to verify if the Acoustic Voice Quality Index (AVQI), the Acoustic Breathing Index (ABI), and their acoustic measures are able to describe the classified voices as more resonant.

Methods: Eight vocally healthy English first-language actors, participants of the same LKT, were asked to sustain the vowel /a/ and to read a piece of the Rainbow Passage, pre- and post-training, at a self-selected habitual frequency and intensity. The readings were divided into initial and final parts, both with 34 syllables, and combined with the vowel /a/ (3s). The pre- and post-training pairs of the initial and final parts were randomly presented to a voice expert who judged which sample sounded more resonant or if they were similar. The same samples were analyzed using the AVQI and ABI scripts.

Results: 87.5% of the initial parts and 100% of the finals in post-training were judged as more resonant. Tilt was higher for the post-training initial parts (p = 0.036), but a correlation with the perceptual judgement wasn't found. HNR was higher (p = 0.018) and jitter was lower (p = 0.017) for the post-training final parts. The statistical analysis comparing the perceptive and acoustic data for the final samples couldn't be applied.

It seems that LKT has a positive impact on the development of a resonant voice and that the perceptual analysis was more effective to describe resonant voices than the AVQI, ABI, and its acoustic measures.

Authors:

Marilene Grama Viviane Barrichelo-Lindström Marina Englert Deborah Kinghorn Mara Behlau	

Title: ***THE KEY TO SINGING OFF-KEY: THE AMPLIFIED SINGER AND PITCH PERCEPTION DISTORTION***
Category: Voice Pedagogy

Abstract:

Objective: Whether it's Mariah Carey's infamous 2016 New Year's Eve performance or at a karaoke club with friends, most people have witnessed someone singing off-key. This begs the question: if a casual listener can tell when a singer is out of tune, why can't experienced vocalists identify tuning discrepancies? The authors created a novel term to describe this phenomenon: pitch perception distortion (PPD). PPD occurs when an amplified, accompanied singer's perception of their own pitch relative to that of the accompaniment becomes ambiguous, leading to one of two conditions: a) the singer believes they are out of tune, but they are in tune, or b) the singer believes they are in tune, but they are not. This pilot study aimed to establish the incidence of the phenomenon and identify associated variables for further research.

Methods: The incidence of PPD and related variables was assessed in 115 singers via an anonymous online survey. Data was collected regarding singers' self-reported biographical data, level of training, performance environment variables, and PPD experience.

Results: Preliminary results revealed that 68% of the sample population acknowledged experiencing at least one episode of PPD. The factors most highly correlated with the occurrence of PPD included intensity of the musical accompaniment on the stage (69%) and inadequate familiarity with the song (31%), indicating that both internal and external factors play a role in PPD. Further research is needed to establish the effect of these variables on PPD and identify other stimuli that are associated with this misperception.

Authors:

Sarah Kervin Celia Stewart	

Title: ***CONTEMPORARY COMMERCIAL MUSIC (CCM) SURVEY: CURRENT STATE OF WHO'S TEACHING WHAT IN NON-CLASSICAL MUSIC***
Category: Voice Pedagogy

Abstract:

Objective: This study is a follow-up to a study in 2009 by Weekly and LoVetri, which led to the development of CCM vocal pedagogy courses and an institute to address shortcomings in the training available to voice teachers. This study revised the original questionnaire to voice teachers, asking specifically about relevant formal education and training. The 2009 survey by Weekly and LoVetri found many voice teachers indicated they received only classical training and no training in commercial styles. Only 19% had training to teach musical theatre singing. Since then many colleges and universities have added and are in the process of adding courses in CCM vocal pedagogy. The aim of this study is to provide insights into the current state of pedagogical training of voice teachers who teach commercial styles.

Methods: Subjects were solicited via survey links to members of professional vocal teaching organizations and singing teachers throughout the United States and several foreign countries. The detailed questionnaire asks about performance experience, training methods, the use of terminology, knowledge of voice science and medicine, and other parameters.

Results: The specific practices and education of voice teachers may also lead to a better understanding of the problems and difficulties of both private teachers and college professors in addressing this repertoire. It may also show contrasts between older and younger population.

Statistical analysis obtained from the data may lead to both a better understanding of the discipline, the current problems and difficulties of private teachers and college professors in addressing all CCM repertoire.

Authors:

Edrie Means Weekly Marquita Lister Elizabeth Bemis	

Title: ***SINGING AT MENOPAUSE: A SYSTEMATIC REVIEW***
Category: Voice Pedagogy

Abstract:

Objective: to identify most reported menopausal-related characteristics and their implications to singer's voice quality, performance practices and vocal health.

Methods: Scopus, PubMed, Medline, Web of Science, Science Direct, Academic Search Complete, SciELO, ProQuest and Google Scholar were searched. Combinations of the following key words were used: "singing", "singers", "choir", "menopause", "climacterium". Both articles and dissertations were searched in any European or European-derived language, and their references hand searched to further identify related studies. Studies focused on the singing voice were included. References were excluded if the primary focus of attention was not: i) the singing voice; ii) aspects of singer's voice production; iii) natural menopause; and iv) original publications. For those studies reporting effects of hormonal replacement therapy (HRT), only results concerning non-HRT user groups were considered.

Selected references were separated according to type of publication and type of data set and voice characteristics descriptors were grouped into categories and subcategories.

Results: Results: A total of 15 960 references were identified in the initial search, but only 10 were considered relevant, meet the eligible criteria and were not duplicates. Most used evaluation data set were the self-reported ones. Most common voice alterations were found to be related to voice function: problems with pitch range, changes in timbre, decreased endurance and flexibility. Physical, psychological, performance practices and vocal health voice symptoms and characteristics were also found, Pedagogical implications were addressed in order to maintain work ability.

Conclusions: To assist singers during menopause, a comprehensive study on the extent to which menopausal symptoms are reflected on voice production is urgent, the ultimate goal being evidence-based educational resources.

Authors:

Mauro Fiuza Filipa Lã	

Title: ***THE IMPACT OF ONLINE LEARNING PLATFORMS ON SPEAKING AMPLITUDE***
Category: Voice Pedagogy

Abstract:

Objective: INTRODUCTION: COVID-19 related social distancing constraints forced institutions of learning to shift to online learning modalities. Teachers have anecdotally noted that vocal fatigue has increased from using platforms such as Zoom because they speak louder than they might otherwise need to when teaching in-person.

OBJECTIVES: This study seeks to evaluate: 1) if a difference in vocal amplitude occurs when shifting from in-person to Zoom speech; 2) the relationship, if extant, between the size of a room seen on Zoom and the vocal amplitude of the subject speaking "into" that room; and 3) if a difference in vocal amplitude occurs during headphone vs. non-headphone use.

Methods: METHODS: Subjects read half of the rainbow passage to an in-person investigator sitting four feet away and then read the second half to the investigator over Zoom while both the investigator and subject were two feet away from their computer microphones. Subjects were then asked pre-recorded questions showing the investigator in variously sized rooms over Zoom. Subjects were asked to read the first half of the rainbow passage to the investigator over Zoom without headphones and then the second half with headphones. Decibel levels were recorded throughout the process.

Results: RESULTS: Data indicates that speakers alter their vocal volume dependent on whether or not they are speaking in person or virtually, based on the size of the room seen in the Zoom screen, and whether or not they are wearing headphones.

CONCLUSION: Teachers must carefully monitor their speaking volume to maintain vocal health during online teaching.

Authors:

Paul Patinka	

Title: ***THE IMPACT OF INSPIRATORY MUSCLE TRAINING AND BREATHING EXERCISES ON THE INSPIRATORY MUSCLE STRENGTH, MAXIMUM PHONATION TIME AND RANGE OF SINGERS AND NON-SINGERS.***

Category: Voice Pedagogy

Abstract:

Objective: As singing requires deliberate coordination of air with the laryngeal valve, strengthening the muscles that regulate subglottal pressure may aid in training singers. The objective of this study was to investigate the impact inspiratory muscle training (IMT) and traditional breathing exercises (BE) may have on the inspiratory muscle strength and vocal measures of singers and non-singers.

Methods: Methods: Singers (n=10) and non-singers (n=8) were randomized to perform either daily IMT or BE for four weeks. Dependent variables, which included maximum inspiratory pressure (MIP), maximum phonation time (MPT) and range (in semitones), were measured before and after the intervention. Additionally, participants were surveyed about their perceptions of the protocols.

Results: Results: All but two participants completed the protocol. Group mean improvements were found in all domains except the range of the S-IMT group. Statistically significant improvements in MIP were demonstrated in singers performing IMT and BE (S-IMT and S-BE) and non-singers performing BE (NS-BE) (p<0.05). The group of non-singers performing IMT (NS-IMT) did not improve their MIP with statistical significance (p=0.07). Changes in range reached significance (p=0.02) only in the NS-BE group, although there was heterogeneity among individual results across protocols. MPT improved across all groups but did not reach statistical significance. Participants generally enjoyed the experience of both treatments and their responses were similar between groups.

Conclusions: IMT and BE can improve inspiratory muscle strength in singers and non-singers. Training, experience and adherence may play a role in how far improving inspiratory strength impacts range and MPT within four weeks.

Authors:

Rachel Goldenberg	

Title: ***BROADWAY BABY: A VIBRATO OR CONSCIOUS WOBBLE?***
Category: Voice Pedagogy

Abstract:

Objective: Child vibrato is increasingly in demand and there is industry pressure to conform to this aesthetic; but, is it even possible for children to sing with true vibrato? Modern child voice pedagogue Jenevora Williams claims that such a vibrato is a “conscious wobble” and should not appear until after puberty. This contradicts previous opinions, such as that of Richard Miller, who claimed that "all ages of children will sing with a natural vibrato." My research explores whether the child vibrato truly exists. The broader goal is to determine if vibrato should be expected from coordinated young singers, and, if so, if it is a sufficiently healthy and efficient habit to become a component of the tonal model for teaching young performers.

Methods: I analyzed recordings of successful young performers (Beverly Sills, Julie Andrews, and Judy Garland) in Voce Vista v3.3 to identify if the rate, extent, and periodicity of the pitch excursion qualifies as a true vibrato according to Ingo Titze's definition outlined in Principles of Voice Production.

Results: Based on the audio samples analyzed for this paper, there is evidence to suggest that young children can sing with vibrato. However, audio recordings alone are not sufficient to determine whether or not this is a naturally-occurring and further research must be conducted in-person to observe physical indicators of a conscious wobble (e.g. head shake, abdomen pulsing, etc.). This paper does not assume to address these points, but rather concludes that vibrato can and does exist in prepubertal and pubertal voices.

Authors:

Daniel Lyng	

Title: ***THE EFFECT OF FORMANT TUNING ON INTONATION PERCEPTION***
Category: Voice Pedagogy

Abstract:

Objective: Current research has considered intonation as an extension of a singer's pitch perception, but it's been suggested by pedagogues such as Cornelius Reid that even singers with advanced aural skills are perceived as singing out of tune. But perhaps they are not singing out of tune at all; perhaps this is not an issue of which pitch is sung, but rather how it is sung. I hypothesize that one's perception of vocal intonation can be impacted by formant tuning. Specifically, I hypothesize that "yell" timbre (F1/H2) will generally be perceived as flat due to the perceptual associations between yell and vocal strain. On the other hand, "turn" timbre (F2/H3) will generally be perceived as in tune due to the perceptual associations between "turn" and ideal voice technique in the classical singing tradition.

Methods: Testing samples were created in the MADDE Voice Synthesizer. The synthesized voice was modeled after a tenor who was recorded in Overtone Analyzer. The spectral envelope of each sample was reshaped in MADDE and the pitch was then altered by 0, 25, and 50 cents. Listeners completed a visual analog scale from "very flat" to "very sharp" for each sample.

Results: Intra-reliability measures suggest that this study design was not reliable. However, considering only those listeners with a standard deviation under 1, the data suggests that "yell" timbre can be perceived as somewhat sharp. This theory contrasts the original hypothesis that "yell" timbre perceived as flat due to the perceptual associations between "yell" and vocal strain.

Authors:

Daniel Lyng	

Title: ***ACOUSTIC AND AIRFLOW VIBRATO IN DIATONIC SCALES: A PILOT STUDY***
Category: Voice Pedagogy

Abstract:

Objective: To compare fundamental frequency (f_o) and airflow (AF) vibrato measures between ascending and descending diatonic scales, sung by a Western classical singer. Such information is important to both basic phonatory science and pedagogy of expressive singing.

Methods: The performer is an active Western classical soprano and university singing teacher with over 20 years of professional performance experience. The subject sang 3 trials of two diatonic scale octaves ascending/descending (G3-G5). Each note was initiated with the plosive /p/ followed by the vowel /a/ with 3-5 vibrato cycles. Praat, the Glottal Enterprises aerodynamic system (MSIF-2), and custom analysis software were used. The dependent variables were f_oand AF vibrato – rate and extent, as well as intensities.

Results: Similar f_o and AF vibrato rates were seen across all the notes: M_{fo}=5.32Hz(SD=0.25 Hz); M_{AF} =5.31Hz(0.35 Hz). Mean f_o and AF vibrato extents increased from G3-G4 to G4-G5: M_{fo}=41Hz(10 Hz) for the notes between G3 and G4; M_{fo}=85 Hz(18 Hz) for G4-G5; M_{AF}=68.1cm³/s(14.9 cm³/s) for G3-G4; and M_{AF}=107.7cm³/s(19.7 cm³/s) for G4-G5. Vocal intensities increased from G3 to G5, by 25 dB (56 to 81 dB).

Overall, f_o and AF vibrato extents and vocal intensities were greater in the higher octave. Assuming increased CT muscle contraction with higher pitch, the results suggested greater subglottal pressure and glottal area for the higher pitches. Similar f_o and AF rates may primarily relate to fluctuations in CT muscle contraction independent of general CT muscle action and subglottal pressure.

Authors:

Sri Nandamudi Ronald Scherer Tori Spoelma Alana Patterson Rosalie Gagnon	Hanna Benedek

Title: ***SPEAK LIKE YOU SING: INTEGRATING CLASSICAL TECHNIQUES FROM THEATRE AND MUSIC IN SPOKEN DIALOGUE FOR OPERA***
Category: Voice Pedagogy

Abstract:

Objective: Objective: In order to maintain characterization throughout a production, opera singers frequently need skills in more than one vocal task. This exploratory study investigated spoken dialogue before and after two hours of training (one-hour class, one-hour tutorial) in the use of language as an actor, with breath management, pitch range and resonance strategies of a singer. Comparative recordings of sung and spoken material were analyzed for acoustic qualities.

Methods: Design: At the National Opera Center, New York, six professional singers from different voice categories recorded one minute of spoken dialogue before training. Approximately a week later, they recorded one minute of an aria, unaccompanied, followed by the spoken dialogue, then improvised a one-two-minute performance moving between singing and speaking. Data were analyzed for fundamental frequency (F0), sound pressure level (SPL), and long-term average spectrum (LTAS).

Results: Results and Conclusions: Comparing for all singers pre- to post-training, mean F0 of spoken dialogue increased and SPL mean and range increased. Comparing aria to spoken dialogue after training, SPL range increased. F0 ranges were closer to each other in improvisation than in separate performances of aria and dialogue. Energy peaks between 2 and 4 kHz on LTAS appeared in more than one performing condition. In spoken dialogue after training, some F0 and SPL data gravitated toward those of the aria and away from the initial recording, suggesting that participants were beginning to transfer production skills from singing to speaking. A perceptual study is needed to assess characterization and the use of language pre- and post-training.

Authors:

Joan Melton Zachary Bradford Jessica Lee	

Title: ***EMOTIONAL SAFETY IN THE VOICE STUDIO***
Category: Voice Pedagogy

Abstract:

Objective: The university voice studio is a place of intensive 1 to 1 training, with the potential for positive and equally negative learning experiences for students. Anecdotally, power dynamics which favor professors and disempower students may have contributed to negative experiences being underreported. In the spirit of the social movement of #timesup, this study seeks to shine a light on student experiences taking place behind closed doors in 1 to 1 voice training, within a university setting.

Methods: A de-identified survey was designed by the authors, voice and psychology specialists, and circulated to current and recently graduated university voice students. The survey collects open ended descriptions of notable student experiences from their 1 to 1 voice studio training within a university setting. The bulk of the survey features five-point Likert scale statements on topics including emotional safety, body commentary, physical contact for teaching purposes, trust, respect, pride, favoritism, and power dynamics during 1 to 1 voice lessons in a university setting. Demographic information is also collected, including age, sex, degrees earned, style of music studied, country of origin, and country of study. This is a preliminary study to investigate the potential for future research in this area.

Results: Results TBD.

Authors:

Elizabeth Ann Benson Tara D. Snyder Matthew Chin Dale Cox Valerie Sims	

Title: ***SUPRAGLOTTAL PRESSURE MODELING IN EXCISED CANINE LARYNGES***
Category: Basic Science

Abstract:

Objective: Phonation into a resonance tube is a well-known practice that has been used in voice therapy and to improve vocal economy. The goal of this kind of therapy is to improve vocal economy by increasing supraglottal pressure and acoustic impedance in the vocal tract. A specific type of phonation therapy, using straws, is a more common practice observed. Straw phonation therapy involves vocal exercises performed into a tube that artificially creates a semi-occluded vocal tract (SOVT). Previous studies have found that PTP, the minimum lung pressure required for the onset of vocal fold oscillation, and phonation threshold flow (PTF) are both good indicators of phonation ease. A lower PTP and PTF is indicative of better phonation ease, and therefore, can represent better vocal economy. A decrease in PTP and PTF is directly attributable to increased supraglottal pressure and impedance of the vocal tract. The objective of the study is to assess how supraglottal pressure affects vocal economy since optimal supraglottal pressure level for vocal economy has not been determined. Finding an optimal supraglottal pressure range could alter the development of current straw phonation therapies to yield more successive results.

Methods: Canine larynges will be mounted on an excised larynx bench apparatus following specifications by Jiang and Titze. The apparatus is in a sound-attenuated room to minimize confounding variables. The larynx will attach to a pseudo lung output with constant VF adduction. PTP and PTF will be measured.

For the pre-control trial, each larynx will be brought to phonate with no added pressure. Further, the larynx will be exposed to experimental pressures of 4cmH2O, 8cmH2O, 12cmH2O, 16cmH2O, and 20cmH2O using a pressure transducer passed through a flowmeter connected to the pseudo lung. Pressure will be measured below the larynx. Each larynx will undergo five phonations at each condition. A five-minute rest between each phonation will eliminate lingering effects and water will be applied so larynges are hydrated. Last, the larynges will be subject to a post-control trial where no pressure is applied, but this will test fatigue. This will be repeated on ten larynges before data analysis.

Results: Results TBD. The results will help improve phonation therapies in the clinical setting using the most beneficial pressures to improve vocal economy. Determining optimal pressure in excised canine larynges, could be the beginning to eventually modify the most beneficial pressures for voice therapy in humans.

Authors:

Nikita Menon Austin Scholp Jack Jiang Matthew Silverman	

Title: ***SINGING AND PERSONS WITH PHYSICAL DISABILITIES: A SURVEY OF SINGING TEACHER ATTITUDES, KNOWLEDGE AND EXPERIENCE*****.**
Category: Voice Pedagogy

Abstract:

Objective: Knowledge of the anatomy and physiology of the singing voice is vital for professional vocal instruction, but what happens when the student's anatomy and function is drastically different due to a disability? The teaching of PWD (People with Disabilities) requires the adaptation of standard techniques in order to best meet their specific needs. In doing so, some of the main concepts of teaching singing are likely found to be prescriptive and defined upon the template of the able-bodied singer. Furthermore, the lack of presence of PWD in the student bodies of music schools around the country reveals an unspoken systemic discrimination towards them. Are vocal teachers of today pedagogically ready to teach a physically disabled student?

Methods: This paper (1) reviews available literature on the subject of Disability and Music regarding the inclusion of PWD in singing instruction, (2) compiles and analyzes information gathered through an online survey of contemporary vocal pedagogues and teachers in training regarding their attitudes toward teaching PWD as students, how much training in and experience with teaching PWD they have, and how accessible their teaching space is to PWD, and (3) provides a summary of resources that singing teachers can use to expand their pedagogical knowledge on the teaching of PWD.

Results: RESULTS TBD

Authors:

Julieta Garcia Reyes	

Title: ***EFFECTS OF PROVOZ TRAINING IN THE COMMUNICATIVE SKILLS OF YOUNG PEOPLE***
Category: Voice Pedagogy

Abstract:

Objective: To analyze the effect of PROVOZ training on youth communication skills.

Methods: To analyze the effect of PROVOZ training on young people's communication skills. Methods: Forty one young people participated in the study, divided into: Group I (GI) - PROVOZ training during 5 weeks, for 3 houses class; Group II (GII) - 3 hours class were guided on the importance of voice for communication with exercises at home. Communicative skills were assessed for Sending Clear Messages, Listening, Giving and Getting Feedback, Handling Emotional Interactions before and after the interventions using a 40-item questionnaire answered by participants and parents. Both groups were recorded on video during a standardized oral presentation, before and after interventions. The videos were submitted to evaluation of the communication profile by three speech language pathologists, regarding the point of strength/opportunity for improvement. Statistical analysis was performed using Chi-squared test, McNemar test, and paired t-test (p <0.05).

Results: The analysis of questionnaires showed improvement in GI in Sending Clear Messages (p =0.001) and Giving and Getting Feedback (p =0.010), however, there were no differences in GII. The videos evaluation showed associations between comfortable body posture in the pre and tense in the post (p = 0.002) and position of relaxed feet in the pre and tense in the post (p = 0.039) in G2. The IG did not present differences in the evaluation of the communicative profile. Conclusion: The present study points out that the PROVOZ training method applied to young people might improve communicative skills.

Authors:

MariaLucia Torres André Sampaio Hugo César Caracas	

Title: ***THE UPPER VOCAL TRACT CONTRIBUTION ON THE AUDITORY PERCEPTION OF TWANG***
Category: Voice Pedagogy

Abstract:

Objective: The auditory perception of twang has been related to lower vocal tract adjustments. Although some authors have proposed that the upper vocal tract (UVT) might also contribute to the twang voice quality, to the best of our knowledge, there are no auditory perceptual studies based on natural voice stimuli that have assessed the contribution of the UVT to the perception of twang. Through auditory-perceptual tests, the present study attempted to answer whether the spectral features related to the UVT adjustments contribute to the perception of twang and the magnitude of this contribution compared to the spectral characteristics related to the lower vocal tract (LVT).

Methods: Ten blinded judges rated the amount of twang perceived on seventy-six stimuli. Stimuli consisted of twenty voices recorded from eight CCM singers who sustained the vowel [a:] in different pitches, with and without twang quality. Also, forty spectrum-manipulated samples and sixteen synthesized stimuli were included. The spectral manipulation and synthesis were performed based on the acoustic data obtained from the original samples (fundamental frequencies and formant frequencies).

Results: Results TBD

Preliminary results show differences in the twang perception when comparing stimuli that contained acoustic information below 2 kHz and over 2 kHz. Also, differences are being found when comparing stimuli that resembled twang based on the lower formants and those based on the higher formants. Both the LVT and UVT may contribute to the perception of twang. However, based on preliminary data, twang quality seems to rely more on the UVT changes.

Authors:

Marcelo Saldías Anne-Maria Laukkanen Victor Espinoza Christian Castro Justin Stoney	Camilo Quezada

Title: ***IS THERE A MESAURABLE DIFFERENCE IN HOW PITCH IS PERCEIVED FROM AN EXTERNAL SOURCE COMPARED TO WHEN WE SING?***
Category: Voice Pedagogy

Abstract:

Objective: The purpose of this study is to ascertain whether there is any difference when pitch matching using one's voice or a button-controlled pitch and if occluding the ear canal influences pitching accuracy in singing.

Additionally, it will test if pitch accuracy while singing improves by creating occlusion to limit air-conducted hearing.

The results of these tests will be presented and the implications for pitching accuracy when singing will be explored.

Methods: In the first part, a pitch matching task is designed to ascertain whether pitch perception accuracy varies in the context of pitch matching to a target where the subjects match using their own singing voices and computer-generated stimuli. The participant is asked to match a series of note stimuli with their voice and a software button-controlled fundamental frequency vocal synthesizer with each button set 10 cents apart. The question being considered is to establish if there is a perceptual difference in matched pitch when responses are derived from singing as opposed to the use of a software synthesised vowel.

The second is a melodic pitch matching test where the participant is asked to sing the familiar song 'Happy Birthday' three times starting on a given note. The three versions are: normally, with headphones in-ear or on to create some occlusion, and with the headphones playing white noise to mask the air conducted hearing of the voice in the ear canal.

Results: Results TBD

Authors:

Thomas Edmonds	

Title: ***Interpretative map: a pedagogical tool to enhance vocal interpretive ability in acting students***
Category: Voice Pedagogy

Abstract:

Objective: The present study aimed at exploring the effectiveness of the “Interpretive Map” as a specific pedagogical training tool on the vocal interpretive ability of first-year acting students.

Methods: A total of twenty participants were included in the present study, (13 women and 7 men). The ages range was 18-27 years old. All participants signed an informed consent and underwent to voice recordings before and after ten weeks of training with the interpretative map. All acoustic samples were perceptually assessed by five blinded judges to evaluate the interpretive map parameters. Both inter and intra-rater reliability analysis was carried out.

Results: Results: significant differences in six of the seven dependent variables (loudness, pitch, and speed of speech, articulation, phonation, and construction) were observed when comparing conditions before and after training. This suggests that participants acquired the ability to control and vary each of these variables individually to achieve success in vocal expression. Conclusion: The results of the present study, suggest that the "Interpretive Map" can be an initial effective pedagogical tool to develop the vocal interpretive capacities of acting students, by enhancing the interpretive nuances level, according to the text content. Training with the “Interpretive Map”, can improve phonation quality, and articulation effectiveness, both in a functional and expressive sense.

Authors:

Gala Fernandez Karol Acevedo	

Title: ***FUNDAMENTALLY SPEAKING (AND SINGING): A LONGITUDINAL SINGLE-CASE STUDY OF A PROFESSIONAL TRANSMASCULINE SINGER DURING HORMONE REPLACEMENT THERAPY***
Category: Voice Pedagogy

Abstract:

Objective: Hormone replacement therapy ("HRT") provides transmasculine individuals profound physiological changes, including permanent shifts to the speaking fundamental frequency, singing range and timbre of their voices. Uncertainty concerning potential vocal outcomes from HRT is a significant source of anxiety for trans male singers, complicating the choices a performer must make around medical transition. Current literature examining vocal outcomes from HRT tend to focus either on the spoken voice or the social issues and praxis surrounding vocal training for trans male singers. As a result, there are few reliable sources of data concerning vocal outcomes for the singing voice, particularly for professional performers.

Methods: This longitudinal case-study seeks to address that gap by tracking, analyzing and reporting the acoustic changes experienced by one trained, professional singer while undergoing their first year of HRT (Topical testosterone gel, 1%, 50mg Q AM). This acoustical data is further enriched and contextualized through the singer's qualitative observations of their subjective experiences of vocal change, collected via questionnaire prior to each recording session.

Results: Data analysis for this study is ongoing. Preliminary results indicate changes in vocal range, speaking fo, and HNR faster than expected based on literature typically provided to transgender individuals prior to the commencement of HRT. Results will be discussed in the context of HNR, average speaking fo, singing range, perturbation measures, and spectral moments of the LTAS (spectral mean, standard deviation, skewness, and kurtosis), and are presented with the aim of contributing to current understanding of vocal outcomes of HRT in the singing community.

Authors:

Felix Graham Joshua Glasner	

Title: ***QUANTITATIVE ANALYSIS OF THE G. SCHIRMER OPERA ANTHOLOGIES EDITED BY ROBERT LARSEN***
Category: Voice Pedagogy

Abstract:

Objective: Opera aria anthologies provide a convenient repository of popular selections from commonly produced works. While pedagogues regularly utilize these anthologies in their teaching, the efficacy of the selections and their inherent musical difficulty has not yet been assessed.

This study seeks to evaluate and quantitatively measure the compositional range, tessitura, directionality, cycle dose, and time dose of selections found in the G. Schirmer Opera Anthologies edited by Robert Larsen.

Methods: Each aria's pitches were subdivided by the smallest common rhythmic duration and converted to hertz for equal weighting. Quartile analysis defines tessitura as the inclusive range between the first and third quartiles based on previous models of analysis. Directionality was obtained by finding the frequency difference between each pitch and summing the time spent ascending, descending, or remaining stable in pitch.

Results: This research displays the compositional range, tessitura, directionality, cycle dose, and time dose of 212 popularly assigned arias from the operatic repertoire along with implications of vocal difficulty.

Quantitative musical analysis allows for more accurate repertoire assignments through exiting procedures like the voice range profile. Vocal characteristics that individual singers should possess to successfully navigate these arias are described based on data interpretation.

Authors:

James Rodriguez Paul Patinka	

Title: ***HOW DOES BEING A SINGER AFFECT THE WAY WE TREAT SINGERS?***
Category: Voice Pedagogy

Abstract:

Objective: One would have thought that as a medical practitioner who sung his whole life, the plan was always to become a Laryngologist taking care of the singer. This was not the case and the journey that led me here was a dynamic one and almost chosen for me. What could make more sense then to take the experience and understanding of the challenges placed on a performer to successfully fulfill their vocation and marry this to a scientific knowledge of the human instrument? Surely this would place an individual in a unique position to care for the professional voice user with a three dimensional, holistic approach?

I am certainly not unique! There are more like me……

So just how much does being a singer affect the way we manage our singing patients?

Methods: There is no algorithm. This is not a linear model.

Every patient requires a fresh approach and my knowledge is enhanced with every performer that I treat.

Through a series of case presentations, I hope to provide insights into the challenges we face, answer some of the many questions and identify a set of principles that may be applied to our profession. How do we protect ourselves and make sure that we are rewarded for our efforts?

Results: Taking care of the singer must be one of the greatest expressions of SCIENCE and ART and being a medical practitioner enables us to get the performer back on stage…. but being a fellow artist helps us to keep them there!!!!

Authors:

Lance Maron	

Title: ***EFFECTS OF HISTORICAL WAX CYLINDER RECORDING TECHNOLOGY ON SPECTRAL MEASUREMENTS OF TREBLE OPERATIC SINGER CHEST VOICE***
Category: Voice Pedagogy

Abstract:

Objective: Our understanding of historical singing and the methods used by historical voice pedagogues is potentially limited by the technology used to record historical singers. Previous studies of the effects of wax cylinder phonographs have found distortions that may influence our perception of singing features such as registration or cause listeners to make judgements about performance practice and training ca. 1900. The current study tested the hypothesis that historical treble-voice opera singers used chest voice differently than modern-day sopranos and mezzo sopranos by comparing spectral measurements of modern-day singers recorded on wax cylinders and microphones and, subsequently, to archived recordings of historical singers.

Methods: Method/Design: This study recorded 10 professional operatic sopranos and mezzo sopranos with an Edison Home Phonograph onto brown-wax cylinder replicas and, simultaneously, with a flat-response omnidirectional microphone. Spectral moments, L₁-L₂ difference, and HNR were extracted from one task: a C4 in chest voice and on the vowel [a]. Each singer was asked to sing in their interpretation of “chest voice.” Archived recordings were selected to match the vowel and pitch, and were subsequently compared using the same spectral measurements.

Results: Results & Conclusions: The results of this study found significant differences in the first two spectral moments, HNR, and L₁-L₂. It seems likely that analysis of archived recordings—and, specifically, L₁-L₂ and the first two spectral moments—should clarify differences between historical and modern-day treble-voice opera singers and, specifically, their registration tactics in the lower treble-voice passaggio region. Comparison between archived recordings and modern-day cylinder recordings is ongoing.

Authors:

Joshua Glasner Aaron Johnson	

Title: ***PEDAGOGICAL EDUCATION OF THE CURRENT VOICE TEACHER POPULATION***
Category: Voice Pedagogy

Abstract:

Objective:

Vocal Pedagogy is the study of the systematic training of the singing voice. Unfortunately, there is no common agreement in voice training methods, and there currently exists no common certification for voice teachers. Because of this, anyone can claim to teach voice without any minimum standard of pedagogical knowledge. Does a foundation in voice pedagogy affect a voice teacher's employment opportunities? Does more robust pedagogical training translate into employment and/or larger studios? What population of current voice teachers have taken a dedicated vocal pedagogy course, and what did that course entail?

Methods: This quantitative study surveys a sample of current self-identifying professional voice teachers for information on voice studio demographics and student composition, employment history, and pedagogical education. Data will be collected via an anonymous online survey and analyzed to identify possible correlations between pedagogical training and employment, as well as observe trends regarding teaching qualifications. This information could be useful both for voice teachers looking to broaden their pedagogical knowledge and professional success, as well as for schools of music designing pedagogy curricula.

Results: Results TBD

Authors:

Rachelle Fleming Warren Freeman	

Title: ***THE SINGING VOICE SPECIALIST: AN ESSENTIAL BRIDGE BETWEEN TWO WORLDS***
Category: Voice Pedagogy

Abstract:

Objective: For the past 35 years, dedicated research has targeted the need for an educational platform to adequately prepare the singing voice specialist without the requirement of becoming a speech language pathologist. Degrees have been proposed, none were fully implemented, leaving the field without a specific career path or plan for certification.

Objectives: To analyze advancement in the field of singing voice specialization, research curriculum offerings, locate possible certification programs to facilitate extended voice care knowledge, identify associations directly impacting singing voice specialization, and discover the current understanding of singing voice specialization among singers.

Methods: Methods: This study includes interviews with otolaryngologists, speech language pathologists, singing voice specialists, and voice teachers. An anonymous survey was administered with a response rate of 298 singers. Data was analyzed quantitatively, examining performance genre, previous levels of voice study, and vocal health among various types of singers.

Results: Results/Conclusions: The results reveal the need for singing voice specialists to be an active part of the voice care team, an increasing need for a singing voice specialization degree, a certification or licensure for voice teachers, and the need to educate singers to know how and when to seek a singing voice specialist.

Authors:

Rebecca Loar	

Title: ***TEACHER ATTITUDES ON VIBRATO USE IN EARLY VOCAL MUSIC***
Category: Voice Pedagogy

Abstract:

Objective: The issue of vibrato in early vocal music (pre-1750) has long been a hotly contested topic. Many vocal pedagogues agree that vibrato is a healthy and natural part of vocal production, and therefore may be appropriately applied to early solo repertoire. Yet the idea that this repertoire should be sung completely senza vibrato still remains in many early music circles. Singers are given instruction from a number of authorities: voice teachers, conductors, musicologists, and vocal coaches, all of which likely have their own ideas about the function of vibrato in early music. This study, conducted as a survey, aims to discover trends in voice teacher attitudes on vibrato.

Methods: This survey contains 34 questions which ascertain demographic information, early music experience, vibrato preferences, and teaching methods.

Results: Do voice teachers generally agree about the application of vibrato to early music? What instruction do they give for the execution of vibrato and non-vibrato singing? Does the idea that early music should contain as little vibrato as possible come from voice teachers, or another one of the sources mentioned above? The author aims to aid singers in making an informed choice about the execution of vibrato, given the attitudes of the teachers being surveyed. Results TBD.

Authors:

Margaret Wolfe John Nix	

Title: ***CAN ANYTHING BE DONE PEDAGOGICALLY TO ENABLE THE MATURE FEMALE SINGER TO SUSTAIN VOCAL COMPETENCY AND HEALTH?***
Category: Voice Pedagogy

Abstract:

Objective: This research is based on the author's doctoral study of vocal function and efficiency in the mature female singer and whether effective pedagogy can promote sustained healthy vocal production and competence. Studies on the ageing female voice are relatively lacking from the literature. This study hopes to begin to address this lack of literature, and the study is now close to completion and will be submitted in 2021.

Like all instruments, the voice is subject to wear and tear; it can become dysfunctional, due to variations in the hormonal system, the respiratory system and structural changes due to ossification and calcification of the larynx.

Methods: This research investigated the potential benefits of pedagogical intervention on any negative features of female vocal aging in older singers. The literature has led the researcher to devise a series of targeted exercises to assess the function of key components of the voice: respiratory function, agility, onset, stamina and resonance, and which can act as a tool to measure the impact of pedagogical intervention over time. Comparison data was drawn from two matched control groups, the first were volunteers who described themselves as non-singers, the second group were nationally renowned professional singers. All the singers were aged over fifty five years old.

Results: Early findings have produced statistically significant results which support the hypotheses that the vocal competency of the mature female singer can be sustained through effective pedagogy.

Authors:

Rebecca Moseley-Morgan	

Title: ***Extreme Vocal Effects as Measured by Acoustics and EGG - An Investigation of Distortion, Growl, Grunt, and Rattle***
Category: Basic Science

Abstract:

Objective: Research has demonstrated that different and distinct supraglottic vibratory patterns are responsible when singers perform a variety of different vocal effects on different phonation types or vocal modes, used typically in such genres as rock, heavy metal and R&B. The present research continues the line of inquiry into vocal effects by investigating the acoustic and EGG changes occurring when singers add the vocal effects Distortion, Growl, Grunt, and Rattle to four different types of phonation modes.

Methods: Study design: Case-control study with 20 professional singers with a background in genres such as Classical, Rock, RnB, Pop, Gospel, or alternative music.

Methods: Twenty singers were recorded performing four types of phonation modes (Neutral, Curbing, Overdrive and Edge from Complete Vocal Technique) adding Distortion, Growl, Grunt, and Rattle, respectively, to each of the four phonation types, by means of electroglottography and acoustics.

Results: Results: When singers added Distortion, Growl, and Rattle to each of the four vocal modes, the EGG signal revealed little change in waveform patterns, indicating an uninterrupted and unhindered phonation, regardless of the additionally added vocal effect. When singers performed Grunt the EGG revealed statistically significantly changed waveform patterns. For both males and females, Distortion added to the four phonation types resulted in statistically significant differences on Shimmer, NNE, CPP, and HNR measures. For males and females, adding Growl to the four phonation types resulted in statistically significant differences on CPP. For males, Growl added also resulted in differences on Shimmer dB measures. For males, adding Grunt to the four vocal modes did not result in statistically significant differences on any MDVP measure, whereas, females were observed with differences in Fx SD and Qx SD.

On LTAS, adding Distortion increased the noise floor across spectra, with particular excitement in the region between 2150-4700Hz for females, which for males was placed in the region between 2094-4281Hz, regardless of the underlying phonation mode. Adding Growl to the four vocal modes increased the spectra between 781-2531Hz for females, and the spectra between 781-2469Hz for males, with particular decrease of spectral excitement for both males and females from 3500-6000Hz regardless of the underlying phonation mode. Grunt increased the spectral energy for both males and females in the spectral region from 156-1000Hz, with marked decrease of spectral energy and peaks and valleys across the remainder of the spectrum across all four vocal modes. The H1-H2 relationship (Neutral and Curbing being H1 dominant and Overdrive and Edge being H2 dominant) was not compromised by the addition of the vocal effects Distortion, Growl, or Rattle, with the original H1-H2 relationship of the underlying modes still visible regardless of the added vocal effect. However, Grunt did affect H1-H2 relationships of the underlying phonation, which may be explained by the observed increase of noise energy in the region in which H1 and H2 are present for both males and females for the observed pitches.

Conclusion: Each studied vocal effect impacts the acoustic spectra in distinct ways for each vocal effect, regardless of the underlying vocal mode and can thus be seen as independent of the vocal mode. Accordingly, the H1-H2 relationship of the modes are sustained when Distortion, Growl, or Rattle is added with distinct changes in other parts of the spectrum. However, this is not the case when Grunt is added. This

research suggest that vocal modes and vocal effects can be distinguished separately not only perceptually and visually through stroboscopic examination as shown in previous research, but also with statistical significance by means of acoustics and EGG measures.

Authors:

Mathias Aaen Julian McGlashan Cathrine Sadolin	

Title: ***Voice Characteristics of Cisgender Females in Late Adolescence***
Category: Voice Pedagogy

Abstract:

Objective: To date, the male adolescent voice change (MAVC) is a well documented phenomenon in both scientific and pedagogical literature. Empirical data collected from objective voice analysis of cisgender male adolescents has provided a sound foundation for the formation of pedagogical theorem from which effective practice has emerged in the contemporary voice studio. A paucity exists however when considering the female adolescent voice change (FAVC). Much of the research available is perceptual or anecdotal and there is a lack of rigorously conducted objective empirical study of the female adolescent voice, particularly in late adolescence (16 to 19 years). In the context of singing and singing assessment in secondary schools in New Zealand Aotearoa, the question of equitable assessment practice arises when considering the linear and universal relationship assumption between chronological age and vocal maturity assumed by current assessment protocol.

Methods: This study uses a non-experimental design to obtain a

Results:

Authors:

Title: ***Sound Colour as a Physiologically Observable Alternative to Perceptual Assessments of Timbre***
Category: Basic Science

Abstract:

Objective: The perceptual notion of timbre, including vowel quality and voice quality, remains a singing voice topic of ambiguity and potential disagreement amongst teaching professionals, researchers, and singers. Timbre relates to that perceptual characteristic allowing a listener to distinguish two notes similar in pitch and loudness as dissimilar. Vowel here relates to articulatory adjustments resulting in changes in the lower part of the spectrum. Voice quality can relate both to the phonation type determined by vibratory mode and intrinsic laryngeal muscular activity – i.e. vocal mode – and/or the colouring of a note accomplished by changing the shape and size of the filter above the larynx all the way to the lips – i.e. sound colour. Sound colour can be distinguished on a continuum ranging Darkest-Dark-Mid-Light-Lightest whereas vocal mode can be determined as Neutral (including a falsetto and non-falsetto setting), Curbing, Overdrive, and Edge.

At present, no study aimed explicitly at investigating which vocal mode and sound colour combinations are possible and the associated laryngeal setups has been published. The purpose of this study was to investigate the laryngeal gestures involved in obtaining the darkest and lightest sound colours possible.

Methods: Case-control with 20 professional singers recorded by nasal endoscopy performing four types of phonation modes (Neutral in a falsetto, thyroid-tilted, or non-falsetto setting, Curbing, Overdrive and Edge from CVT) for a mid sound colour condition, Lightest possible sound colour condition, darkest possible sound colour condition, and a classical sound colour condition on C4 for males and B4 for females using vowel 'EH' as in 'Stay' for Neutral, Overdrive, and Edge and vowel 'I' as in 'sit' for Curbing. Visual assessments of still images chosen from the videoscopic data was performed independently by two authors for each condition (total of 33 physiological gestures for 3 conditions for 7 phonatory conditions totalling 13.860 assessments), followed by a consensus assessment for each assessment.

Results: The sound colours correlated with the size and shape of the space above the glottis. Overall, the larger the size, the darker the sound colour became, whereas, the smaller the size, the lighter the sound colour became, without changing the underlying vocal mode or loss of vowel articulation. Metallic modes (also known as belting) were observed with a more narrowed pharyngeal space, and were, thereby, more limited in the darkest sound colour extreme as compared to the Neutral vocal mode, which did not require any laryngeal narrowing to be performed. Accordingly, the metallic modes accounted for the lightest possible sound colours in the data set.

Overall, the lowest sound colour average value was observed for the classical condition in the Neutral vocal mode, but, the classical condition did not exhibit the lowest value (i.e. darkest possible) on all gestures measured, suggesting that a classical sound colour requires laryngeal adjustments related to both darkening and a lightening the sound colour.

Whereas most measures across the vocal modes increased in value going from the Darkest to the Lightest conditions, against expectations, the anterior-posterior narrowing was observed with increased values for both the Darkest and Lightest conditions for the metallic modes Overdrive and Edge, with a lowered value for the mid condition. A similar tendency was seen for the angle between the aryepiglottic folds and epiglottis, with high values for both Darkest and Lightest for Overdrive, Curbing, and Neutral.

Conclusion: Sound colour adjustments were possible for all the investigated phonation modes on a continuum. Sound colour changes did not lead to a change in vowel or phonation type, indicating that sound colour can be altered independently by adjusting the shape of the vocal tract in one or several of the investigated 33 gestures.

Authors:

Mathias Aaen Cathrine Sadolin Julian McGlashan	

Title: ***VOCAL HABITS AND BEHAVIORS OF CONTEMPORARY CHRISTIAN MUSIC PROFESSIONAL SINGERS IN BRAZIL***
Category: Voice Pedagogy

Abstract:

Objective: This article aims to investigate behaviors and vocal habits of Contemporary Christian Music professional singers in Brazil, analyzing male and female individuals from different regions of the country. In addition, the study also aims to promote the awareness of the importance of knowing the vocal mechanism and adopting vocal hygiene habits by the professional christian singer, and its role to prevent vocal disorders and to protect their instrument from vocal injuries, contributing to a better vocal health and, consequently, a better vocal performance.

Methods: With a predominantly quantitative approach, the exploratory research uses as data collection tool the interview with 40 professional Brazilian singers of the Contemporary Christian Music segment. Twenty (20) female and twenty (20) male subjects were interviewed using online questionnaires.

Results: The results present habitual practices related to their professional use of the voice, besides the level of knowledge about how the vocal mechanism works, the level of vocal education or vocal instruction they have, which are the vocal hygiene habits practiced by the group analyzed and which are their biggest complaints about their voice performance. The relevance of the study is based on the need of knowing better the habits and vocal behaviors of this specific group of singers, which music segment is growing in Brazilian music industry in the last two decades.

Authors:

Maíra Jaber	

Title: ***Best Virtual Practices: Teaching in the Time of COVID-19***
Category: Voice Pedagogy

Abstract:

Objective: The objective of this study is to analyze best virtual practices for voice lessons and rehearsals in virtual contexts. As a result of the COVID-19 pandemic, an ability to adapt music education to virtual settings has become vital for the survival of the discipline. Singing serves as a method of healing and connection that is accessible within one's own body, free of charge, which are critical factors in enabling society to recover from the impacts of COVID-19. My research will analyze the effectiveness of various online platforms and teaching strategies in making music successfully through the pandemic. Findings from this study have the potential to benefit all vocal pedagogues and music educators as they transition to virtual teaching, providing them with strategies for embodied, holistic, and accessible ways to continue making music through an unprecedented time. This study will also describe the emotional impacts and responsibilities of virtual teaching and learning, reflecting the reality of students' increased exposure to trauma and mental health concerns stemming from the effects of COVID-19.

Methods: I will observe several choral rehearsals of varying genres and levels to evaluate the effectiveness of virtual rehearsal practices through participant observation. I will also be conducting unstructured interviews with voice instructors and choral directors to learn about their experiences and challenges teaching voice in virtual settings. I will additionally be creating a personal journal to depict my own experiences as an undergraduate voice student learning online. I will integrate these observations with my work as an opera and musical theatre vocal director as well as a private voice instructor and create a summary of findings based on data from each of these settings. This summary will provide vocal pedagogues with a foundation from which to build effective virtual teaching strategies during the pandemic and beyond.

Results: Results TBD.

Authors:

Sarah Stapleton	

Title: ***ACOUSTIC AND PERCEPTUAL QUALITIES OF MUSIC THEATER MIX IN FOUR PROFESSIONAL SINGERS***
Category: Voice Pedagogy

Abstract:

Objective: Music theater singers are often charged with developing belt, mix, and legit styles of voicing. Established parameters of mix singing, however, have not been well codified in either voice research or in voice studio work. Therefore, we wanted to observe if acoustic and perceptual measures could be used to determine whether music theatre mix singing more closely resembles belt singing or legit singing.

Methods: We recorded four professional female music theatre singers while sustaining four notes (C5, D-flat5, D5, E-flat5) in self-prescribed legit styles, mix styles, and belt styles.

We then applied several acoustic analyses to the excerpted recordings using the Praat voice and speech analysis software: The spectral slope of the long-term average spectrum (LTAS), the harmonic-to-noise ratio (HNR), the smoothed cepstral peak prominence (CPPS), and the mean frequency compared to expected pitch to measure intonation. All results were compared across pitch and style (belt, mix, and legit).

In addition, we randomized the recordings and played them for five casting directors of regional Equity theaters who rated each sample on a 100-mm visual analog scale with belt on one end and legit at the other.

Results: Initial acoustic analysis of one singer indicates that, on the lower three pitches, mix more closely resembled legit rather than belt according to CPPS and spectral slope. Analysis of the other singers has yet to take place.

Analysis to identify possible correlations between the sound the singers intended and the sound the listeners perceived has yet to be done.

Authors:

Brian Manternach Lynn Maxfield	

Title: ***SYNTHESIZING SCHUBERT: QUANTITATIVE ANALYSIS OF DIE SCHÖNE MÜLLERIN***
Category: Voice Pedagogy

Abstract:

Objective: INTRODUCTION: While analysis on individual arias, songs, and choral pieces is readily available, a comprehensive analysis of the inherent difficulty of larger non-operatic musical works sung in a single concert still requires evaluation.

OBJECTIVES: This study quantitatively measures, graphically represents, and evaluates the difficulty inherent in the compositional range, tessitura, directionality, cycle dose, and time dose of each song and the composite whole of Franz Schubert's song cycle, Die schöne Müllerin. This study additionally seeks to measure accompaniment density and theorize its impact on vocality.

Methods: METHODS: Each piece's vocal and piano pitches were subdivided by the smallest prevailing rhythmic duration and converted to hertz for equal weighting. Accompaniment density was determined by similarly subdividing each pitch in the piano part. Quartile analysis defines tessitura as the inclusive range between the first and third quartiles based on previous analysis models. Vocal directionality is determined by finding the frequency difference between each pitch and summing the time spent ascending, descending, or remaining stable in pitch.

Results: RESULTS: This research displays the compositional range, tessitura, directionality, cycle dose, and time dose of Franz Schubert's, Die schöne Müllerin. It additionally engages a new method of quantitatively evaluating musical density for a better understanding of the accompaniment's effects on vocal production.

CONCLUSION: Quantitative musical analysis allows for accurate understandings of the inherent difficulties in singing works intended for a single performance. Vocal characteristics that individual singers should possess to navigate these works are described based on data interpretation.

Authors:

Paul Patinka	

Title: ***COMPARISON OF THE EFFECTS OF THE NARES AND NASAL CAVITY ON VOICE QUALITY VERSUS VOCAL TRACT ADJUSTMENTS***
Category: Voice Pedagogy

Abstract:

Objective: The properties of "nasal resonance" and its contribution to voice quality during singing is not well understood. Most singers and vocal pedagogues work toward diminishing the nasality in the voice. Nonetheless, some singers feel that nasality benefits their vocal production. Is this simply due to the internal sensations felt by these singers or is there an acoustic contribution to the overall quality of the sound produced? This study is focused on the latter question – that is, can nasal resonance be actively controlled by a singer to enhance voice quality?

Methods: This question was addressed in two ways. First, ten voice students were asked to follow a protocol that consisted of recording "ng" (as in "sing") as a voiced nasal consonant and a whispered nasal consonant, and also an open "a" vowel. The purpose of "ng" consonant was to have only nasal resonance available while instructing the singers to activate and release the naris muscle such that effects of the nasal resonance might be observed in the acoustic signal. VoceVista was used to analyze the recorded samples. The second part of the study involved a computational approach to configuring a model of the vocal tract such that its acoustic resonances matched those of recorded samples.

Results: Preliminary results have shown, that constricting the region near the uvula and subtle reshaping of the oral and lower pharyngeal cavities producing acoustic effects similar to those observed from the singers. This suggests that while singers experience the use of nasality and feel they control the airflow from the nostrils, it is possible that the acoustic benefits are derived from another source in the vocal tract. Further research and tests will allow us to fully understand the acoustic results and what physical adjustments the singers use during this protocol.

Authors:

Aramat Arnheim-Sharon Brad Story	

Title: ***LONG-TERM IMPACT OF COVID-19 ON SINGING TEACHERS***
Category: Voice Pedagogy

Abstract:

Objective: The long-term impact of SARS-CoV-2 on the physical and vocal performance of singing teachers is unknown. Based on the literature regarding potential deleterious effects of COVID-19 which may contribute negatively to the subsystems of the singing voice, this survey was designed to gather information on singing teachers who have had COVID-19. A 21-item questionnaire was designed and distributed to voice teachers nationally and internationally collecting data on vocal and physical fitness levels pre- and post-COVID-19, and symptomology as it relates to vocal performance during both the acute and the long-term phases of the virus.

Methods: To date, 58 participants have completed this survey which will remain open until at least January 2021. Initial findings indicate the majority of respondents (44%) contracted the virus between March 1-31, 2020. After a significant drop off in April, an additional 27% of participants have reported a COVID-19 diagnosis since September 1, 2020. Severity of the impact of the virus on current participants ranged from "staying home and recovered" to "required hospitalization with ventilation." Overall, a 10% reduction in physical fitness (post-COVID-19) and a 20% decrease in vocal fitness following infection was reported. Approximately 64% of participants indicated vocal fatigue as their primary vocal complaint following illness impacting both singing and teaching. Additional concerns expressed by participants in returning to singing post-COVID-19 included: physical weakness & fatigue (53%), shortness of breath (40%), poor breath support (37%), and lack of dynamic control/power (34%). Information obtained from this survey will contribute to the literature on COVID-19 and voice.

Results: Final Results TBD

Authors:

Wendy LeBorgne Allen Henderson	

Title: ***CHARACTERISTICS OF THE VOCAL FUNCTION RESULTING FROM THE USE OF A FEMINIZED VOICE IN TRANS WOMEN***
Category: Voice Pedagogy

Abstract:

Objective: Learning the characteristics of the vocal function resulting from the use of a feminized voice in trans women from the Community "Vidas Escondidas" (Hidden lives), Neuquén, and the Association of Travestites, Transsexuals and Transgenders of Argentina, Córdoba, in 2017.

Methods: Simple descriptive observational correlational study carried out in 23 participants. A perceptual-auditory evaluation of the laryngeal posture was carried out by applying Aronson's Laryngeal Palpation, vocal quality using the GRBAS Scale and vocal register, pitch and habitual F0 in chained speech. The latter was analyzed using the PRAAT software. All variables were recorded in tables of records.

Results: It was observed that the 52.17 % of the trans women had an appropriate laryngeal posture and the 47.83 % had a high posture in a static state; the 100 % had a high posture in a dynamic state. The habitual F0 was between 108.71 Hz and 210.95 Hz, with a mid-frequency of 150.91 Hz belonging to the habitual masculine tone range. All the trans women presented a modal vocal range, the 43.48 % of the modal of chest, the 30.43 % of head and the 26.09 % of the mixed type. The 69.57 % presented a higher pitch and the 30.43 % a suitable one. The voice quality was compromised at a moderate degree following the parameters of the glottis in the next decreasing order of frequency of occurrence: the 95.65 % of strain, the 78.26 % of breathiness and the 69.57 % of roughness. The 0 % of asthenic, it was not compromised.

The characteristics of vocal function in trans women were known, establishing a relationship between the data obtained in coherence with the underlying anatomophysiology.

Authors:

Triana Aguirre Ornella Barbiani Valeria Pereyra	

Title: ***The Influence of Voice Training on Vocal Learner's Objective Acoustic Voice Components***
Category: Voice Pedagogy

Abstract:

Objective: Objective: Acoustic parameters of voice were studied in music majors throughout 18 months of training to understand the influence of voice training on voice.

Methods: Methods: Twenty-three students from Xiamen Music School between 12 and 15 years old were enrolled. All students were confirmed to be without organic voice disorders by a laryngologist. Acoustic examination was performed three times-- every 6 months for 18 months. Various traditional acoustic parameters were measured, including dysphonia severity index (DSI), jitter, and D-value of vocal range. Nonlinear dynamic measures were also measured, including diffusive chaos to construct voice type component profiles, spectrum convergence ratio, and nonlinear energy difference ratio. The results were analyzed by multivariate analysis of variance.

Results: Results: Over the study duration, there was an improvement of DSI(p=0.002), and D-value of vocal range(p=0.000). Among nonlinear parameters, only voice type component data demonstrated significant changes during the study duration. Both VTC1 and VTC3 values differed from Time 1 (2017) to Time 2 (2018) as well as from Time 1 to Time 3 (2019). The proportion of VTC1 in samples generally decreased, while VTC3, representative of aperiodicity, increased. Both NEDR and SCR exhibited no significant changes throughout the study.

Conclusion: Professional voice training can improve DSI and D-value of vocal range in singers' voices. These parameters have potential to be used for voice training evaluation and screening. Many nonlinear parameters did not detect differences in the healthy voices studied, but VTCPs created using intrinsic dimension present a valuable new method, visualizing increases in aperiodicity of the speaking voices.

Authors:

Peiyun Zhuang Pinhong Wu Logan Klein Zoe Rozema Austin Scholp	Xinlin Xu Liming Huang

Title: ***Exogenous Testosterone and the Transgender Singing Voice***
Category: Voice Pedagogy

Abstract:

Objective:

Objective

Mirroring the growing awareness of transgender/gender diverse people in popular media, vocal research has begun to devote more resources to this population. Voice scholarship on these populations focuses mostly on speaking, not singing, and on transgender women. This is the first rigorous, empirical study of the singing voice transition of an assigned-female singer taking exogenous testosterone. It provides a detailed description of the timing and nature of singing voice changes, explores the relationship between voice changes and dosage and serum levels of testosterone and estrogen, and describes the singer's experiences with a changing voice.

Methods: Methods/Design

In this case study, the subject, who is also the lead author, is an adult, amateur singer who is gender non-binary and uses they/them pronouns. Data collection began before initiation of testosterone and continued for 34 months. Perceptual measures of vocal range and timbre include recordings of weekly singing lessons with University-level voice faculty, written observations from the singing teacher, and regular recordings of the song 'Simple Gifts.' Hormone measures include testosterone dosage and blood serum levels of testosterone and estrogen. Videostroboscopy and acoustical analysis were conducted before and several times after initiation of testosterone. Documentation of the singer's experience of their changing voice includes written journals and video blogs.

Results: Results and Conclusions

Analysis shows the singing range descended by five semitones at the top and bottom of the range and passaggi shifted down. Timing of changes did not closely align with hormone dosage or blood serum changes. Vocal technique required increased attention to laryngeal and acoustic registration management strategies as the singer shifted from vocalizing primarily in mode two to primarily in mode one. The singer experienced moderate to severe levels of vocal fatigue in speaking and singing, vocal instability and loss of vocal stamina, all of which improved with training and time. Unlike anecdotal reports of singing transitions, the singer maintained consistent access to mode two head voice throughout the study period. Assessment of videostroboscopy and acoustical analysis is ongoing. The singer's experience of their changing voice was complex and varied over time, including excitement and joy as well as fear, uncertainty and frustration.

Authors:

Ari Agha Laura Hynes	

Title: ***Vocal Health of Choral Singers from Kenya and the United States: Dysphonia and Vocal Fatigue in Relation to Musical Genres***
Category: Voice Pedagogy

Abstract:

Objective: The purpose of this mixed methods study was to explore the vocal health of semi-professional choral singers from two countries to determine whether genre (Western classical choral, traditional Kenyan, and Contemporary Commercial Music [CCM]) has any impact on healthy vocal production, particularly as it relates to vocal fatigue.

Methods: Participants were adult singers (N = 94) in two semi-professional choirs, the Nairobi Chamber Chorus (NCC) from Kenya (n = 25) and the Festival Singers of Florida (FSOF) from the United States (n = 69). Singers' perceived overall vocal health was measured using multiparametric clinical self-reporting instruments and acoustical assessment. Singers' level of dysphonia was assessed using the SVHI (Cohen et al., 2007), and the overall speaking voice was assessed using the VFI (Nanjundeswaran et al., 2015). VoxMetria (1.0.7, CTS Informtica, Brazil) was used as an acoustical assessment to provide further analysis of the quality of each participants' voice by measuring Irregularity (jitter and shimmer) and Glottal-to-Noise Excitation (GNE). Singers' vocal fatigue while singing various genres was assessed with the self-reporting Ability to Sing Easily (EASE) (Phyland et al, 2013) while employing the stylistic techniques performed in varying genres including Western classical choral music, traditional Kenyan folk music, and choral selections within the realm of CCM. Singers also completed a questionnaire which provided demographic information, vocal training, genres performed,

physiological aspects of the voice, vocal loading and hygiene behaviors, and a medical background as it pertains to their vocal health. This study also included interviews of four music educators from within each ensemble, selected using a stratified randomization process. Those interviewed had their voices analyzed using the CAPE-V analysis (ASHA, 2006).

Results: In this sample of vocally healthy, semi-professional choral singers from two nations, genre did not impact vocal fatigue. Participants from both ensembles are considered to be vocally healthy overall (p < .001) as it relates to their speaking and singing voices, though acoustic scores for the Kenyan participants indicated mild dysphonia. Aspects of vocal training, physiology, vocal loading, vocal hygiene, genres performed, and pathology within the vocal mechanism played a significant role in predicting the overall health of singers. Regarding effect of genre on vocal fatigue, both choirs became less fatigued as they sang through the three genres with the choir from the States being significantly less fatigued (p < .05). The Kenyan participants' fatigue significantly decreased when singing traditional folk music (p < .05). Qualitative results indicated that both groups have a similar understanding of vocal health, and that sustained singing in extreme ranges is more of a contributing issue to vocal fatigue than genre considerations with this population.

Implications from this research include creating a validated instrument for clinical and educational use that can be used to assess vocal health by analyzing the speaking voice, singing voice, and acoustical properties of the voice, which include assessment of vocal training, physiology, vocal loading, vocal hygiene, genre, and pathology of the voice. Replication studies are needed in varying populations, including formally trained and untrained singers. Additionally, the findings of the differences between participants' perceptions of vocal health compared with the data from the actual independent measures was significant, as was having a more integrated culture of singing within Kenya did not provide any greater awareness of the mechanics of vocal behavior and health.

Authors:

Morgan Burburan	

Title: ***HEALTH SEEKING BEHAVIORS OF CCM PERFORMERS***
Category: Voice Pedagogy

Abstract:

Objective:

Approximately 1% of the US population suffers from dysphonia on a yearly basis.1 Performers are particularly prone to voice problems given the intensity, frequency, and scope of voice use.2-4 Studies have found that singers in general are among an at risk population when compared to non-singers.4 The CCM (contemporary commercial music) population make up a large percentage of professional singers whose demands of public performance, including intensity, frequency, and duration of singing, as well as associated lifestyle factors create potential for vocal injury. While various factors can have significant impact in the vocal health of this population, including but not limited to level of formal training, lifestyle and level of vocal health education, little is known about how CCM singers cope with vocal difficulties. There is a dearth of research looking specifically at how the CCM population seeks professional help when running into vocal issues.

This study seeks to assess the health seeking behaviors of CCM singers and its impact on vocal health. We've explored the prevalence and practices of treatment seeking behaviors when faced with voice challenges and further assessed which types of treatment this population has been receiving and soughing after and how compliant they are with treatment. This study has the potential to contribute to the further understanding of the challenges faced by CCM singers for more targeted and meaningful professional voice care.

Methods:

This research was conducted via an online survey distributed via social media and email, and it included questions about demographics, stylistical choices, lifestyle and health seeking behaviors. There were 145 responses received.

Results: Results TBD

Authors:

Ana Zuim Shirley Gherson	

Title: ***In-Person or Virtual? – Assessing the Impact of COVID-19 on the Teaching Habits of Voice Pedagogues***
Category: Voice Pedagogy

Abstract:

Objective: The social distancing measures implemented world-wide in the wake of the novel Coronavirus (COVID-19) crisis have forced voice pedagogues to alter their teaching habits, likely shifting from customary in-person teaching to virtual teaching.

Methods: An online survey, distributed world-wide in April/May 2020, investigated how singing voice pedagogues were impacted by the COVID-19 crisis.

Results: The collected responses from 387 survey participants suggest that, overall, voice teachers were only moderately satisfied with having to teach virtually, indicating that virtual voice teaching is not a sufficient replacement for in-person teaching. The participants indicated that during virtual teaching the singing voice can be assessed relatively well through features which provide both acoustic and visual clues. In contrast, depending on utilized technology, it may be harder to judge those aspects of the singing voice that are solely defined acoustically, such as dynamic range and spectral composition. This may be explained by limitations imposed by "out of the box" technology for online communication, which is typically optimized for speech instead of singing. This calls for better information on technological solutions for virtual voice teaching.

Authors:

Kristen Murdaugh Josipa Bainac-Hausknecht Christian Herbst	

Title: ***Knowledge, Attitude and Practices of Indian Classical Singers towards Vocal Health Care***
Category: Voice Pedagogy

Abstract:

Objective:

Indian Classical music has one of the oldest and richest traditions of classical music. Indian classical music is divided into Hindustani and Carnatic classical forms. Studies in singers have revealed the high probability of singers developing voice problems, vocal fatigue and attrition. There have been some attempts towards studying vocal and non-vocal habits, or health seeking behaviours of Indian Classical singers. However, little is known about their awareness levels and practices towards vocal health.

Methods: Study design:

Cross-sectional study design

Method:

The study was conducted after approval from Institutional Ethical Committee (IEC KMC MLR 11- 19/516). The study was conducted in two phases. Phase one involved developing a questionnaire to explore the knowledge, attitude and practices of Indian Classical Singers towards vocal health care. Phase two involved administration of questionnaire and analysis.

Results: Results:

Preliminary analysis have revealed that most singers possessed basic knowledge about voice use during singing as well as factors affecting the singing voice. Their attitudes towards taking care of their vocal health were overall positive. A high percentage relied on home remedies for their voice. The participants also focused on their physical health and vocal health.

Conclusion:

The findings of the present study highlight the knowledge, attitude and practices of Indian Classical Singers towards vocal health care. These would be useful for effective counseling and management for singers with voice concerns.

Authors:

Dhanshree Gunjawate Raveena Nair	

Title: ***An Eclectic Voice Habilitation Program for Hyperfunctional Voice disorders (HFVD)– An Evaluation by RCT***
Category: Speech Language Pathology

Abstract:

Objective: To perform a randomized controlled trial to evaluate the outcomes of an eclectic voice habilitation program on South Indian Tamil speaking population using voice-related measures and compare it with a standard voice therapy program, such as vocal function exercises (VFE) on selected subjects with hyperfunctional voice disorders (HFVD)

Methods: Design: Randomized, controlled two-group parallel trial with double-blinding.

A total of 60 subjects were recruited from a tertiary care hospital and randomized using random allocation software i.e., Group I (eclectic approach) - 30; Group II (VFE) - 30. Two trained SLPs administered the voice therapy protocol for both groups with two 'one-on-one' sessions (30 minutes) for six weeks. Findings were documented at the baseline and in the immediate post-therapy period using Stroboscopy, acoustic analysis, perceptual measures, Voice related symptoms, self-assessment of voice using Voice Disorder Outcome Profile (V-DOP) and Vocal Fatigue Index in Tamil (VFI-T). Statistical analysis was performed with ANCOVA and chi-square test.

Results: No significant differences were noted in the baseline characteristics in both groups, confirming the homogeneity of the samples. A statistically significant difference (p<0.05) was observed in closure pattern, reduction in ventricular hyperadduction, Cepstral peak prominence (CPPv) in vowel, dynamic range in speaking, overall grade, asthenia, strain in GRBAS scale and factor I in VFI-T between the groups. The eclectic approach showed better outcomes compared to VFE in this study done on South Indian Tamil speaking population.

Conclusion: The eclectic voice habilitation program demonstrated a systematic and sequential method of treatment with documented positive outcomes in subjects with HFVD.

Authors:

Shenbagavalli Mahalingam Ravikumar Arunachalam Prakash Boominathan Lakshmi Venkatesh	

Title: ***An Assessment of Different Praat Versions for Acoustic Measures Analyzed Automatically by VoiceEvalU8 and Manually by Two Raters***
Category: Speech Language Pathology

Abstract:

Objective: The study assessed acoustic measures analyzed through multiple Praat versions automatically by VoiceEvalU8 or manually by two raters. In addition, default settings to calculate CPPS in two Praat versions was compared to automatic analysis using Maryn and Weenik (2015) procedures by VoiceEvalU8.

Methods: Nineteen vocally healthy females used VoiceEvalU8 to record three 5-s sustained /a/ trials, the all voiced phrase "we were away a year ago," and a 15-s speech sample twice a day for five consecutive days. Two raters manually completed acoustic analysis using different versions of Praat and compared that analysis to measures automatically generated through a version of Praat used by VoiceEvalU8.

Results: Results showed no significant differences across automatic and manual analysis for different versions of Praat for all acoustic measures during /a/, for F_o, jitter%, shimmer%, and NHR during the phrase, for jitter%, shimmer%, NHR, and CPPS during speech, and for AVQI. The default Praat settings for CPPS were not significantly different from the Maryn and Weenik (2015) procedures for sustained /a/ and speech. Significant differences were present for SD of F_o and CPPS during the phrase and F_o and SD of F_oduring speech. Phrase CPPS was strongly correlated across the different versions of Praat.

Conclusions: Praat version used by clinicians and researchers may matter more for SD of F_o and CPPS in the phrase and F_o and SD of F_o in speech.

Authors:

Elizabeth Grillo Jeremy Wolfberg	

Title: ***An Assessment of Perceptual Measures Administered by Paper and Pencil and by the VoiceEvalU8 App***
Category: Speech Language Pathology

Abstract:

Objective: The study compared perceptual measures completed by paper and pencil and by the VoiceEvalU8 app. Traditionally, individuals complete the measures by hand using paper and pencil. All normative data for the measures are based on this traditional method. With the creation of VoiceEvalU8, validation of the electronic completion of these measures is necessary.

Methods: Fifty vocally healthy participants completed the Voice Handicap Index (VHI)-30, VHI-10, the Vocal Fatigue Index, and other perceptual questions modeled after the Consensus Auditory-Perceptual Evaluation of Voice using paper and pencil and the VoiceEvalU8 app. The order of completion (i.e., paper versus app) was randomized across participants with the stipulation that all participants completed both paper and app administration.

Results: Results are being analyzed to address the following research question, will the traditional, paper-based method and the electronic completion via VoiceEvalU8 produce the same results for perceptual measures in vocally healthy adults?

Conclusions: The rationale for the study, study design, perceptual measures, and results will be presented in the poster.

Authors:

Elizabeth Grillo Brigit Corej Jeremy Wolfberg	

Title: ***The Effect of Vocal Intensity Mode on Acoustic and Aerodynamic Measures in People with Parkinson's Disease***
Category: Speech Language Pathology

Abstract:

Objective: Traditional treatment for hypophonia in PWPD focuses on cognitive and physiological strategies which alter vocal intensity mode. It has been shown that vocal intensity and voice quality improve post-treatment in PWPD. However, manipulating vocal intensity also influences resulting acoustic and aerodynamic measurements even in healthy speakers. To determine if this phenomenon is present in speakers with PD, we investigated the immediate effect of manipulating intensity mode on an acoustic measures of voice quality (CPP and CSID) and aerodynamic measures of vocal function (transglottal airflow and subglottal pressure) in PWPD. Additionally, we studied how vocal intensity mode influenced acoustic and aerodynamic measures as a function of stimulus type by comparing sustained vowels and connected speech.

Methods: 15 PWPD (11 males, 4 females) were recorded producing sustained vowels, CAPE-V sentences, the rainbow passage, and repetitions of /pa/ at three intensity modes: comfortable, soft, and loud. The Computerized Speech Lab and Phonatory Aerodynamic System were used to measure dependent variables.

Results: Parametric statistics revealed: significant differences for vocal intensity as a function of mode and stimulus type; significant differences for CPP and CSID as a function of intensity mode and stimulus type; and significant differences for transglottal airflow and subglottal pressure as a function of intensity mode. Findings support the supposition that acoustic and aerodynamic data used as outcome measures in clinical practice and research must consider vocal intensity mode as a covariate factor which can influence target measures. Additionally, stimulus type (e.g., vowel, connected speech) should be considered as it influences resulting acoustic measurements.

Authors:

Christopher Watts Zoë Thijs Matt Dumican	

Title: ***IS AN AQUATIC SETTING AN ALTERNATIVE WAY TO DELIVER SPEECH THERAPY IN PATIENTS WITH BILATERAL VOCAL FOLD NODULES? A RETROSPECTIVE STUDY***
Category: Speech Language Pathology

Abstract:

Objective: Vocal fold nodules are bilateral lesions that can have an important negative impact in a person's job performance, social interaction and quality of life. Voice therapy in an aquatic setting is a well-established but less revealed practice.

The aim of this study was to analyse the results of voice therapy delivered in water environment in patients who presented with vocal fold nodules.

Methods: A retrospective analysis of multidimensional voice outcomes was performed in 17 patients with vocal fold nodules, who presented dysphonia and received voice therapy in aquatic setting with an experienced speech-language pathologist once a week. Patients were referred by Ear Nose and Throat consultation. Data was collected from January/2001 to December/2017. The median of the pairwise pre- and post-treatment data was compared with non-parametric tests (Wilcoxon test) using α=0.05.

Results: A total of 17 patients (female n=15) with bilateral vocal fold nodules were included in the study. Average age was 33.7±9.7 years (range 27-86 years). The average number of appointments was 9.8±5.2 (range 8-26 appointments). Vocal fold lesions disappeared in 82.3% of the patients after voice therapy. Late initiation of treatment presents worse prognosis (small sample size for statistical comparison). Compared pre- and post-therapy audio-perceptual and aerodynamic parameters showed significant improvement.

Voice therapy delivered in aquatic environment may be a valid and effective way to treat patients with vocal fold nodules. Early timing to initiate voice therapy after onset of symptoms/diagnosis seems to be a significant factor for the therapy outcomes (effectiveness).

Authors:

Rita Alegria Susana Vaz Freitas Maria Conceição Manso	

Title: ***Students' Experience with Vocal Injury in Undergraduate Performing Arts Training Programs***
Category: Voice Pedagogy

Abstract:

Objective: Many performing arts students enter their college training with a previously diagnosed vocal injury, while others suffer injuries while in school. The aim of this study was to assess the overall experience of students who had a vocal injury while pursuing their undergraduate performance degree. We investigated the students' history with vocal injury, specifically assessing the timing of their diagnosis and their willingness to disclose their injury to faculty. We also looked at what type of resources and accommodations were provided to students by both their universities and outside sources. Finally, we assessed the students' perception of being stigmatized by faculty or peers while recovering from their injury, and what impacts that had on graduation, casting, and assignments.

Methods: An IRB approved, online survey was created to assess students' experience as a performing arts major with a vocal injury. One hundred and twenty one participants completed the survey, which was shared via social media and email outreach.

Results: The results of this study show clear ways that undergraduate faculty can support their injured students while they are in training. For instance, 82% of participants required vocal rest during their undergraduate education. Many of these students expressed their negative experience with vocal rest and a lack of understanding and empathy from faculty and peers. The study also found that 60% of participants felt stigmatized for having an injury, with the most stigma coming from faulty. Additional findings include the importance of the voice teacher/student relationship, timing of diagnoses, and the overall faculty dynamic.

Authors:

Christine Suddeth Amanda Flynn	

Title: ***A NEW VOCAL TRACT ORGAN FOR KEYBOARD AND/OR MULTIPLE PERFORMER CONTROL***
Category: Basic Science

Abstract:

Objective: The objective is to create performance versions of the Vocal Tract Organ {Howard, D.M. (2018) The Vocal Tract Organ: A New Musical Instrument Using 3-D Printed Vocal Tracts, J. Voice, 32(6)} for use as either (a) a polyphonic MIDI keyboard playable instrument or (b) for individuals to perform on with on instrument each as a group.

Methods: The Vocal Tract Organ exists in Pure Data (Pd) which relies on a computer to run. With the recent release of the Bela board which will run Pd directly, the opportunity has arisen to create a stand-alone version of the Vocal Tract Organ for use as a performance instrument based on the two performance scenarios indicated above. This paper describes the two Pd implementations and how they have been implemented to run on a dedicated real-time audio processing Bela board. Implementation in Pd means that the organisation of the underlying algorithms is readily grasped by direct observation of the Pd patches.

Results: Video (and possibly live) demonstrations of the final working Bela version of the Vocal Tract Organ implementation will form part of this poster presentation along with flow diagrams of its operation.

Authors:

David Howard FREng	

Title: ***VALIDATION OF THE ACOUSTIC VOICE QUALITY INDEX AND THE ACOUSTIC BREATHINESS INDEX IN THE BRAZILIAN PORTUGUESE***
Category: Speech Language Pathology

Abstract:

Objective: Objective: To validate the AVQI and the ABI in the Brazilian Portuguese.

Methods: Methods: The methodology was divided in four studies that analyzed: 1. the best continuous speech sample to be used in the validation; 2. the best length of the continuous speech; 3. the performance of the continuous speech defined to be used in the Brazilian Portuguese in comparison with the continuous speech used worldwide (reading); 4. the analysis of the AVQI and ABI in the Brazilian Portuguese following the standards used in other languages to assess its concurrent validity and diagnostic accuracy.

Results: Results: The automatic speech of counting numbers 1 to 11 has the best concurrent validity and diagnostic accuracy in the Brazilian Portuguese. Although, reading of a text presented better outcomes of reliability and diagnostic accuracy, the automatic speech of counting numbers was not depreciated once it had good outcomes (AVQI_reading=0.963, ABI_reading=0.929 Vs. AVQI_counting=0.870, ABI_couting=0.924). The Brazilian validation of the AVQI and ABI presented high correlation with the perceptual judgement of the voice quality and good diagnostic accuracy with defined specificity, sensitivity and thresholds values for each index. Conclusion: The continuous speech material with best performance with the AVQI and ABI is counting numbers 1 to 11. Although reading has higher concurrent validity, it is not usual in the voice clinical routine in Brazil due to literacy limitation. The AVQI and ABI are multiparametric acoustic indexes valid to be used in clinical practice and researches in the Brazilian Portuguese using the automatic speech of counting numbers.

Authors:

Marina Englert Jorge Lucero Mara Behlau	

Title: ***THE IMPACT OF LANGUAGES AND CULTURAL BACKGROUNDS ON VOICE QUALITY ANALYSES***
Category: Speech Language Pathology

Abstract:

Objective: Objective: To verify the influence that different cultural background has on the perception of the voice quality and its effect on the concurrent validity and diagnostic accuracy of AVQI and ABI.

Methods: Methods: A multi-cultural dataset (i.e., 150 Brazilian Portuguese and 218 German voice sample sets) were analyzed by five Brazilian and five European judges. The dataset contained concatenated voice samples of continuous speech and sustained phonation. The raters judged the vocal quality according to the overall voice quality and breathiness. The intra and inter-rater reliability were tested. Also, the concurrent validity and the diagnostic accuracy of the two acoustic indexes were analyzed considering the ratings of the Brazilian and European judges for each dataset.

Results: Results: Non-native judges decreased in rater-reliability in the evaluation of a foreign dataset. Brazilian raters seemed to judge German voices as more severe and German raters seemed to judge Brazilian voices as less severe when compared to the native raters. The AVQI and ABI concurrent validity was equally high regardless of the group of judges. The diagnostic accuracy was higher considering the perceptual judgement of native listeners.

Conclusion: Language and culture play a role in perceptual auditory analysis. Brazilian raters might classify the voice quality as more deviated than European raters. The Brazilian voice samples are measured as less severe, which can be a language characteristic.

Authors:

Marina Englert Ben v. Latoszek Mara Behlau	

Title: ***IDENTIFYING THE IMPACT OF VOCAL HYGIENIC ADVICE ON THE VOICE OF UNIVERSITY LECTURERS***

Category: Speech Language Pathology

Abstract:

Objective: Clinicians use various voice therapy protocols to rehabilitate patients with voice disorders; voice hygienic advice (VHA) is a common denominator in most protocols. The list of patient instructions included in VHA targets the elimination of the ill effects of dehydration, vocal abuse, and misuse on the vocal mechanism. This study investigates the impact of VHA on the acoustic parameters of voice in university lecturers.

Methods: We collected a standardized Maximum phonation time (MPT) acoustic signal from 15 university lecturers with a variable amount of teaching hours/week and students/class; we also delivered VHA to every participant. Fourteen days later, we collected a second MPT acoustic signal and a self-rated VHA compliance score from the participants. We analyzed the signals with the Multi-dimensional Voice Program (MDVP) and calculated the Dysphonia severity index (DSI) before and after the delivery of VHA.

Results: There was an overall deterioration of the DSI across the study. A linear regression analysis shows that despite this general DSI deterioration, lecturers complying strongly with the instructions show an improvement. Also, lecturers with more students in their class had a higher compliance score. The worsening of DSI in our data is not related to the number of students/class, teaching hours/week, the accumulation of hours across weeks of the semester, or the interaction of students/ class and teaching hours/ week. A post-hoc investigation of possible confounding factors shows a 5-degree Celcius increase in climate temperature across the study, possibly contributing to a dehydration effect countered with VHA in the compliant subset of instructors.

Authors:

Francesca D'Alessandro Nicole Feeley Thea Knowles Mamhoud Mosaad Helali Ahmed Abdelgoad	Ahmed Nagy

Title: ***EVALUATION OF FACTORS AFFECTING SPEECH-SPECIFIC QUALITY OF LIFE IN PATIENTS AFTER TOTAL LARYNGECTOMY***
Category: Speech Language Pathology

Abstract:

Objective: The study aims to identify the factors affecting the speech-related quality of life among American patients after total laryngectomy in an English-speaking population using the validated Speech Handicap Index (SHI). The Speech Handicap Index (SHI) is a self-reported speech-related quality of life assessment originally developed for measuring the psychosocial speech impact in patients with oral or pharyngeal cancer. This is the first study investigating the factors associated with the speech-specific quality of life (QOL) in English-speaking patients after total laryngectomy in the United States.

Methods: One-hundred and four laryngectomized patients in the United States completed the SHI. Factors were divided into sociodemographic factors (age, gender, smoking history and alcohol consumption history) and disease-related factors (time since total laryngectomy and alaryngeal mode). Analysis of variance (ANOVA) was carried out to test differences regarding gender, alaryngeal mode, smoking history, and alcohol consumption history. Correlation analyses were performed to study the relationship between age and time since total laryngectomy.

Results: Strong, significant relationships were found between the SHI total score, speech score, psychosocial score and time since total laryngectomy. No relationships were found between score of the SHI and age or gender or smoking history in patients after total laryngectomy. To determine whether the mode of alaryngeal speech influenced patient-reported SHI scores, a post-hoc analysis was performed. No significant group difference were found among the 4 types of alaryngeal speakers (p>0.05) for any of the patient-reported SHI scores. Specially, no differences were found with regard to the SHI scores among the four alaryngeal speech modes.

Authors:

Hiu Fung Chan Sarah Schneider Clark Rosen Manwa Ng	

Title: ***Realization of Vocalizzi as a tool for vocal training and therapy in singers, through the use of the keyboard***
Category: Speech Language Pathology

Abstract:

Objective: To deliver practical tools to generate Vocalizzos through the use of the keyboard, in the training and rehabilitation of the voice in singers.

Methods: Practical, basic elements are taught for keyboarding in the evaluation and therapy process, making different types of vocalizations that help to make these events closer to the singer (popular / classical) when he / she is submitted to therapeutical help. Some of these are octave sound exercises, arpeggios with intervals of third, third and fifth, the first five notes of different musical scales, considering the tastes of the individual and the musical style which develops.

Results: Greater commitment and adherence to therapy is generated, either at the time of evaluation and / or for rehabilitation or vocal training in popular or classical music singers, the patient feels more comfortable, involved, motivated and closer to what he does daily.

Innovation in voice therapy and the use of musical technological resources should be part of the current vocal clinic, which allows us to be a professional closer to the needs of the patient, satisfying more accurately their possible needs in the social field and / or labor, thus allowing us to deliver a higher quality service.

Authors:

Gonzalo Inostroza - Moreno	

Title: ***INFLUENCE ON SPECTRAL ENERGY DISTRIBUTION OF EMOTIONAL EXPRESSION***
Category: Speech Language Pathology

Abstract:

Objective: Objective: The aim of the study was to determine the influence of emotional expression in spectral energy distribution in professional theater actors.

Methods: Methods: Thirty-seven actors, native Spanish speakers, were included. All subjects had at least 3 years of professional experience as a theater actor and no history of vocal pathology for the last 5 years. Participants were recorded during a read-aloud task of a 230-word passage, expressing six different emotions (happiness, sadness, fear, anger, tenderness, and eroticism) and without emotion (neutral state). Acoustical analysis with long-term average spectrum included three variables: the energy level difference between the F1 and fundamental frequency (F0) regions, ratio between 1–5 kHz and 5–8 kHz, and alpha ratio.

Results: Results: All the different emotions differ significantly from the neutral state for alpha ratio and 1–5/5–8 kHz ratio. Only significant differences between “joy’’, “anger,’’ and “eroticism’’ were found for L1–L0 ratio. Statistically significant differences between genders for the three acoustical variables were also found.

Conclusions: The expression of emotion impacts the spectral energy distribution. On the one hand emotional states characterized by a breathy voice quality such as tenderness, sadness, and eroticism present a low harmonic energy above 1 kHz, high glottal noise energy, and more energy on F0 than overtones. On the other hand, emotional states such as joy, anger, and fear are characterized by high harmonic energy greater than 1 kHz (less steep spectral slope declination), low glottal noise energy, and more energy on the F1 than F0 region.

Authors:

Soledad Correa Daniel Muñoz Ross Mayerhoff Marco Guzmán	

Title: ***AUTOMATED QUANTIFICATION OF INFLECTION EVENTS IN THE ELECTROGLOTTOGRAPHIC SIGNAL***
Category: Basic Science

Abstract:

Objective: The goal of this study is to further investigate an automated tool (ATool), developed by our team, that can report and classify inflection events (IE) in the electroglottographic signal. Its performance is here studied.

Methods: This study is build on a previously published research. With the goal of improving the automated performance of the ATool, we run a statistical analysis in a larger database and for different thresholds settings. Sixty one EGG signals were selected. Based on the waves' mathematical properties, we developed an ATool to be run on Matlab©. The IE within the signal are reported and classified by ATool with 7 different detection thresholds settings. Blinded to the automatic output, 4 voice specialists manually evaluated the signals (by sight). Agreement between the manual analysis and ATool was determined.

Results: The agreement between the 4 blind raters and the ATool was calculated for the 7 thresholds settings. Some exhibited better performance. This would allow threshold selection to the user when performing automated analysis of IE. ATool had slightly lower agreement in the descending portion of the signal.

The ATool provides a detailed quantified analysis of IE in the EGG signal throughout a voice sample, having acceptable levels of agreement compared to observation performed by clinicians, obviating the need for time consuming visual analysis.   The ATool also includes the option of adjusting threshold settings for this quantification, exhibiting different performance levels.

Authors:

Juliana Codino María Torres Adam Rubin María Jackson-Menaldi	

Title: ***EVALUATION OF GRADUATE STUDENTS' ABILITY TO DETECT PATHOLOGICAL QUALITIES AND ASSIGN SEVERITY RATINGS USING THE GIRBAS SCALE***
Category: Speech Language Pathology

Abstract:

Objective: Despite their extensive use, perceptual ratings of dysphonia are prone to low reliability and accuracy. Many protocols have been implemented with success, but it remains unclear what aspects of the ratings are most difficult and how training is best implemented. This makes training students on this skill problematic. The aim of this study was to investigate which aspects of perceptual voice ratings are most challenging for students and whether training students using stimuli progressing in difficulty would increase accuracy and reliability.

Methods: Participants were randomly assigned to experimental and control conditions. The training protocol mimicked a didactic university program, featuring a lecture, practice problems, and a quiz for detecting qualities and assigning severity ratings. Overall accuracy was assessed on pre- and post-training tests by measuring the percent agreement to a gold-standard for detecting qualities and assigning severity ratings. Stimulus properties were analyzed as factors contributing to accuracy.

Results: Results suggest assigning severity ratings is more difficult than detecting pathological qualities. Furthermore, the two tasks appear to be influenced by distinct variables; specific quality-severity combinations appear to influence the accuracy of detecting pathological qualities while the number of qualities and number of distinct severities appear to significantly influence the accuracy of assigning severity ratings. Neither training condition significantly improved accuracy of the ratings. Results from the current study suggest greater time should be devoted to detecting mild qualities and assigning severity ratings to more complex stimuli.

Authors:

Jay Wilkinson Eileen Finnegan	

Title: ***RELATIONSHIP BETWEEN SELF-EFFICACY AND RELIABILITY IN STUDENT PERCEPTION OF VOICE QUALITY FEATURES***
Category: Speech Language Pathology

Abstract:

Objective: Speech-language pathology (SLP) students and clinicians have reported low confidence, or self-efficacy, in their ability to make auditory ratings of voice quality features. The lack of confidence SLPs currently have in rating voice quality indicates a need for training for this clinical task. Increased experience at successfully completing tasks increases self-efficacy in the ability to complete the tasks. Developing a training program for rating voice quality features will provide SLP students and clinicians the opportunity to practice this clinical task, increasing their skill at it and their self-efficacy concerning their ability to do it. The purpose of this study was to assess the relationship between students' self-efficacy for completing a set of clinical tasks when working with people who have voice disorders and the accuracy of their ratings of vocal roughness and breathiness.

Methods: In this experimental, two group pre- and post-test study, 60 first-year graduate students completed a pre-test and post-test of their ability to rate the voice quality features of breathiness and roughness and of their self-efficacy for performing a set of 14 clinical tasks when working with people who have voice disorders. A group of 26 of them also completed a voice quality feature training module. The other participants served as a control group. Three measures were obtained from the participants: the accuracy of their voice quality feature ratings in comparison to expert opinion for the breathiness and the roughness of a set of voice samples, the time the participants spent listening to the anchor files, and the time participants spent making the two voice quality ratings for each voice sample. In addition, they completed a self-efficacy survey on their confidence for completing 14 clinical tasks with voice clients.

Results: Overall, the students' self-efficacy for completing all of the clinical tasks increased after one semester of graduate school. However, the students' accuracy in rating voice quality features did not improve after completing the training module. In the future, the training program needs to be more rigorous, Completion of the training program will need to be dependent on accuracy scores that indicate mastery of the task.

Authors:

Mallory Meuser Richard Morris Jesse Klein	

Title: ***BEHAVIORAL CHOICES THAT IMPACT VOCAL FATIGUE***
Category: Voice Pedagogy

Abstract:

Objective: The demands of an academic vocal training program are extensive. This study was designed to determine the impact of lifestyle choices on vocal fatigue.

Methods: Data were obtained from 6 sopranos,1 mezzo-soprano, and 2 tenors. Four were second year MM students, 1 DMA, and 4 undergraduates. Average reporting days was 12. Participants provided a minute by minute log of speaking and singing, with scaled self-assessments (0 to 10) of vocal fatigue for each activity. Participants also reported on all beverages, medications, and vocal and general health, and sleep.

Results: Participants were divided into low fatigue (n = 5; rating = 0.8) and high fatigue (n = 4; rating = 2.3) groups. Mean hours of conversation, singing and sleep were comparable between groups. Mean hydration was 12.1 for the low fatigue groups, and 6.1 for the high fatigue group.

     Both hydration and voice rest appeared to impact fatigue. One singer reported minimal fatigue (mean = 0.63) despite allergies, by averaging over 10 glasses of hydrating fluids per day and implementing vocal rest. After three heavy singing days, she took three days off, and never exceeded a fatigue rating of 2. Another singer reported consistent fatigue (mean = 2.9) and demonstrated very slow recovery from 5 hours of singing on the weekend. He only consumed 6 glasses of hydrating fluids per day and sang 2 hours in each of the subsequent days, increasing his vocal fatigue from 2 to 5.

     These findings highlight the importance of vocal fatigue management through hydration and vocal rest.

Authors:

Monica McHenry Joseph Evans Gabrielle Monge	

Title: ***THE INFLUENCE OF LARYNGEAL ADDUCTORY EFFORT AND GLOTTIC BEHAVIOR ON THE VIBRATORY MECHANISMS: AN EXPLORATORY STUDY***
Category: Medical

Abstract:

Objective: The concept of laryngeal vibratory mechanism has been introduced by Roubeau et al. as a revision of the historical notion of vocal registers. Laryngeal vibratory mechanisms are labeled as M0, M1, M2 and M3 basing on acoustic and electroglottographic features. The aim of the present exploratory study was to investigate and deepen the knowledge of the laryngeal vibratory mechanisms according to the laryngeal adductory effort and glottic behaviors, with a multidimensional analysis based on laryngostroboscopic, acoustic and inverse filtering examinations.

Methods: Two trained singers (1 male and 1 female) were recruited. Each subject underwent laryngostroboscopic evaluation and voice recording in a standard setting, while performing a sustained vowel in various vibratory mechanisms and with different degrees of laryngeal adductory effort. An examination of the laryngostroboscopic vibratory patterns, acoustic spectrographic analysis and inverse filtering analysis (with the calculation of the glottic contact quotients) were carried out.

Results: The current study revealed that each laryngeal vibratory mechanism can be performed with different grades of adduction, resulting in different glottic behaviors, flow-glottogram parameters and acoustic features. Each vibratory mechanism has peculiar features, but some interesting and not negligible differences in terms of laryngostroboscopic and inverse filtering findings have been found for some different glottic behaviors in M0, M2 and M3.

The research on vibratory mechanisms is still an open field. Further investigation is needed to fully understand the influence of adductory effort and glottic behaviors on laryngeal vibratory mechanisms and to define a correct classification for different glottic behaviors in M0, M2 and M3, respectively.

Authors:

Marco Fantini Franco Fussi	

Title: ***REAL-WORLD AUDIO EXPERIENCES CAN BE TRANSPARENTLY RECREATED IN VIRTUAL REALITY***
Category: Basic Science

Abstract:

Objective: Virtual Reality provides wonderful opportunity to create experiences that, in the physical world, could otherwise be inaccessible to many people. It is desirable that these created experiences reflect reality wherever possible, creating a natural representation indistinguishable from the real-world experience. As the quality of head-mounted displays, tracking systems for headsets, and home computer setups improve, so does the ability to virtually present real-world spaces commercially.

Methods: Through measuring the impulse response of a physical space and the use of a convolution reverb plugin, fabricated performances were placed within a virtual space to be compared with their live counterparts. Participants were asked to select the real recording in a series of blind comparison tests between the real recording and the fabricate one, and give reasoning for their choices.

Results: Here we show that we can recreate the audio cues of a space to such a degree that it is hard to tell live from faked performances. This was shown for a female voice, male voice, and orchestral recording for both a reverberant indoor space, and an open outdoor space.

Authors:

Florence Roberts David Howard	

Title: ***USING THE CAPE-V TO RATE ROUGHNESS AND BREATHINESS: DIFFERENCES AMONG EXPERT CLINICIANS***
Category: Speech Language Pathology

Abstract:

Objective: Variability in inter-rater agreement on voice quality has prevented development of training protocols that might themselves improve agreement among new clinicians (Nagle & Solomon, 2018). As part of a larger mixed methods project, we obtained data from 20 experienced clinicians using the CAPE-V to rate voice recordings. This study focuses on inter-rater agreement and reliability of their roughness and breathiness ratings.

Methods: Clinicians with at least 2 years of experience provided ratings of 12 speakers (N=[6 male + 6 female] x 4 samples each = 48) selected from a corpus of voice recordings. Recordings were selected based on previous auditory-perceptual ratings by expert clinicians using the CAPE-V to represent a range of overall voice quality. Participants were asked to rate the four primary dimensions of voice quality ("overall severity, breathiness, roughness, strain") on the CAPE-V's hybrid visual analog scale as they normally would. Not all participants rated roughness and breathiness, reducing the number of raters for the current study to 16.

Results: Mean P_o for was quite low for breathiness, 0.29 (SD 0.13) and roughness, 0.26 (SD 0.17). There was no clear pattern to agreement for either dimension. Inter-rater reliability, based on single-measures ICC (3, 1) was moderate for breathiness, r =.67, 95% CI [.47-.86], but only fair for roughness, r = .47, 95% CI [.27-.73]. These results suggest that individual expert listeners 1) have varying interpretations of "roughness and "breathiness;" 2) basing their judgments on different internal standards of voice quality; and 3) use the CAPE-V scales differently.

Authors:

Alissa Loffreno Kathleen Nagle	

Title: ***Components of Healthcare Disparities for Voice and Upper Airway Disorders: A Theoretical Framework***
Category: Speech Language Pathology

Abstract:

Objective: The CDC defines health disparities as avoidable differences in health outcomes and the causes of these inequalities between segments of the population. Healthcare disparities distinctly address differences between groups in access to and use of care and quality of care. The extent to which healthcare disparities exist within speech-language pathology related to disorders of laryngeal function are not well understood. Therefore, the objective of this study was to develop a theoretical framework to characterize the underlying components leading to healthcare disparities to medical services appropriate for the management of voice and upper airway disorders.

Methods: A scoping review using prospectively determined search terms and databases was conducted using the Preferred Reporting Items for Systematic Review and Meta-Analysis Extension for Scoping Reviews; checklist and explanation. Data extracted from each study included and expanded upon the identified elements of patient centered access adopted from Berry, Seiders, Wild (2003).

Results: The database search resulted in 614 titles and abstracts being screened, with 12 selected for full-text review. Using an exclusion and inclusion criteria, 6 articles were considered eligible for inclusion and 1 of those articles was excluded due to inability to gain access. A theoretical framework of seven underlying components (availability, patient bias, clinician bias, timeliness, awareness, preference and appropriateness) of healthcare disparities was developed.

This evolving patient-centered theoretical framework conceptualizes the underlying elements of disparate health outcomes that ultimately lead to poorer quality of life. Each latent cause outlined in the framework merits further investigation to increase access to medical care for all Americans.

Authors:

Mariah Morton Mary Sandage	

Title: ***VOICE THERAPY DELIVERED IN A WATER-BASED SETTING FOR UNILATERAL VOCAL FOLD PARALYSIS: A CASE REPORT***
Category: Speech Language Pathology

Abstract:

Objective: Voice therapy programs – in a water-based setting – can lead an improved quality of life for individuals with various conditions. This case report looks at a specific voice therapy programme – delivered in a water-based setting – for a patient with unilateral vocal fold paralysis (UVFP) following surgery.

Methods: Sixty-four years old man, professional voice user (teacher), ex-smoker, who underwent a total thyroidectomy for a thyroid cancer. He participated in a voice therapy program in a water-based setting once a week, for 8 weeks. Voice therapy strategy included a combination of direct and indirect techniques. Direct water-based exercises aimed to reduce vocal fold gap, reduce supra-glottic structures hyperfunction and improve voice quality. A pre- and post-therapy multidimensional assessment and a six-month follow-up were performed.

Results: There was a change in the voice outcome measures after completion of treatment (visual perceptual, audio-perceptual, acoustic and self-perception). At six-month follow-up assessment, patient reported a return to its almost normal – professional and social – voice use.

Water-based therapy can create a gentle, engaging, motivational and supportive context for voice treatment. The properties of water create an environment for safe practice of skills. Advantages of combining water-based therapy with voice therapy are promoting communication and improving breathing and phonation control. Further studies with larger samples are needed to draw any realistic conclusions on the efficacy of water-based voice therapy in patients with UVFP.

Authors:

Rita Alegria Susana Vaz Freitas Maria Conceição Manso	

Title: ***CONFRONTING THE VARIABILITY OF VIBRATO BY GENRE: A NOVEL APPROACH TO DERIVING PARAMETERS OF COMPLEX VIBRATO PATTERNS***
Category: Voice Pedagogy

Abstract:

Objective: Vibrato has shifted over decades (Glasner & Johnson 2020), while the regularity of vibrato remains an important feature which deserves further investigation (Herbst et al 2017). Historically, vibrato has been analyzed with tools that presume a western classical opera aesthetic (Nix et al 2016) which is applicable only if vibrato is uniform and disregards various stylistic characteristics of other genres. This makes essential a new comprehensive system of vibrato evaluation taking into account both the variability and the shape of the vibrato.

This study aims to define and examine quantifiable measures that accurately describe the shape and represent the variability of complex vibrato patterns.

Methods: Three groups of vibrato samples (Madde synthesized, real voice generated, and recording excerpts) were subjected to sinusoidal extraction, fundamental frequency band-pass filtering, and long-term average spectrum of the FFT in the Praat platform via a custom script. Within each category, the half extent values were calculated and analyzed by regression techniques, standard deviation, and Coefficient of Variation (CV), as well as slope measures.

Results: Half-extent rather than rate is the most variable feature of vibrato. CV well characterizes variability in simple vibrato patterns, however, in isolation may be misleading when applied to complex vibrato shapes. Introducing slope as an additional parameter offers a possible novel solution for both quantitative and qualitative evaluation of naturally-occurring vibrato. The proposed vibrato analysis approach could be employed as a useful tool for voice teaching as well as for evaluating vibrato differences between genres, styles of teaching, epochs, etc.

Authors:

Theodora Nestorova Ian Howell	

Title: ***THE EFFECT OF BILINGUALISM ON THE VOICE OF SPANISH-ENGLISH BILINGUAL SPEAKERS***
Category: Speech Language Pathology

Abstract:

Objective: Over 20% of individuals in the US speak more than one language. It is well-known that language fluency affects speech production; however, there is little information on how it affects voice production. The goal of the current study was to identify the task and acoustic measures that could be applied to future research investigating vocal production in bilingual speakers.

Methods: Acoustic analyses were conducted on speech recordings from the Archive of L1 and L2 Scripted and Spontaneous Transcripts and Recordings. The participants were 11 Spanish-English bilingual speakers (8 males, 3 females). Each speaker recorded speech during three spontaneous speech tasks (SS) and five reading tasks (RS). Acoustic analyses were conducted to obtain the following measures: sound pressure level (SPL), fundamental frequency, pitch strength (PS), smoothed cepstral peak prominence (CPPS), speech rate, and time.

Results: The difference in PS between L1 and L2 during the SS task was statistically significant for females, but not for the males. There was a statistically significant difference between L1 and L2 in SPL and fundamental frequency for both male and female groups for SS tasks. No statistically significant difference between L1 and L2 was found in CPPS for both the male and female groups for the SS tasks. There was no effect of time on any of the acoustic measures, most likely due to the brevity of the audio recordings. The findings provide preliminary evidence that spontaneous speech tasks reveal vocal difference associated with language fluency more than reading tasks.

Authors:

JosseMia Webster Keiko Ishikawa Lady Catherine Cantor Cutiva Pasquale Bottalico	

Title: ***EFFECT OF FLOW PHONATION VOICE EXERCISES ON VOCAL AND AERODYNAMIC MEASURES IN UNDERGRADUATE STUDENT SINGERS***
Category: Voice Pedagogy

Abstract:

Objective: Previous research has demonstrated that therapeutic exercises designed for voice disorders to be beneficial in improving vocal outcomes of singers. The purpose of this study is to investigate the effects of flow phonation exercises on vocal characteristics of students in undergraduate music training programs. Flow phonation exercises enable better channeling of air stream achieved using a relaxed laryngeal position, which eventually facilitates clear vocal quality. We hypothesized that the use of these exercises will offer better phonatory-respiratory outcomes in student singers which will eventually translate to better ease of singing.

Methods: Data collection for the study is still ongoing. Data from 6 participants are reported in this abstract. Participants were assessed during two periods: before and after 5 weeks of intervention. Outcome measures consisted of overall severity ratings of the Consensus Auditory Perceptual Evaluation of Voice (CAPE-V); acoustic measures of noise to harmonic ratio, jitter, shimmer obtained using the PRAAT program; maximum sustained phonation duration and s/z ratio as part of subjective respiratory assessment; self-reported responses to the Singing Voice handicap index (sVHI) and the vocal fatigue index (VFI). In addition, participants also provided singing samples consisting of an English language classical song sung for a minimum of 30 seconds, which was rated using the The Evaluation of the Ability to Sing Easily (EASE).

Results: Results TBD. The implications will be discussed within the framework of employing these methods in vocal pedagogy in singing education.

Authors:

Jorge Diaz Balaji Rangarathnam	

Title: ***EFFECTS OF A VOICE THERAPY PROGRAM FOR MALE TO FEMALE TRANSGENDER INDIVIDUALS***
Category: Speech Language Pathology

Abstract:

Objective: The purpose of this study is to investigate the specific effects of a voice therapy protocol for male-to-female (MTF) transgender individuals. We aim to study the effects of a therapy protocol that would potentially help MTF individuals achieve their desired voice outcomes by adopting strategies that are beneficial for vocal health.

Methods: Five MTF participants who are over the age of 18, reported no history of vocal pathology, and are seeking to sound more feminine, were recruited. Participants provided voice samples before and 5 weeks after therapy. Voice outcome measures were auditory-perceptual measures derived from the Consensus auditory-perceptual evaluation of Voice (CAPE-V); acoustic measures of noise to harmonic ratio, jitter% and shimmer% obtained using the PRAAT program; measures of respiratory-phonatory dynamics such as the maximum phonation time and s/z ratio; and voice-related quality of life obtained through the VHI. Participants were also rated on a scale of 1-10 to understand how feminine the voice sounds, which were completed by the participants and three naive listeners. Therapy methods consisted of establishing a desired pitch using biofeedback (visual), SOVT exercises of lip trills, lip spreading, cup bubble blowing, and stretch and flow exercises. Exercises were performed in a hierarchy from voiceless productions through generalization to conversations. Participants were also provided strategies for feminine communication patterns such as laughing, smiling, and use of body language. Therapy was delivered via telepractice for 5 sessions - 1 session/week. Data collection is ongoing. Implications of transgender communication therapy and non-phonotraumatic voice exercises will be discussed.

Results: Results TBD

Authors:

Melissa Barbieri Veronica Gonzalez Nicole Pelaez Guiby Quinonez Balaji Rangarathnam	

Title: ***VOCAL ACOUSTIC MEASUREMENTS BEHAVIOR IN THE DERMATOGLYPHIC PROFILES OF VOICE PROFESSIONALS***
Category: Speech Language Pathology

Abstract:

Objective: The acoustic analysis is widely applied in the assessment and monitoring of the vocal function. Dermatoglyphics is a technique used to study genetic markers from the fingerprint, capable of predicting physical skills related to anaerobic (strength and speed) and aerobic (motor coordination and endurance) mechanisms. Therefore, it can be used as an indicator for the prescription of individualized vocal training. This research aimed to verify the behavior of acoustic measurements in the dermatoglyphic profiles of voice professionals.

Methods: It was a cross-sectional study with 79 voice professionals. Acoustic analysis was performed using PRAAT software. The acoustic measurements of mean intensity, fundamental frequency (f0) and cepstral peak prominence (CPP) were extracted from the sustained vowel / a /. Fingerprints were collected using the Integrated Biometric Watson Mini scanner and analyzed following Cummins e Midlo protocol. The confidence levels varied between 90% and 95%.

Results: Most professionals had an anaerobic dermatoglyphic profile (p = 0.004), and therefore had a lower number of lines (p <0.001). Higher values of F0 (p = 0.061), intensity (p = 0.065) and CPP (p = 0.073) were found in the anaerobic profile (p <00.1). As for the correlation between muscular endurance and acoustic variables, it was observed weak and negative for intensity (p = 0.026) and F0 (p = 0.017) at the 0.05 significance level; and for CPP (p = 0.069) at the level of significance 0.10. Thus, anaerobic profile was predominant. There was an association between acoustic variables and dematoglyphic profiles, as well as correlation with muscular endurance.

Authors:

Émile Santana Lisiane Sacramento Priscila Oliveira Cristiane Coelho Leonardo Lopes	

Title: ***THE ASSOCIATION BETWEEN VOCAL RESONANCE AND VOCAL QUALITY***
Category: Speech Language Pathology

Abstract:

Objective: Vocal resonances are changes that occur in the amplification of the sound emitted by the larynx and projected by the vocal tract (oral, nasal, pharyngeal and laryngeal cavities and paranasal sinuses). Depending on the filtration performed by these supraglottic cavities, the vocal folds may or may not be overloaded. This study aimed to estimate the association between vocal resonance and vocal quality of voice professionals.

Methods: It was a cross-sectional study with 79 voice professionals. Adapted Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) was performed with assessment of vocal resonance. Three blinded speech pathologists specialized in voice evaluated the samples. Intraclass correlation coefficient (ICC) was applied to choose the most consistent judge (ICC between subjects= 0,79 and intrasubject =0,89). Pearson's Chi-Square Test and relative risk were performed. The confidence level was 95%.

Results: The sample consisted of teachers and singers with an average age of 40 and 16.35 years of profession. Statistical significance was found in the association between voice resonance and vocal quality: 53.2% of the sample presented muffled resonance and, between them, 19% had altered CAPE-V. Subjects with non-muffled resonance did not presented voice alteration (p-value = 0.005). Relative risk of muffled resonance presence was 2.09 (1.64 - 2.67 confidence interval) (p-value =0.001) times higher in voice professionals with altered CAPE-V. Thus, the objective of the study was achieved. Findings showed that vocal quality is influenced by vocal resonance and emphasized the importance of taking care of supraglottic aspects to avoid dysphonia in voice professionals.

Authors:

Émile Santana Caroline Jesus Aloísio Machado Lisiane Sacramento	

Title: ***RELATIONSHIP BETWEEN SLEEP AND STRESS WITH VOICE ACOUSTIC PARAMETERS AMONG COLLEGE PROFESSORS***
Category: Voice Pedagogy

Abstract:

Objective: Background: Teachers are among the occupational voice users recognized for having a high likelihood of developing voice disorders, being exposed to work-related stressful conditions, and having sleep disorders. Nevertheless, to the best of the authors' knowledge, no study has yet assessed the possible relationship between sleep and stress with voice acoustic parameters among college teachers.

Objective: To characterize the relationship between sleep and stress with voice acoustic parameters among college professors.

Methods: Methods: A longitudinal, correlational, and exploratory study with the participation of 24 professors that were followed-up during 15 continuous days. Within this period, daily self-reports of sleep quality and duration, stress levels and voice recordings were obtained. Generalized linear models were used to determine the possible associations.

Results: Results: Self-report of intermediate and elevated levels of sleep quality were associated with statistically significant increases in: the standard deviation of sound pressure level in connected speech, the standard deviation of the fundamental frequency, the mean of the sound pressure level, and the minimum sound pressure level in the vowel /i/. Additionally, sleep quality was associated with statistically significant reductions in the maximum vocal sound pressure level /i/, mediated by different degrees of stress.

Conclusions: Sleep and stress are significantly associated with voice acoustic parameters. Therefore, it is recommended that workplace vocal health promotion programs include activities to improve sleep conditions and decrease stress, considering that these aspects affect voice functioning.

Authors:

Andrés Carrillo-González Maryluz Camargo-Mendoza Lady Cantor-Cutiva	

Title: ***VOCAL HEALTH EDUCATION FOR PRESERVICE MUSIC EDUCATORS***
Category: Speech Language Pathology

Abstract:

Objective: The purpose of this study was to examine the knowledge of voice care gained by preservice music educators following a vocal hygiene program.

Methods: A 30-minute vocal hygiene program was delivered in two courses for university-level preservice music education students. The program was delivered to a course for first-year students and a seminar course for fourth-year students who completed their student teaching requirement the following semester. The vocal hygiene program consisted of a showing a video regarding general voice care followed by presentation by a speech-language pathologist who specializes in treatment of professional voice users. The presentation was tailored to preservice music educators with discussion of voice care specific for professional settings and potential classroom strategies such as the use of amplification.

The vocal hygiene program was delivered during a regularly scheduled class period for the music education students (30 first-year students and 24 fourth-year students). Those students completed a pretest that assessed their knowledge of voice care and potential harmful behavior. Following the 30-minute program, an identical post-test was given.

Results: Both groups of students were able to identify more methods to prevent vocal problems following the educational seminar. Both groups were also able more accurately identify reflux-inducing activities/foods. Over 50% of the fourth-year students indicated the seminar was helpful in regards to improving vocal hygiene during their student teaching experience. This study will assist the development of a collaborative effort to provide voice care information to all preservice music and general education students at an academic institution.

Authors:

Susan Brehm Jacquelyn Jarachovic Renee Gottliebson Barbara Weinrich Brian Meyers	

Title: ***CARING IN DISTANCE: TRAINING FUTURE CLINICIANS FOR REMOTE VOICE EVALUATION***
Category: Speech Language Pathology

Abstract:

Objective: The purpose of this presentation is to describe our experience in developing the graduate-level training program for remote voice evaluation. The recent medical office closures due to the COVID-19 pandemic underscored the importance of telehealth. Empathy is a critical skill for developing a strong therapeutic alliance between patients and clinicians. However, the lack of shared physical space in the telehealth environment may challenge clinicians from conveying a sense of empathy to patients.

Methods: The program was developed in collaboration with the graduate program in Speech-Language Pathology, Vocal Performance, and Theater studies. The training consisted of three phases: 1) didactic lectures on clinical evaluation of voice disorders and telepractice etiquette, 2) remote voice evaluation using the Standardized Patient (SP) model, and 3) the evaluation with real patients. Thirteen students majoring in Vocal Performance and Theater studies were trained to serve as SPs. Twenty-four students in the first year of the master's program in Speech-Language Pathology (SLP) conducted remote voice evaluation on the SPs and real patients via Zoom. The outcome of the training was measured by the accuracy in the case history, technological fluency, and CARE measure, which assessed the patient's perception of their empathy. Interviews were conducted to explore the impact of the training program on clinical skill development.

Results: The preliminary findings indicated the students significantly improved in history taking and technological fluency after the SP training. The empathy rating was high. We will also report the thematic analysis of the interview data.

Authors:

Keiko Ishikawa Clarion Mendes Yvonne Redman Sarah Wigley Bridget Sweet	

Title: ***Expression and clinical significance of interleukin-10 (IL-10), transforming growth factor β-1 (TGF-β1) and inducible nitric oxide synthase (iNOS) in the process of vocal fold leukoplakia canceration***
Category: Speech Language Pathology

Abstract:

Objective: To assess the expression of IL-10, TGF-β1 and iNOS in different pathological grades of vocal fold leukoplakia, and to explore their roles in the process of vocal fold leukoplakia canceration.

Methods: 10 cases of vocal fold leukoplakia with simple hyperplasia of squamous epithelium, 10 of mild epithelial dysplasia, 10 of moderate to severe, 10 of laryngeal cancer and 10 of vocal polyp were enrolled in the study. Immunohistochemical analysis and quantitative image analysis was used to detect the expression level of IL-10, TGF-β1 and iNOS of the selected pathological samples.

Results: Results With the increase of dysplasia degree of the epithelial cells of vocal fold, the IL-10 was increasingly expressed. The positive expression rate of both TGF-β1 and iNOS showed an increasing trend from vocal fold leukoplakia with simple hyperplasia of squamous epithelium, mild epithelial dysplasia to moderate and severe epithelial dysplasia, but reduction when vocal fold leukoplakia with moderate to severe dysplasia worsened to laryngeal cancer. In the expression of IL-10, TGF-β1 and iNOS, there was statistical significance among the vocal fold leukoplakia with simple hyperplasia of squamous epithelium, mild epithelial dysplasia, moderate to severe and vocal fold leukoplakia canceration (P＜0.05) . The comparison between the vocal fold leukoplakia with simple hyperplasia of squamous epithelium and vocal polyp was no significant difference (P＞0.05). Conclusion TGF-β1 and iNOS may be the early events in the process of vocal fold leukoplakia canceration. IL-10 is expected to be a molecular marker for early carcinogenesis of vocal fold leukoplakia.

Authors:

Yongjing You Yanli Ma Peiyun Zhuang	

Title: ***DISCUSSION ON THE SAFETY OF ENDOTRACHEAL INTUBATION ANESTHESIA FOR LARYNGEAL WITH SMALL INNER DIAMETER IN ANESTHESIA FOR LARYNGEAL MICROSURGERY***
Category: Medical

Abstract:

Objective: The endotracheal intubation with small inner diameter has the advantage of maximizing the surgical field of glottis, and has been widely used in airway management in laryngeal microsurgery. However, too small a tube diameter is a test for the body' s ventilation and oxygenation requirements because it can promote instrinsic positive end-expiratory pressure(PEEPi) formation. The main purpose of our research is to evaluate the safety of endotracheal intubation with small inner diameter by monitoring various parameters

Methods: A total of 73 patients with laryngomicrosurgery who underwent endotracheal intubation under general anesthesia in our hospital during a period time of 2020 were selected and divided into theoretical size endotracheal tube group(ID 7.0-8.0) and small size endotracheal tube group(ID 5.0-6.0). After the induction of anesthesia was completed, PEEPi was measured at three time points of endotracheal intubation and at the end of the operation. Meanwhile, the peak airway pressure, respiratory rate, tidal volume, lung compliance, blood pressure, heart rate, and oxygen saturation were recorded at three time points of endotracheal intubation. In addition, the time to wake up from anesthesia and the occurrence of adverse reactions were also recorded.

Results: Results There was no significant difference in general conditions, respiratory mechanics and hemodynamic parameters between two groups (P>0.05).

There was a statistically significant difference in PEEPi between two groups (P<0.05), but no PEEPi-related adverse reactions were found.

Conclusion In laryngeal microsurgery, the application of small inner diameter endotracheal tube has reference value for airway management.

Authors:

Yunyi You Xinlin Xu Yanli Ma Peiyun Zhuang	

Title: ***PERCEPTUAL DISCRIMINATION OF PITCH, LOUDNESS AND OVERALL VOICE SEVERITY IN 6-TO 8-YEAR-OLD CHILDREN***
Category: Speech Language Pathology

Abstract:

Objective: This study investigated the auditory-perceptual discrimination of pitch, loudness and overall voice severity in typically developing children aged from 6 to 8 years old.

Methods: Sixty typically developing children aged from 6 to 8 years old together with 20 control adults were recruited. They were required to listen to recordings of normophonic and dysphonic voice of children. Their task was to make gross and fine discrimination on perceptual characteristics of pitch, loudness and overall voice quality.

Results: In general, children's performances improved with age for all parameters of pitch, loudness and overall voice severity. Children at age 6 and 7 showed similar levels of perceptual abilities. Children at age 8 showed significantly better performance in making gross and fine pitch discrimination than those at age 7. Adult-like performance was observed in the 8-year-old group in most of the tasks except fine discrimination of pitch and fine discrimination of overall severity. The results suggest that perceptual discrimination of pitch, loudness and overall voice quality mature with age. Clinicians should provide young children with sufficient assistance and training on understanding of these perceptual parameters in voice assessment and therapy.

Authors:

Estella P.-M. Ma Yonnie W.-Y. Li	

Title: ***Psychological and Daily Life Impacts of SARS-COV-2 on the Transgender Non-Conforming Community***
Category: Speech Language Pathology

Abstract:

Objective: The Transgender Non Conforming Community (TGNC) experience higher discrimination, stigma, harassment, and victimization compared to the general cisgender population. Lack of accessibility to inclusive healthcare makes some TGNC individuals hesitant to seek a healthcare provider because of prejudice and stigmatization. The primary goal of this study is to examine how the SARS-COV-2 pandemic, shelter in place (SIP), and social distancing has impacted the psychological health outcomes in the TGNC population. The secondary goal is to assess how SARS-COV-2 has altered overall quality of life among the TGNC community. We hypothesize that the psychological health of the TGNC community will be negatively impacted by SARS-COV-2, primarily as an effect of SIP.

Methods: 20 TGNC participants recruited from social media and LGBT+ organizations will be interviewed via audio/video conference platforms. Three questionnaires will be administered in a series of initial, follow-up, and final interviews. The SARS-COV-2 Emotions and Feelings Questionnaire (CEFQ) analyzes impacts of SARS-COV-2 on the participant's daily life and emotions. The CEFQ was developed by study authors and includes yes/no, scales out of 5 or 7, and free responses (for personal history and daily activities). The Hamilton UCLA Depression Rating Scale (HAM-D) assesses depression levels by asking participants to rate symptoms of insomnia, anxiety, work, daily activities, and overall feeling toward depression. The Transgender Self-Evaluation Questionnaire (TSEQ) reflects how participants' voices impact their daily life and asks to rate statements from 1-5 based on which applies.

Results: This study will explore how clinicians can provide effective, efficient, and inclusive care that will improve TGNC quality of life outcomes. Future research will include a comparative study focusing on the differences in reported psychological health and quality of life for the Cisgender community.

Authors:

Hannah Khorassani Allyssa Madriaga Zurisadai Hernandez Cruz Anusha Sundarrajan	

Title: ***INFLAMMATORY MYOFIBROBLASTIC TUMOR OF THE LARYNX: REPORT OF A CASE***
Category: Medical

Abstract:

Objective: Inflammatory myofibroblastic tumor (IMT) is a rare tumor of mesenchymal myofibroblastic spindle cells enveloped by an inflammatory infiltrate. Historically, this tumor sparked debate regarding whether it was a true malignancy with metastatic potential, or a locally destructive inflammatory response. Confusion regarding the pathologic nature of this cellular phenomenon is evident in the many names by which IMT was previously described. In 1994, based on exploration of the histopathological nature of this tumor, the World Health Organization designated its current nomenclature of IMT. Few reports of IMT exist; the majority of cases occur in the pediatric population and favor the lungs.

Methods: Here we present an exceedingly rare case of IMT involving the larynx of a 22 year old female. Videostroboscopy demonstrated a large mass of the right true vocal fold. A hemorrhagic and solid mass encompassing 90% of the right true membranous vocal fold was excised in its entirety. Histopathological assessment revealed a hypercellular myxoid process with atypical spindle cell proliferation; specimens were positive for ALK-1 and ALK gene rearrangement 3'ALK sep 5'ALKg1 in 91.5% of the nuclei, confirming the diagnosis of IMT (Figures 1 & 2).

Results: Based on available evidence, intralesional steroid therapy was performed for prevention of recurrence, in conjunction with panendoscopy to assess for additional or recurrent lesions. The right true vocal fold was well healed and soft; no intracordal mass was detected. Tracheal and esophageal anatomy were normal. At 11 months post-excision, a follow-up MRI was performed, revealing symmetric vocal cords without evidence of any masses.

Authors:

Torunn Sivesind Austen Anderson James Small David Opperman	

Title: ***B.E.R.R.: THE COLD HARD FACTS OF A TAUGHT BREATH EXHALATION REGULATION ROUTINE***
Category: Voice Pedagogy

Abstract:

Objective: The effectiveness of a sung vocal exercise is widely accepted based only on anecdotal evidence.¹ Nearly everything that we teach in a voice lesson is based on something that someone else has done before us.² For most vocal pedagogues, those who taught us shaped our perceptions of what constitutes an effective vocal regimen. However, all exercises are not created equal and may not stand up to the scrutiny of modern vocal pedagogy. In this investigation, I sought to measure the relationship between the regular use of a specific breath exhalation regulation routine, or BERR, and maximum phonation time.

¹Sugars, J. M. (2009) Trends of Vocal Warm-ups and Vocal Health From the Perspective of Singing and Medical Professionals

(Unpublished doctoral dissertation). The University of Texas at Austin, Austin, Texas.

²Sell, K. (2005). The Disciplines of Vocal Pedagogy: Towards an Holistic Approach (1st ed.).

London, England: Ashgate.

Methods: Pretest and posttest measurements of /z/, /u/, and /a/ durations were taken of 30 collegiate level singers, divided into two groups (control, n=15; experimental, n=15). The experimental group was then taught a specific BERR and asked to rehearse the routine once a day for seven days. The data was analyzed by comparison of pretest-posttest results for both the control and experimental groups.

Results: Results TBD. This experiment is scheduled to run from 11/8/20 to 11/15/20. The results for this investigation will be delineated by /z/, /u/, and /a/ durations to the 0.01 second and will be discussed in terms of vocal pedagogy and applicable breathing techniques.

Authors:

Zachary Devin	

Title: ***THE EFFECT OF FACE MASKS ON THE VOCAL FATIGUE OF TEACHERS***
Category: Speech Language Pathology

Abstract:

Objective: Concerns about vocal function and health of professional voice users have arisen with mask use during the COVID-19 pandemic. A recent survey of the Brazilian population found self-reported changes in function for those not working at home (Ribiero, et al., 2020). The purpose of the current study was two-fold: 1) to survey teachers to see if masks increase vocal fatigue and 2) to determine the effect of a face mask on classroom dB levels if the teacher is wearing a mask.

Methods: For the first objective, a Qualtrics survey was sent via email to high school and university-level instructors. Instructors who taught exclusively online or without masks were excluded. Teachers were asked to respond regarding vocal problems and effort to speak pre- and post-introduction of face masks. For the second objective, loudness levels of university instructors were taken in a classroom using a sound-level meter. Speakers were recorded without a mask and then wearing a variety of masks.

Results: Preliminary data taken from 16 completed surveys suggest significant changes in several areas of vocal performance and health. Participants reported a significant increase in the number of vocal complaints after teaching in a mask ($t(28) = 3.75$, $p=0.004$) including increased reports of vocal fatigue, throat clearing, and tightness in throat. Additionally, respondents report increased effort to teach with a mask ($t(30) = 4.37$, p<0.001) despite more respondents using amplification (31%) as compared to without a mask (6%). Results of the sound level study are yet to be determined.

Authors:

Judith Wingate Daniel Furnas	

Title: ***THE ROLE OF SPECTRAL AND TEMPORAL FEATURES IN THE INTELLIGIBILITY ADVANTAGE OF TWANG VOICE IN NOISE***
Category: Basic Science

Abstract:

Objective: The aim of this study was to examine how spectral and temporal characteristics of twang speech contribute to intelligibility in noisy environments.

Methods: One professional female vocalist recorded ten sentences from the Hearing in Noise Test in four speech production styles: conversational speech, clear speech, speech in operatic resonant voice, and speech in twang voice. The vocalist listened to speech shaped noise at 55 dBA through headphones during the recording. Acoustic analyses were conducted to obtain intensity, speech rate, and spectral slope of each sentence, and frequencies and bandwidths of the first three formants of the vowels. For each sentence, the recordings of the four different speech production styles were grouped and mixed with speech shaped noise at 65 dBA. These stimuli were presented to ten speakers of American English with normal hearing, who were instructed to select the most intelligible stimulus among the four styles.

Results: The analyses of the data are currently underway. The results from the speech perception experiment indicated that speech in twang voice was more intelligible than speech in other speech production styles. The preliminary results of the acoustic analyses indicated that the intensity was significantly greater for speech in operatic and twang voice in comparison to conversational and clear speech. There was no statistically significant difference in the intensity between speech in operatic and twang voice, suggesting that spectral and/or temporal features of twang speech contributes to its intelligibility advantage.

Authors:

Keiko Ishikawa Mary Buchheit Searam Park	

Title: ***VIRTUAL EXPLORATION OF THE HUMAN VOCAL TRACT***
Category: Basic Science

Abstract:

Objective: The ability to explore the human vocal tract, both visually and audibly, is key to improving understanding and education. By using modern processing techniques, exploration of the vocal tract in 3D becomes possible and accessible to a wide audience for the purposes of public outreach, teaching, and simple visual comparative analysis between different vocal tracts.

Methods: Complex 3D models can be simplified using voxelisation to increase the ease of post-processing and visualisation. Model pre-processing is done using Blender and voxelisation is performed using proprietary software. Once voxelised, models can be more easily integrated with simulation algorithms and visualisation software, namely the popular video game Minecraft. By integrating audio, the vocal tract visualisations can serve as a powerful outreach and teaching tool.

Results: Results TBD

Authors:

Daniel Woods David Howard	

Title: ***MAXIMUM PHONATION TIME, MAXIMUM EXPIRATION TIME, AND THE S/Z RATIO IN TWINS***
Category: Basic Science

Abstract:

Objective: The purpose of this study was to determine whether monozygotic (MZ) and dizygotic (DZ) twins perform differently in the following measures: maximum phonation time (MPT), Maximum Expiration Time (MET) and the s/z ratio.

Methods: Twenty-eight healthy male adults participated in this investigation: 10 MZ twin pairs and 4 DZ twin pairs. They were all native speakers of Standard Peninsular Spanish, recorded during 2012. Subjects were asked to sustain: (1) /a/ three times and (2) /s/ three times. They performed these tasks at a comfortable pitch and loudness after maximum inhalation. All /a/ and /s/ tokens were manually labelled in Praat. Their durations were calculated and extracted with a script. MPT and MET were defined as the maximum duration of /a/ and /s/. For the calculation of the s/z ratio, /a/ substitutes /z/, as in Spanish the phoneme /z/ does not exist.

Results: Preliminary results suggest that MPT is longer in MZ twins than in DZ twins while MET values are very similar. Consequently, the s/z ratio in MZ twins is lower than in DZ twins. However, when considering the ED of s/z ratios in intra-twin comparisons, values are very similar.

Results need to be examined in view of each subject's anamnesis to detect possible outliers. An increased sample size would also be required in order to determine whether respiratory and glottal efficiency can be influenced by genetic factors. This could be useful to understand more about how a highly infectious respiratory disease such as COVID-19 affects different people.

Authors:

Eugenia San Segundo	

Title: ***USE OF A VORTEX WHISTLE FOR MEASURES OF RESPIRATORY CAPACITY***
Category: Basic Science

Abstract:

Objective: Objectives: The objective of this study was to assess the degree of relationship between measures of vital capacity (VC) obtained using low-cost methods (vortex whistle and hand-held spirometry) vs. pneumotach-based spirometry.

Methods: Methodology: A vortex whistle was designed using 3D modeling software, 3D printer and non-toxic, biodegradable polylactic acid (PLA). The digitized vortex whistle tone was analyzed using custom software to produce a flow vs. time contour, whose integral provides an estimate of the overall volume. The accuracy of vortex whistle volume estimates were assessed using (1) controlled flow rates from a consistent volume calibration syringe, and (2) with 66 subjects between the ages of 18-30 yrs. in comparison to hand-held spirometry and two pneumotach systems.

Results: Results: Observations from the calibration syringe experiment confirmed that the vortex whistle and software are able to effectively track flow rate (r = 0.9982 for average flow vs. average whistle frequency). Results from the human VC testing showed that measures obtained using both vortex whistles and hand-held spirometry correlated very strongly (r > 0.94) with computerized pneumotach systems, and the strength of correlations obtained via vortex whistles vs. hand-held spirometry were highly comparable.

Discussion & Conclusions: When coupled with the analysis software, valid and reliable frequency/flow curves and volume estimates may be obtained using a vortex whistle comparable to the hand-held spirometer. The use of the vortex whistle has the potential to bring measures of basic respiratory function to clinicians and patients alike at a fraction of the cost of currently used spirometric methods.

Authors:

Shaheen Awan Jordan Awan	

Title: ***TRAINING AUDIO-PERCEPTUAL RATINGS: EFFECTS ON RATER CONFIDENCE***
Category: Speech Language Pathology

Abstract:

Objective: Objective: This study analyzed the effects of training on the inter- and intra-rater reliability of auditory-perceptual analysis of voice ratings as well as training influence on rater confidence.

Methods: Methods/Design: Part 1: Twenty-nine speech-language pathology graduate students were trained in audio-perceptual ratings. Pre-and post-training questionnaires assessed confidence using rating tools. Audio-recorded samples of dysphonic and normal speaking voices were rated by participants using the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V). Following initial ratings, the participants were trained using the tool with textual (parameter definitions) and auditory anchors consisting of voice samples that were selected to exemplify each parameter. Participants then completed post-training ratings without the use of anchors. Part 2: Eight speech-language pathology undergraduate students followed the same protocol. Five participants were randomly assigned to an experimental group and three to a control group. Experimental participants engaged in practice rating sessions for eight weeks. All participants completed follow up ratings and confidence questionnaires eight weeks and three months post.

Results: Results/Conclusions: Part 1: Results showed increased inter-rater reliability for the parameters of Breathiness, Strain, and Pitch. In conjunction with this increase in reliability, subjects also reported a statistically significant increase in confidence from pre-test to post-test evaluation. Part 2: Results TBD

Authors:

Renee Gottliebson Nicole Collins Caroline Goodpaster Susan Brehm Courtney Robinson	

Title: ***Activated Macrophages Immunoregulate Vocal Fold Fibroblasts Behaviour***
Category: Speech Language Pathology

Abstract:

Objective: Macrophages contribute to the elimination of pathogens, and also serve other roles in wound healing, angiogenesis, and organ regeneration [1]. According to recent studies, macrophages are responsible for modulating fibrosis and scarring during wound healing [2-4]. The present study aims to compare the effects of different macrophages activation states on the regenerative behavior of vocal fold fibroblasts.

Methods: To this end, THP-1 monocytes were differentiated into inactivated macrophages (M0) through exposure to 200 nm phorbol 12-myristate 13-acetate. Macrophages were polarized by treatment with 20 ng/ml interferon-gamma and 100 ng/ml lipopolysaccharide for inflammatory macrophages (M1), 20 ng/ml Interleukin-4 and 20 ng/ml Interleukin-13 or 20 ng/ml Interleukin-10 for two subtypes of anti-inflammatory macrophages (M2a and M2c). A 3D co-culture system using two well silicon inserts allowed the encapsulation of fibroblast and macrophages separately in gelatin-based hydrogels.

Results: After 21 days, most of the fibroblasts co-cultured with M1 fibroblasts adopted a rounded morphology and produced a very low level of collagen type I (col-I) and collagen type III (col-III). The M2a group possessed aligned fibroblasts with significantly higher α-smooth muscle actin and col-I production compared to the other groups. The observations confirmed the contribution of M2a to wound healing via fibrosis. The fibroblasts affected by M2c showed an elongated spindle-like morphology similar to the M0 group. They also showed increased production of col-III, which is characteristic of scar-free wound healing. The results illustrate the potential benefits of immunomodulation for promoting tissue regeneration.

Authors:

Sepideh Mohammadi Fatemeh Taheri Luc Mongeau	

Title: ***The Control of Vibrato In "Crossover" Singers***
Category: Voice Pedagogy

Abstract:

Objective: Vibrato is believed to be a distinguishing factor between legit and belt singing in musical theater performance (Echternach et al 2014). For example vibrato, for legit singing is used more frequently throughout a phrase whereas belt makes use of straight tone and added vibrato at the ends of phrases. Some studies have demonstrated that singers of one style use the same vibrato for other styles of singing.   However, what do "crossover" singers do with their vibrato for legit and belt performances. This study examined vibrato rate, extent, variability, and proportion of singing time with vibrato in 5 internationally known "crossover" performers.

Methods: Accompaniments were removed from recordings of legit and belt performances. These modified recordings were submitted for acoustic analysis of vibrato. They were also rated by blinded judges, using a visual-analog scale (VAS), as to whether a song was more belt (100) or legit (0) in quality.

Results: Currently data from one singer's legit and belt performances, Kristen Chenoweth's, have been completed. Comparison between her legit and belt performances were, respectively: (a) proportion of singing with vibrato was 40% and 13%; (b) rates of vibrato were 7.5 and 6 cycles per second; and VAS scaling was 13.2 and 82.8. This demonstrates that a highly-skilled "crossover" performer is able to use vibrato to distinguish between the two styles. Data analysis for the remaining four singers is in progress.

Authors:

Alyssa Becker Peter Watson	

Title: ***VOICE AWARENESS AMONG FITNESS TRAINERS IN INDIA ABSTRACT***
Category: Speech Language Pathology

Abstract:

Objective: To identify the voice awareness among fitness trainers in India.

Methods: Study design: Self-completion questionnaire design

Method: The present study is a pilot study. A total of 36 Indian Group Fitness trainers, completed a self-reported questionnaire distributed via Google Form . The sections include the instructor's personal habits, ground fitness questions, instructing avenues, voice usage and voice experience.

Results: Results: All the participants reported experiencing tiredness post instruction sessions while 45.2% perceived a change in the voice quality. Dryness (86.4%) and throat ache (13.6%) were the commonly mentioned symptoms. 34.4% were worried about the change they perceived while 21.9% reported a hoarse and breathy voice quality due to excessive instructions. To overcome these changes, over 80% have regularly consumed medication due to inadequate knowledge on voice care measures. 85.7% of them have claimed the need for remediation of voice care as a fundamental routine among fitness trainers. The study highlights the unhealthy lifestyle fashion and voice usage followed among fitness trainers. Majority of the trainers have reported voice rest, home care remedies as breathing and pranayama as the measures of care before and after instructions.

Conclusion: The findings of the present study represents a significant occupational hazard among fitness trainers. The responses obtained clearly states the lack of knowledge among fitness trainers regarding voice care and the need for voice education program.

Authors:

Priyanka Nayak Usha Manjunatha Dr. Jayashree Bhat	

Title: ***BIOMECHANICAL ANALYSIS OF A PATIENT WITH REINKE'S EDEMA BEFORE AND AFTER SURGICAL TREATMENT. CASE REPORT.***
Category: Medical

Abstract:

Objective: Reinke's edema is a common disease of the vocal folds. Although videolaryngoscopy is essential to evaluate the severity of the disease, no information about voice quality is provided by it. The objective is to assess the role of biomechanical analysis in the evaluation of voice quality in a patient with Reinke's edema before and after surgery.

Methods: We report a case of a 69-year-old female with Reinke's edema. Laryngeal evaluation was performed with Olympus Visera Elite OTV-S190 chip-on-tip videolaryngoscope. Biomechanical analysis from App Online Lab® by Voice Clinical Systems® for android- was performed preoperatively and two months after surgery in order to evaluate changes in fundamental frequency (F0), vocal cycle phases duration, force and tension, efficiency, instability, mucosal wave correlates and mass effect.

Results: Biomechanical analysis before surgery showed a F0 lower than normal; a reduced closure phase duration in spite of the increase of strain and muscular force parameters; an excessive mucosal wave in the opening phase and an increase of mass effect and instability during closure phase.

Two months after surgery, the biomechanical pattern showed a normalization of F0 and of the mucosal wave in the opening phase, and a significant reduction of strain, force and instability parameters, although there was still an excessive mass effect and the closure phase duration showed no improvement.

Biomechanical analysis in Reinke's edema seems to be a useful tool to objectively evaluate the effects of treatment and offers a good correlation between vocal fold aspect and voice production pattern.

Authors:

Isabel Cardoso Ángel Rodríguez-Paramás	

Title: ***The Impact of Telehealth on Voice Therapy Attendance***
Category: Speech Language Pathology

Abstract:

Objective: Low attendance to voice therapy has been well documented demonstrating that only 28-35% of patients complete a scheduled course of voice therapy. The SARS Coronavirus (Covid-19) and has posed critical challenges for voice therapy citing concerns about aerosol generation and length of exposure putting both patient and clinician at greater risk. Telehealth voice therapy has provided an opportunity for remote voice therapy thereby eliminating the risk of exposure to the virus.

Methods: This study investigated the impact of remote synchronous patient-clinician voice therapy on attendance at one major academic medical center in the first six months of COVID 19. A retrospective chart review was conducted for 50 consecutive patients referred to voice therapy from 04/2020 - 09/2020.   Data collected included demographic variables , primary diagnosis, severity of dysphonia, voice quality of life (VHI-10 raw score), date of physician's referral to therapy, date of initial telehealth session, number of telehealth therapy sessions recommended, number of telehealth therapy sessions attended, and completion status as either completed or dropped out prior to completion.

Results: Spearman's rho (ρ) rank correlation coefficient was calculated to examine the relationship between each variable studied and therapy completion. Results indicated that remote synchronous voice therapy improves voice therapy attendance. Trends regarding cancellation and rescheduling of appointments, number of sessions to complete therapy, and patient satisfaction with the remote synchronous treatment will be presented in the poster.

Authors:

Samantha Kridgen Edie Hapner	

Title: ***THE EFFICACY OF SELECTED SEMI-OCCLUDED VOCAL TRACT EXERCISES ON THE DURATION OF THE EXHALATION PHASE IN THE BREATH CYCLE OF THE YOUNG SINGER***
Category: Voice Pedagogy

Abstract:

Objective: The objective of this study is to determine which of the many-used semi-occluded vocal exercises are most effective in assisting the young singer in extending the exhalation phase of the breathing cycle in singing.

Methods: Students will be presented with a series of narrow melismatic passages to execute on three vowels across the vowel spectrum at a consistent metronomic marking in the middle register of the voice. A consistent dynamic marking in the execution of the vocal exercises will be observed. A baseline at the beginning of the experimental period will be taken over the course of three days. Following the baseline measurement, three separate groups of students will observe a regimen that involves either straw phonation, lip trills, and the voiced consonant [v]. Subsequent monitorings will take place three times a week over the course of four weeks. Data will be analyzed to determine which of the three exercises was consistently most successful in the extension of the exhalation phase of the breath cycle.

Results: Results TBD.

Authors:

Chris Turner	

Title: ***EFFECT OF MASK AND FACE SHIELD ON VOICE AND SPEECH CHARACTERISTICS***
Category: Speech Language Pathology

Abstract:

Objective: Social distancing (at least 6-feet) and Personal Protective Equipment (PPE) such as mask and face shield affect voice and speech communication. Vocal effort has to be increased to compensate for the loss in intensity and spectral features. This research project includes the analysis of (i) a triangular wave transmitted from a speaker embedded in a mannequin, and (ii) human subjects' speech without and with commonly worn masks and face shield (medical/non-medical).

Methods: Phase I: A mannequin head with a mini-speaker at the mouth level will be used to simulate a scenario of speech communication. A pre-recorded triangular wave will be generated through the speaker. A high-fidelity condenser microphone, placed 1-meter away will record the output (listener). A sound level meter (SLM) will be placed at the same level of the microphone to measure sound pressure level in decibels.

Phase II: Phonotypical subjects will be recorded during reading and spontaneous speech without and with mask and face shield. Acoustic and electroglottographic recordings will be made to analyze speech and voice measures.

Analysis: Intensity (dBSPL), Spectral Slope, and Contact Quotient (EGG) will be analyzed across different conditions (with/without mask and face shield)

Results: Results: Selected measures will be statistically analyzed using ANOVA (Repeated Measures) and Post hoc Bonferroni tests.

Inference: These results will reflect the effect of PPE on voice and speech communication. Based on the results, modifications to decrease vocal effort may be suggested.

Authors:

Katia Ortiz Carlee Quinn Nandhu Radhakrishnan	

Title: ***LISTENER IDENTIFICATION OF VOWEL FOR FILTERED AND NON-FILTERED SINGING SAMPLES: A PILOT STUDY EXAMINING ABSOLUTE SPECTRAL TONE COLOR***
Category: Voice Pedagogy

Abstract:

Objective: In 2016, Howell proposed a framework for perceiving a sung vowel in terms of discrete spectral bands, each conveying a distinct percept characterized by its absolute spectral tone color. This concept has precedent in psychoacoustics and music perception literature (e.g. Plomp (2002), Slawson (1985), Cogan and Escot (1976) and Winckle (1967)). While some experimental data regarding perceptual qualities of spectral bands of vowels exists (Bizley, et al., 2013), no human trials have been attempted. Howell (2016) claims that a subset of continuous-state vowels categorized as spectral is most meaningfully characterized by one radiated spectral peak, e.g. the second radiated peak typically defines the tone color of the [i] vowel while other peaks offer contrasting colors that may define other vowels. This study seeks to understand the relationship between listener perception and absolute spectral tone color.

Methods: This pilot study uses a free choice perceptual test to analyze percepts of multiple samples sung by a male-sex voice (2fo <fR1) and a female-sex voice (fo =fR1). 20 college-age music students will be presented with sustained consonant-vowel-consonant clusters of the sung words: beat, bait, boat, boot ([bit], [bet], [bot], [but]), with (1) frequencies above the first radiated spectral peak excluded, (2) the same but with frequencies above and below the second spectral peak removed, and (3) the unfiltered audio sample. The subject will complete a free choice test, identifying the central vowel and guessing the sung word. Perceptual results will be analyzed for inter-subject agreement and subsequently contextualized within Bizley's (2013) findings.

Results: Results TBD

Authors:

Ian Howell Kayla Gautereaux Joshua Glasner	

Title: ***The Relationship between the Voice Handicap Index, the Voice-Related Quality of Life, and the Vocal Fatigue Index in CSD Graduate Students***
Category: Speech Language Pathology

Abstract:

Objective: To determine the relationship between the Voice Handicap Index (VHI), the Voice-Related Quality of Life (V-RQOL), and the Vocal Fatigue Index (VFI) in female graduate students.

Methods: Approval from the Valdosta State University Institutional Review Board was obtained prior to initiation of the study. To date,32 female graduate students in Communication Sciences and Disorders enrolled in a voice disorders class have participated in the study. All participants completed the VHI, the V-RQOL, and the VFI as part of a class project. Data were analyzed using correlational analyses through JMP statistical software.

Results: The total VHI was correlated with both the V-RQOL (p = .821) and the VFI physical discomfort scale (p = .825). The VHI functional subscale was strongly correlated with the V-RQOL (p = .809) but the VHI physical and emotional subscales were weakly related to the V-RQOL (p = .673 and p = .777, respectively). The V-RQOL was not related to any component of the VFI.

Prior reports have documented a strong correlation between the VHI and the V-RQOL and between the VHI and the VFI (e.g., Moghtader et al., 2019' Portone et al., 2007; Romak et al., 2014). These preliminary results are generally in agreement with prior reports. The relationship between the VHI and the VFI is less clear, as Moghtader et al. found a strong relationship between the two surveys with the exception of the third factor of the VFI.

Authors:

Mary Gorham-Rowan Melissa Carter Laura Mullis	

Title: ***EFFICACY OF STRAW PHONATION IN PREVENTION OF VOCAL FATIGUE IN TEACHERS***
Category: Voice Pedagogy

Abstract:

Objective: Vocal fatigue has been one of the major problems reported by professional voice users such as teachers. It affects significantly the teachers' phonation, and thus their teaching performance. Vocal warm-up exercises set out to prevent vocal fatigue. Although straw phonation, a kind of semi-occluded vocal tract exercise, has been commonly used as vocal warm-up; its preventive effect for vocal fatigue is still largely unknown. This study aimed to investigate the efficacy of straw phonation for the prevention of vocal fatigue in teachers in Hong Kong.

Methods: Thirty-two vocally healthy school teachers were recruited. They were randomly assigned to the Experimental (i.e. one-minute straw phonation in water) and Control groups (i.e. systemic hydration and 15-minute voice rest). Both groups performed a vocal fatigue-inducing task of 70-minute reading aloud. Outcome measurements of phonatory threshold pressure, voice sample recording, self-perceived phonatory effort and self-perceived voice quality were conducted before and after treatment, and after fatigue.

Results: Non-significant differences were found between the two groups for all outcome measures. Furthermore, no significant changes between the pre-treatment and post-fatigue timepoints in both the Experimental and Control groups, indicating both experimental and control treatment are effective in preventing vocal fatigue induced by fatigue task.

Comparable preventive effects were found between the Experimental group and Control group. Considering the time consumed for the preventive measures, straw phonation into water for one minute is considered more time-efficient than voice rest with hydration for 15 minutes. A larger-scale study is recommended to confirm the efficacy of the current straw phonation protocol.

Authors:

Crystal W.N. Yuen Elaine Y.L. Kwong	

Title: ***A LOW-COST APPROACH TO SOUND INTENSITY CALIBRATION IN RECORDING AND VOICE ACOUSTIC ANALYSIS***
Category: Speech Language Pathology

Abstract:

Objective: Vocal intensity has an important influence on the interpretation of various acoustic measurements. The calibration of a voice recording system (VRS) allows standardization of the recorded acoustic signal intensity (ASI) and consequently improves the usefulness of acoustic measurements. Objective: To describe the feasibility of VRS and ASI calibration with the "comparison method", using low cost and complexity equipment.

Methods: Methods: We used a calibrated Speech Weighted Noise (SWN) emitted by a loudspeaker at five different intensities (52-99dB(C)) and the voice recordings of a man and a woman while sustaining the vowel /a/ and counting in three subjective voice intensities (64-95dB(C)), all measured by a dB meter. Recordings were done with a manual digital recorder coupled to a headset microphone. The non-calibrated ASI measurements (dB) were extracted using Praat program.

Results: Results: For SWN, intensity captured by the dB meter were on average 24.6dB above results given by Praat. For the male/female vowel and speech, this difference was respectively 18dB and 22dB. SWN also presented the most constant values (SD 0.7-1.7) in the repetition of the stimulus, followed by speech (SD 0.3-1.9). The vowel phonations yielded the greatest variations (SD 0.9-6.4). Conclusion: SWN was the most stable signal for VRS and ASI calibration. This may be explained by the wide range of spectral speech configurations present in the SWN. Even so, connected speech samples may be an alternative for calibration in the absence of the SWN. The comparison method is a viable option for VMS and ASI calibration using lower-cost equipment.

Authors:

Marilia Sampaio Ruan Nascimento Alicia Silva Felipe Mascarenhas Meike Brockmann-Bauser	

Title: ***PER PERIOD TIMBRAL EVOLUTION OF VOICED ONSETS***
Category: Voice Pedagogy

Abstract:

Objective: Music perception literature has long identified three temporal phases of a sound: onset, steady state, and offset (Howard and Angus, 2017). These aspects of sound function as instrument-specific timbral signifiers (Saldanha and Corso, 1964). Recent work by Chen (2017) suggests important characteristics of vocal timbre are encoded at the timescale of a single period. This aligns with previous work by Gautereaux (2019), Howell (2016), Plomp (2002), Slawson (1985), and Winckle (1967), suggesting meaningful aspects of timbre exist exclusive of spectro-temporal fluctuations. This begs the question as to how timbre evolves per period from onset to steady state. When is the sound the vowel, and if it is something else prior to steady state, what is the nature of that timbral evolution?

Methods: Using single period extraction and duplication, concatenation, and spectral analysis, the per period timbral evolution of onsets is explored in two voices (male and female sex) and three onset qualities (breathy, balanced, and glottal). Intensity-weighted subband spectral centroid analysis of LTAS is used to chart the change in timbre from period to period until the first amplitude maximum is reached.

Results: Preliminary results suggest the first complete period of voicing occurs rapidly in the onset phase; the timbre profile of this period is very similar to the target vowel. Implications include refining the anticipated perceptual characteristics of different voiced onsets, comparing the spectral characteristics of different onset qualities, and further refinement of concatenation as a means to control for the temporal aspects of timbre exceeding the timescale of a period.

Authors:

Ian Howell Kayla Gautereaux Mark Tempesta Theodora Nestorova	

Title: ***WHY DO EXPERTS DISAGREE ABOUT THE VOCAL PHYSIOLOGY THEY HEAR?***
Category: Basic Science

Abstract:

Objective: This paper presents qualitative findings and meta-analysis of an investigative study, which saw 13 experts, of varied backgrounds, analyse physiology of vocal samples from around the world, using common vocabulary.

Methods: Participants included larynx surgeons, phoniators, singing teachers, voice scientists, three of them with non-Western musical expertise. They analysed vocal physiology in 19 samples of audio recordings of singing from a wide range of musical cultures. The analysis was performed employing an ontology of vocal production we suggested, which incorporated vocal source dynamics [Sundberg 1987], vocal physiology [Estill 2005, Hirano 1981, Harris 1988, Kayes 2013] and vocal registration debate [Henrich 2006, Roubeau 2009, Kob 2011]. Semi-structured interviews were conducted in which the participants used our ontological terms for the analysis, discussed the appropriateness and completeness of the terms, pointed out possible difficulties and contradictions and suggested improvements. Additionally, participants reflected on the study design overall and on the choice of musical samples.

A quantitative analysis showed that, while the acceptance of the study design was very high, no agreement between participants' judgements of vocal physiology could be demonstrated, with a tendency to agreement between experts' ratings only established for two out of 11 ontological descriptors (or 17 dimensions) [Proutskova 2018].

Results: In this paper we present our qualitative analysis of over 33 hours of interviews. Firstly, we summarise the discussion about the ontological terms, participants' concerns about their application and their improvement suggestions. We further lay out our meta-analysis, extracting common themes and confounding issues which point to the reasons for disagreement.

Authors:

Polina Proutskova Christophe Rhodes Tim Crawford Geraint Wiggins	

Title: ***In Vitro Analysis of Polymeric Microspheres Containing Human Vocal Fold Fibroblasts for Vocal Fold Lamina Propria Regeneration***
Category: Basic Science

Abstract:

Objective: Keywords: Alginate, Cell encapsulation, Cell therapy, Lamina Propria, Microspheres, Scarring, Vocal Folds

Objectives: The aim of the present study was to evaluate the feasibility of using microspheres (Ms) containing human vocal fold (VF) fibroblasts to induce lamina propria (LP) regeneration.

Introduction: Material injection is a frequently used strategy to treat injured or dysfunctional VF-LP. The regeneration function of this strategy is compromised because injectable materials may be rapidly cleared by the mononuclear phagocyte system after injection. The morphology of Ms capsules helps to reduce the immune response, allowing the therapeutics it contains to remain in the body for a longer time period.

Methods: Methods: Electrospraying and layer-by-layer assembly of polyelectrolytes were used to fabricate Alginate-Poly-L-Lysine-Alginate and Alginate-Chitosan Ms. The optimal loaded cell concentration of the Ms was determined based on the morphology and integrity of the Ms. MTT assays were used to monitor the viability of the cells after incubation with Ms for 48 h. To evaluate the immunoprotection of the microspheres, the concentration of IL-18, IL-4, and IL-1B was determined using ELISA

Results: Results: An homogeneous size distribution, and a spherical morphology were obtained. Mechanical tests showed that alginate Ms were the toughest. None of the three configurations of Ms compromised the viability of fibroblasts. Human VF fibroblasts encapsulated in alginate microspheres induced the production of interleukin IL-8 and IL-4 at 24 hours.

Conclusions: Microspheres for the encapsulation of hVFF cells were fabricated and evaluated for possible application to promote VF regeneration. Alginate microspheres were found to have significant potential as cell delivery tool. They were resistant to mechanical challenges. They were found to be friendly to hVFFs. They reduced the expression levels of IL-1β, and thus they may provide cell immunoprotection.

Acknowledgements: The National Institutes of Health is acknowledged for providing funding for this research through grant DC-005788 (Mongeau, PI).

Authors:

Alicia Reyes Guangyu Bao Luc Mongeau	

Title: ***Changes to the Female Singing Voice During Puberty: A Review of the Literature***
Category: Voice Pedagogy

Abstract:

Objective: For voice instructors with female adolescent students, puberty can be an arduous journey, and elicits a multitude of physical changes to the female voice. It is vital for a vocal pedagogue to understand the changes the adolescent female voice is experiencing and how it will impact their student's singing voice. Although there is a significant amount of research detailing the effects puberty has on the male singing voice, resources on the impact of puberty on the female singing voice are exceedingly limited. There is a substantial need for additional resources detailing the changes the female voice undergoes throughout puberty and the effects it will have on the singing voice, for voice instructors.

Methods: Current research and scientific findings support the adolescent female's ability to sing through puberty without harming her voice, yet some voice teachers are hesitant to teach adolescent females despite this research. A thorough review of the literature across various fields and sources, will be conducted and reported to expand our knowledge of the female adolescent singing voice, and to support vocal pedagogues working with these voices.

Results: TBD

Authors:

Emily Sobieski	

Title: ***PRE AND POST OPERATIVE VOICE THERAPY: FACTORS INFLUENCING A COMPLEX INTERVENTION***
Category: Speech Language Pathology

Abstract:

Objective: Objective

- To understand the factors influencing pre and post-operative voice therapy content.

Phonosurgery for benign vocal fold lesions (BVFLs) demonstrates positive acoustic, perceptual and quality of life outcomes. Research suggests that Voice Therapy (VT) delivered pre and post-operatively can improve outcomes. However, what constitutes VT in this population is poorly understood and documented. Outlining treatment schedules for VT in BVFLs is an important precursor to effectiveness research.

Methods: Semi-structured interviews were conducted with ten expert voice therapists from multidisciplinary voice clinics in England. Participants described the typical content, timing and intensity of intervention for patients undergoing phonosurgery for BVFLs. Variations in practice and views on optimum intervention were explored. The Framework Method,was used to facilitate analysis.

Results: Four themes described the factors contributing to variation in VT. 1) Pathophysiological factors included the type of lesion, the extent of surgical resection and the presence of scarring or tethered mucosa. 2) Patient factors related to an individual’s goals, vocal requirements, motivation and compliance in addition to their precipitating factors. 3) Therapist factors related to a clinician's experience with BVFLs and their understanding of wound healing, epithelial mobilization and motor learning theory. Finally, 4) service factors included the strength of the multidisciplinary team, referral processes, access to surgical information and issues around capacity. Participants described the intervention in detail, with significant areas of consensus, such that a comprehensive picture of pre and post-operative VT emerged. Further consensus work and patient involvement to ensure acceptability of an agreed intervention is now proposed. Subsequent proof of concept and effectiveness studies can then ensue.

Authors:

Anna White Paul Carding	

Title: ***The Influence of Voice Training on Vocal Learners' Supraglottal Activities and Aerodynamic Evaluation***
Category: Voice Pedagogy

Abstract:

Objective: The Influence of Voice Training on Vocal Learners' Supraglottal Activities and Aerodynamic Evaluation

Methods: Methods: Twenty-three students from Xiamen Music School aged between 12 and 15 years utilized semi-occluded vocal tract exercises for their voice training. All students were confirmed to be without organic voice disorders by a laryngologist. Strobolaryngoscopy and aerodynamic examination were performed every 6 months for 18 months. Using the laryngoscope images of the students, anterior-posterior compression and medial-lateral compression were analyzed. The aerodynamic examination used labial interruption to measure maximum phonation time, phonation threshold flow, glottal resistance, subglottal pressure, phonation threshold pressure and vocal efficiency. From these measurements, the mean was calculated along with a measurement of reliability. The results were analyzed over the length of the study by repeated measures ANOVA.

Results: Results: Referring to the Strobolaryngoscopy Evaluation Rating Form, 4 of the 17 students had decreased anterior-posterior compression scores in the second measurement compared to the first (from 2.24±0.20 to 2.12±0.17, p = 1). After completion of the program, 6 of the 17 students' anterior-posterior compression scores further improved from the second measurement (from 2.12±0.17 to 1.71±0.17, p =0.043). In addition, there was an improvement of maximum phonation time (p =0.004).

Conclusion: Professional voice training can improve the condition of supraglottal activities and maximum phonation time. These parameters have potential to be used for voice training evaluation and screening.

Authors:

Peiyun Zhuang Pinhong Wu Logan Klein Nicole Haderlein Austin Scholp	Xinlin Xu Liming Huang

Title: ***PRE AND POST-OPERATIVE VOICE THERAPY FOR BENIGN VOCAL FOLD LESIONS: A SYSTEMATIC SCOPING REVIEW***
Category: Speech Language Pathology

Abstract:

Objective: 6500 individuals undergo phonosurgery in England each year to remove benign vocal fold lesions (BVFLs). Emerging evidence suggests that outcomes can be improved if adjunct voice therapy accompanies phonosurgery. However, there is little description of the intervention delivered making it impossible to compare or combine outcomes from studies or understand the relative impact of therapy compared to surgery.

Objectives

- To map the available evidence regarding voice therapy schedules for pre and post-operative voice therapy.

- To identify the behavior change interventions used in interventions to understand the mechanism by which change in patients occurs.

Methods: The protocol for this systematic review followed the PRISMA-P guidelines. A systematic search of CINAHL, Embase and Medline identified articles which investigated voice/surgical outcomes after phonosurgery for BVFLs where discussion of voice therapy content, timing or duration was included. Quality was assessed using the Joanna Briggs Critical Appraisal tools and risk of bias where appropriate was assessed. Articles were scrutinized for detail regarding the content, timing, intensity and behavior change mechanisms employed in pre and post-operative voice therapy.

Results: Results: Of the 432 articles identified, 35 met the inclusion criteria and were included in the review. 5 were RCTs, 2 were individual cohort studies, 2 were case control studies and 26 were case series. There was considerable heterogeneity in participant characteristics. Information was frequently lacking regarding the content timing and intensity of the reported voice therapy intervention, and where present, interventions were highly variable.

Conclusions: Reporting in relevant literature is limited in all aspects of content, timing and intensity of intervention. Further intervention development work is required to develop a robust voice therapy treatment intervention for this population, before effectiveness work can commence.

Authors:

Anna White Rehab Awad Paul Carding	

Title: ***MULTI SENSORIAL IMAGERY STRATEGY FOR THE MIX VOICE LEARNING: A PRELIMINARY STUDY WITH FEMALE SINGERS***
Category: Voice Pedagogy

Abstract:

Objective: Cognitive science literature reveals that mental imagery can be used in a variety of sensory stimuli. This article aims to study a multi sensorial imagery strategy as a sensory stimulus for the mix voice teaching and learning purposes, producing measurable results . It's our desire to verify the efficiency of this strategy as a pedagogic tool in the teaching of female singing students on how to mix.

Methods: For this exploratory research, ten (10) students of singing, women, from 15 to 35 years old, were invited to perform the same singing exercise 2 times. The exercise chose was in a "1 8 5 3 1" model, in which the number 1 represents a middle note of their range (depending on the vocal range of each student) and 8 represents a middle to high note of their vocal range. At the first time, they were asked to perform the exercise only with the singing example of the teacher, without any imagery instruction. In a second time, they were asked to repeat it after being instructed with an imagery stimulation that puts together kinesthetic, auditory and visual imagery at the same stimulus. The spectrum of both performances was recorded and, then, compared.

Results: The results reveal significant differences between the 2 performances, suggesting that multi sensorial imagery strategies can extract concrete results from the students, improving the quality of the mix sound produced by them and helping them to make a better connection between their mind and body through the senses.

Authors:

Maíra Jaber	

Title: ***HEALTHY SINGING PRACTICES: AN ANALYSIS OF BODY MAPPING IN VOCAL PEDAGOGY***
Category: Voice Pedagogy

Abstract:

Objective: Through this study, I will investigate the effectiveness of Body Mapping education for undergraduate-level voice students. In doing so, I intend to explore the importance of Body Mapping as a foundational component of healthy singing to develop an effective somatic pedagogy for voice teachers. Singers are unique in that their instrument is their body. As such, having a clear foundational understanding of one's body can provide musicians with a deeper understanding of the practice of singing, leading to enhanced performances, heightened personal discoveries, and reduced instances of injury.

Methods: Undergraduate singers studying at Ontario universities will be recruited to participate in this study and divided into an experimental and control group. Panelists will also be recruited, who must have experience as a vocal pedagogue, Body Mapping Educator, or both. The two student groups will perform a pre-assigned English piece of music, after which the experimental group will participate in a Body Mapping course led by a Licensed Body Mapping Educator. Both groups will perform the piece a second time, one group having received Body Mapping training and one having not. The students will self-report their ease of singing after each performance through a mixed-methods survey and will also have both of their performances evaluated by a panel. By combining students' self-reported findings with panel observations, I will describe the effectiveness of Body Mapping as an aspect of vocal pedagogy.

Results: Results TBD.

Authors:

Sarah Stapleton	

Title: ***THE EFFECT OF AURAL MODELING ON VOWEL VS. CONSONANT DURATION IN UNDERGRADUATE WESTERN CLASSICAL SINGING***
Category: Voice Pedagogy

Abstract:

Objective: This empirical study measured the effect of repeated exposure to recorded aural models on the vocal production of undergraduate singers studying the Western Classical style. In an effort to evaluate the legato singing style valued in the Western Classical tradition, this study measured the duration of vowel phonemes vs. the duration of consonant phonemes. Research was conducted at Southwestern University, a private liberal arts institution in Georgetown, Texas.

Methods: Study participants were divided into two groups. The control group performed a newly-composed melody after a recorded aural model of the melody was played a single time. The experimental group completed 10-minute listening assignments once a day for a five-day period before performing the same melody. Data between non-listening and listening groups was compared.

Listening assignments were adapted from a speech pathology remediation technique known as auditory bombardment. Participants were instructed to listen to multiple repetitions of the recorded aural model without attempting to practice singing the melody. Aural models were recorded by professional opera singers in a non-soundproofed voice studio using a Marantz CDR111 recording device and a matched pair of Earthworks cardioid microphones. All participant recordings were recorded in the percussion studio in the Sarofim School of Fine Arts at Southwestern University.

The amount of time that each singer spent articulating each phoneme was marked in Praat by the primary investigator. Bearing the 8.5-millisecond margin of error in mind, these durational measurements were analyzed to compare the amount of time spent articulating vowels and consonants in the samples. A ratio of time spent articulating vowels vs. consonants, henceforth Ratio of Vowels vs. Consonants (RVC), was calculated for each audio sample. RVC is defined as the sum of the duration of all vowel sounds divided by the sum of the duration of all consonant sounds.

Results: A comparison of the RVC values between subject groups yielded a difference in favor of the experimental Group (post-listening, Group B). For this acoustic measure, the aural model singers set a consistent standard, with the female model singer demonstrating an RVC of 4.03 and the male singer demonstrating an RVC of 4.46. Group B, with an average RVC of 3.69 (stdev. 0.73), demonstrated a higher average RVC value (longer vowels and shorter consonants) than Group A, for whom the average RVC was 3.04 (stdev. 0.64).

It is notable that the difference in mean RVC between the two groups (0.65) is approximately the size of one standard deviation138 for this acoustic measure. As 70% of the values of any given dataset fall within one standard deviation, a difference larger than one standard deviation indicates that the change observed between groups is sizeable and warranted statistical analysis. In addition, Group B yielded RVC values closer to those demonstrated by the model singers than Group A. Singers in Group B also demonstrated an RVC closer to the mean RVC value for the aural models than the singers in Group A.

A normalized accuracy value and RVC metric were created for the above data set, and a T-test was performed to determine statistical significance using the SPSS software program. The differences between Group A and Group B were determined to be 105 statistically significant with a sig. value of .026, indicating that members of Group B demonstrated RVC values significantly closer to those exhibited by the aural model singers.

These data suggest that undergraduate students of singing in the Western Classical style in which a connected, legato vocal phrase is desired, exhibit a demonstrable response to targeted periods of listening to aural models, specifically with regards to the length of time they spend phonating on vowel vs. consonant phonemes.

Authors:

Dana Zenobi	

Title: ***Resonance Tube Therapy in Individuals with Parkinson's Disease: Clinical Trial***
Category: Speech Language Pathology

Abstract:

Objective: Objective: to test the effect of Resonance Tube Therapy on vocal quality and voice-related quality of life in individuals with Parkinson's Disease.

Methods: Method: This study was approved by Bauru School of Dentistry, University of São Paulo, ethic committee (protocol2.820.942) and all data baseline and post assessment measures were completed at the Laboratory of Voice at Bauru School of Dentistry, University of São Paulo. Fourteen participants (10 male, average=66,1 years old; 4 female, average 73,7years old) with Parkinson's disease with hypokinetic dysarthria (average disease duration 6.4 years; MOCA average = 24.95) completed this prospective clinical trial. All the participants completed three assessment: baseline (M0), after 30 days without treatment (M1) and post four weeks of voice therapy with tube phonation (M2). The assessment visits included measurement of vocal intensity using a sound pressure level meter along with perceptual and acoustic vocal analysis and voice-related quality of life protocol (VR-QOL). The voice was recorded in an acoustically treated room. It was asked to the participant the vowel /a/ emission at a habitual pitch and loudness (three times) for 5 seconds. The recorder equipment used was a professional audio editing software, Sound Forge version 7.0 with a 44.1-Hz sampling rate, monochannel, 16-Bit microphone AKG, model C 44 PP, interfaced to a computer with Creative Sound Blaster model Audigy II. The perceptual voice analysis was performed by a blind three judges who analyzed the randomized voices in pairs (vowel /a/, M0xM1; M1xM2; M0xM2), compared (voice AxB) and then decided which voice was better considering the general quality of voice. The PRAAT software (version 6.0.04; https://www.fon.hum.uva.nl/praat) was used to complete acoustic analysis (parameter: Cepstrum Proeminence Peak soft - CPPs) from the central 3 seconds of all vowel /a/ emissions. The mean of the three /a/ sounds was used. The tube phonation therapy consisted of 8 sessions, 4 weeks (twice a week), 45 minutes which was completed face to face. A resonance tube (27cm by 9mm) and a box (12cm x 12 cm x 15cm) with water were utilized during treatment. The tube was kept between the teeth, the lips rounded and the free end into the water (about 2cm under the surface for sessions 1 to 4, and 9cm for the sessions from 5 to 8). The participant phonated /u/ making bubbles into the water. The therapy mixed exercises and conversation. ANOVA test (p<0.05) was applied to compare the results before (M)/M1) and after training (M0/M2; M1/M2).

Results: Results: There was significant improvement in vocal intensity as measured by SPL meter after therapy (M0/M2) (p=0.021) and improvement in the general grade of vocal quality (p=0.049) when compared without therapy (M0/M1). There was no significant difference in CPPs after resonance tube therapy. The VR-QOL protocol showed better values after therapy in all aspects: physic (p=0.023 M1/M2); emotional (p=0.003 M0/M2) and total (p=0.006 M1/M2).

Conclusion: Resonance tube therapy improved the vocal intensity level and vocal quality of individuals with Parkinson's disease. In addition there was improvement of quality of life after the resonance tube therapy.

Authors:

Ana Paula dos Santos Jhonatan Vitor Michelle Troche Fabio Barbieri Giedre Berretin	Alcione Brasolotto Kelly Silverio

Title: ***RELATIONSHIP BETWEEN VOCAL SYMPTOMS AND VOCAL HANDICAP INDEX IN UNIVERSITY PROFESSORS***

Category: Speech Language Pathology

Abstract:

Objective: University professors are voice professionals susceptible to vocal risks, mainly due to the environmental and organizational work conditions in which they are exposed. Such professionals have limited prominence in studies about voice, therefore, there is little evidence about the level of vocal risk of these teachers in specific. The aim of this study was to verify whether university professors with and without vocal symptoms differ in the self-perception of vocal handicap index and to evaluate the relationships between vocal symptoms and voice handicap index.

Methods: Cross-sectional, observational, analytical study. 126 university teachers participated without previous vocal complaints and a sociodemographic questionnaire, the Voice Symptoms Scale (VoiSS) and the reduced Voice Handicap Index (VHI-10) were applied. Professors were classified into two groups according to the cutoff value of the VoiSS: a vocal healthy group with a total score of 15 points or less (G1) and a group of vocal symptoms with 16 points or more (G2). Of the 126 teachers, 71 were women and 55 men, with an average age of 43 years. G1 was formed by 41 teachers (23 men and 18 women), and G2 by 85 (32 men and 53 women). The subscales of the VoiSS were compared and correlated with the VHI-10. The Mann-Whitney test was used to compare the groups and the Spearman correlation test was used to correlate the protocols. The analyzes were performed in the Statistical Package for the Social Sciences, version 25.0. For the interpretation of the magnitude of the correlations, the following classification was adopted: correlation coefficients <0.4 (weak magnitude correlation), ≥ 0.4 to <0.5 (moderate magnitude) and ≥ 0.5 (strong magnitude). The level of significance adopted was 5% (p <0.05).

Results: The G1 mean in the VoiSS was 5.18 (SD ± 3.49) for limitation, 0.05 (SD ± 0.21) for emotional, 3.93 (SD ± 2.71) for physical and 9.16 (SD ± 4.24) for the total score, and the G2 mean was 19.96 (SD ± 7.04), 2.18 (SD ± 3.16), 8.62 (SD ± 3.07) and 30.77 (sd ± 10.24) for the scores of the limitation, emotional, physical and total domains, respectively. The mean for the VHI-10 in G1 was 0.82 (SD ± 1.11) and 5.76 (SD ± 3.97) for G2, both below the cutoff suggested by the literature of 7.5 points[8]. G2 presented perception of vocal symptoms, for all domains of the VoiSS, and self-perception of vocal handicap index significantly higher than G1 (p <0.001). A significant positive correlation was found between the limitation (r = 0.858; p <0.001), emotional (r = 0.641; p <0.001) and total (r = 0.837; p <0.001) domains of the VoiSS with the VHI-10, and significant positive moderate correlation between the physical domain of the VoiSS and the VHI-10 (r= 0.441; p<0.001). University professors with greater reference to vocal symptoms have a higher perception of vocal handicap index. In this population, as vocal symptoms increase, the vocal handicap index increases. Such findings reinforce the need for vocal promotion and prevention in the studied population, in addition to a clinical speech therapy view more directed at these professionals.

Authors:

Gabriel Depolli Djanira Fernandes Karen Cruz Wilson Fernandes Jonathan Rodrigues	Michelle Guimarães

Title: ***TOWARD THE DEVELOPMENT OF VOCAL INJURY PREVENTION MODEL: A LITERATURE REVIEW***
Category: Speech Language Pathology

Abstract:

Objective: Teachers are at high risk of developing a vocal injury. However, the model for preventing the injury has not been clearly defined. The goal of this presentation is to report our findings from a systematic literature review with a particular focus on 1) the prevalence of vocal injury within teaching populations, and 2) the effectiveness of prevention methods for voice disorders. We will also propose a novel prevention model for vocal injury, which was developed based on prevention models for sports injury.

Methods: We conducted a systematic literature review using the following databases: Google Scholar, PubMed, and Research Gate, focusing on literature published after 2010. Key search terms included "voice disorders," "risk factors," "prevention," and "teachers." The review focused on identifying the disorder prevalence across a range of teaching populations. For the effectiveness of the prevention efforts, the review focused on different types of prevention methods (e.g., vocal hygiene, voice training, voice amplification).

Results: Despite the continued efforts in the past decades, the risk of developing voice disorders remains high among teachers. Elementary education teachers and music teachers may have greater vocal load, making them even more susceptible to vocal injury than other teaching populations. Sports injury prevention models include a player's skill level, health, and environment as risk factors for an injury. The health and environment of the teachers have been identified as risk factors for vocal injury; however, whether their vocal skill contributes to the risk is unclear.

Authors:

Arianna Bastys Su Hyun Lee Malinda Mullet Keiko Ishikawa	

Title: ***INCIDENCE OF LEMG FINDINGS FOR VOCAL FOLD PARESIS IN VOICE PATIENTS WHO PLAY WIND INSTRUMENTS, EITHER PAST OR PRESENT***
Category: Medical

Abstract:

Objective: To study incidence and patterns of vocal fold paresis as measured by Laryngeal Electromyography (LEMG) in voice patients who have studied wind instruments.

Methods: Patients who had a history of playing one or more wind instruments, who had played an instrument for a minimum of 1 year, including those who played in elementary through middle school only, and those who played during their entire musical careers, provided the LEMG data for the study. LMG had been obtained because it was suspected clinically, and data were reviewed retrospectively. The control group was comprised of singers, teachers, athletes, and other professional voice users who had never played a wind instrument but were diagnosed with vocal fold paresis and underwent LEMG. Other variables assessed included gender, age, career designation, singer/non-singer, and other diagnoses (e.g., Myasthenia Gravis). All subjects in the study were under the care of the same physician who also performed the LEMG testing. Currently, N = 89 (includes wind instrument players (n = 37) and control cases (n = 52). Additional cases (wind instrument data and control data) will be added to the data set through April, 2021.

Results: Currently, the study indicates that wind instrument players, past and present, may experience the same levels of decreased nerve recruitment that non-instrumentalist singers do when presenting with paresis. There were no significant differences in recruitment comparing the subjects who had a history of playing a wind instrument with those who did not. However, when the subjects who had a history of playing a wind instrument were extracted and investigated, the data indicated patterns of loss of superior laryngeal nerve recruitment (measured by testing the right and left cricothyroid muscles) that were decreased further if the instrument player was also not a trained singer. The instrument most commonly played by the subjects in the study was clarinet (n = 18), followed by 7 flute, 6 high brass, and 3 each of double reed and low brass. Twenty-eight of the subjects were female and 9 were male. The average age of the subjects was 27 years. The wind instrumentalists also trended towards not being diagnosed with laryngeal Myesthenia Gravis as frequently as non-instrumentalist voice patients.

It is not known whether laryngeal nerve paresis affects instrument performance, or whether playing an instrument affects or contributes to development of vocal fold paresis. Recent pedagogical concerns about laryngeal tension and vocal fold trauma from playing instruments in low-skilled players suggest a possible causal relationship between wind instrument playing and dysphonia, but not paresis specifically. Gender and voice training may be important variables. Anecdotal evidence from wind instrumentalists who haave reported difficulty singing with vibrato or having a limited range may be related to these findings, and the emerging data from this current study may support the findings from an earlier study of 352 wind instrumentalists (Trollinger, 2019) that showed statistically significant relationships between their instrument and the musicians' lack of confidence in singing, greater voice fatigue, and in having no high voice. The interaction of all of these variables and their effects on those who sing and play a wind instrument needs further study.

Authors:

Valerie Trollinger Giath Alnouri Robert Sataloff	

Title: ***Immediate Effect of the Application of Transcutaneous Electrical Nerve Stimulation Associated with Vocal Exercises in Dysphonic Women***
Category: Speech Language Pathology

Abstract:

Objective: Objective: to analyze the immediate effects of Transcutaneous Electrical Nerve Stimulation (TENS) performed in different moments of a vocal therapy session.

Methods: Method: This study is a cross-over, experimental, and prospective approved by the ethics committee institution (protocol 3.288.587) conducted between February 2019 and November 2019 at the city of Bauru/São Paulo. Female participants with behavioral dysphonia diagnostic and aged between 18 and 50 years old were included in this study. The outcomes assessment with vowel /a/ and connected speech were auditory-perceptual analysis of overall degree, breathiness, roughness, strain, and instability through visual analogical scale (VAS); and fundamental frequency (F0) jitter percent (jitt), shimmer percent (shimm), noise-to-harmonic ratio (NHR), and soft phonation index (SPI) with Multi-Dimensional Voice Program (KatPentax). The outcomes assessment was done before and after both procedures, PA and PB. Participants performed TENS in both moments: (procedure A - PA) TENS before vocal exercises or (procedure B - PB) TENS after vocal exercises, whereas the simple randomization determined the first procedure application. Hence, after a one-week washout, participants performed the opposite procedure. TENS application procedure (20 minutes): participant laid in the supine position, frequency pulse = 10Hz, symmetrical biphasic quadratic pulse with 200 ms duration phase, and at the motor threshold intensity. The electrodes were positioned on the upper fibers of the trapezius muscle (bilaterally) and on the submandibular region. The vocal exercises applied were: tongue trill, humming, Lax Vox Technique, and finger kazoo. These exercises lasted 20 minutes. The intragroup and intergroup results were analyzed with the paired t-test (p<0.05).

Results: Results: Thirty female (average age = xx) participated in this study. The intragroup analysis for the vowel /a/ revealed: increase of breathiness (PA: p<0.001; PB: p=0.017), a decrease of strain (PA: p=0.011; PB: p<0.001), and an increase of instability (PB=0,033), a decrease of F0 (PB: p=0.002), an increase of jitt (PB: p=0.028), and an increase of SPI (PA: p=0.004; PB: p<0.001). The connected speech intragroup analysis revealed: an increase of overall degree (PA: p=0.049), an increase of roughness (PA: p=0.018), an increase of breathiness (PA: p=0.013; PB: p<0.00), and a decrease of strain (PB: p<0.001). The intergroup analysis revealed: higher variance of breathiness (p=0.001) and NHR (p=0.001) for PB.

Conclusion: Both moments of TENS performance decreased the strain parameter in vowel /a/ auditory-perceptual analysis. However, only PB decreased this parameter in connected speech. Furthermore, the results revealed a higher variation of breathiness and NHR for PB, which is probably related to the decrease of strain in this procedure. Thus, we suggest that TENS should be performed after vocal exercises when treating women with behavioral dysphonia.

Authors:

Gabriela Moura Angélica Antonetti Larissa Siqueira Ana Paula dos Santos Jhonatan Vitor	Alcione Brasolotto Kelly Silverio

Title: ***Workplace Psychosocial and Vocal Health Promotion Program among college professors***
Category: Speech Language Pathology

Abstract:

Objective: Background: Previous studies have reported that teachers have an increased likelihood of reporting voice disorders, stress, anxiety, and depression. Therefore, workplace health promotion programs are needed to decrease the occurrence of these health problems. Objective: To determine the effect of the implementation of a workplace vocal and psychosocial Health Promotion program among college professors.

Methods: Methods: Quasi-experimental study, with a longitudinal - correlational design. A questionnaire will be filled in before and after of the implementation of the program to determine voice functioning, work-related stress, anxiety, and depression. The Workplace Vocal and Psychosocial Health Promotion Program will be implemented in 5 sessions that will cover information related with reduction of stress and healthy voice use, among other concepts.

Results: Expected results: We expected to have a better voice functioning, and reduced work-related stress, anxiety, and depression after the implementation of the program.

Authors:

Leidy Forero Suárez Lady Cantor Cutiva	

Title: ***Voice Fatigue and Changes After Increased Rate of Speech as A Vocal Loading Task***
Category: Speech Language Pathology

Abstract:

Objective: Objective: Rate of speech (ROS) is often reported to be higher than average in professional voice users such as radio/video jockeys, news readers etc. This study aimed to explore the impact of altering ROS (a non-conventional vocal loading task) on voice parameters in normal adults.

Methods: Method: Twenty healthy adults (10 male & 10 female) volunteered to participate. Two reading tasks (with 20% & 40% increased ROS from their baseline) were employed using metronome. Changes in voice was estimated before and after each task using vocal fatigue index (VFI) and self-reported voice symptoms (visual analogue scale). ANOVA and paired t-test was used to compare the effects of pre, post & recovery measures (after a period of one week) of altered ROS.

Results: Results: Participants reported significant self-perceptual changes in voice on both tasks. VFI scores increased significantly in males [Part 1=12.8 (SD 12.54) & Part 2=3.1 (SD 3.47)] after 40% increase in ROS. On comparing baseline and post loading vocal symptoms, significant difference were observed in tiredness ($p = 0.00$), strain ($p = 0.04$), dryness ($p = 0.01$) and throat pain ($p = 0.02$). However, all the vocal symptoms were temporary and recovered back to baseline after a period of rest.

Conclusion: Findings suggest that alterations in ROS could induce voice fatigue related changes in healthy adults. Further, the study suggests the use of increased ROS as a vocal loading task to assess professional voice users such as radio/video jockeys and call centre operators, who are often required to speak at a higher ROS.

Authors:

Lakshmi Maya Venkitachalam Aishwarya Nallamuthu Prakash Boominathan	

Title: ***Association of Mindfulness with Perceived Singing Voice Function Among Singers***
Category: Speech Language Pathology

Abstract:

Objective: Objective: Mindfulness has been described in the psychology literature as a state of nonjudgmental accepting awareness of one's moment-to-moment experience. Many studies have found that mindfulness techniques (i.e. meditation) promote better physical and mental health, and some evidence suggests that regular meditation is correlated with lower psychological distress and anxiety. These findings contribute to the increasing interest in mindfulness across many healthcare fields. Several studies suggest that mindfulness and relaxation practices may provide clinical benefits when used as a supplement to traditional treatment in a range of communication disorders including stuttering and aphasia. However, to our knowledge, there are no studies which have examined the relationship between mindfulness and vocal function. It is relevant to determine whether a relationship between mindfulness and vocal function exists, given the observed association between psychosocial distress and voice disorders, and the aforementioned benefits of mindfulness.

The objective of this study will be to examine the relationship between singers' level of mindfulness and their perceptions of their current vocal function associated with singing. We hypothesize that greater mindfulness attainment will be associated with a more positive perception of singing voice function. Knowledge of this relationship would be valuable to vocal health professionals, teachers, and singers to better evaluate the potential for mindfulness techniques to support optimal vocal function for singing.

Methods: Design: We propose a cross-sectional survey to examine the relationship between mindfulness level and singers' perceptions of their voice function.

Methods: An online survey will be distributed to individuals between 18 and 60 years of age who self-identify as a professional singer or an amateur singer with at least 3 years of voice lessons, and we will collect information about mindfulness level, vocal function, demographic information, and supplementary questions. The survey will include the Freiburg Mindfulness Inventory (FMI), a psychometrically sound 30-item scale to measure an individual's mindfulness level, and the Evaluation of the Ability to Sing Easily (EASE), a 20-item scale to assess singers' perceptions of the current vocal function. We will also collect demographic information and responses to supplementary questions such as age, gender, singing experience, perceived vocal load over the past 24 hours, self-reported voice problem, and meditation experience. We aim to collect data from at least 40 participants.

Results: Results: Means and standard deviations will be calculated for the Freiburg Mindfulness Scale and the EASE scores, and the results will be compared using statistical and regression analysis. We will also use demographic information and supplementary questions (age, gender, singing experience, perceived vocal load over the past 24 hours, self-reported voice problem, and meditation experience) to act as controls in our study and assess whether mindfulness or other factors are driving the results.

Authors:

Alexandra Schenck Jonelyn Langenstein Michiel Bove Caroline Price	

Title: ***CULTIVATING A SUPPORTIVE PRESENCE: A TRAUMA-INFORMED APPROACH TO VOICE CARE***
Category: Voice Pedagogy

Abstract:

Objective: Whether from societal stressors, such as a global pandemic or systemic oppression, or from individual wounds of abuse and disconnection, a significant number of voice users have experienced trauma. In moments of stress, the body reacts with involuntary nervous system responses meant to armor us against danger. If habituated, these patterns may result in excess muscle tension, dysfunctional breathing, articulation difficulty, anxiety, or other impacts. Treating these symptoms as "vocal faults," without recognizing them as natural physiological responses to stress, risks fostering an environment where voice users feel shamed—directly or indirectly—for the ways in which their bodies have protected them against threatening experiences in the past.

Acknowledging that working with bodies means working with trauma, how can we honor the lived experiences of our clients, provide a compassionate environment, and maintain scope of practice? A critical first step is attuning to the attitude of ourselves as practitioners, exploring what emotions or sensations we are bringing into the space, and how they facilitate connection. We can access our inner resources—physical and emotional cues that ground us in the present moment—so that we can be present in a manner that is supportive of our clients.

This workshop will provide information on how trauma impacts the voice and how present-moment orientation facilitates an environment of co-regulation. It will also offer accessible practices to help both practitioners and clients increase their capacity to contain emotional intensity. In this way, we honor the dignity of every body, every voice, and its innate resiliency.

Methods: N/A

Results: N/A

Authors:

Megan Durham Elisa Monti Heleen Grooten	

Title: ***WORD BECOMES FLESH: ACTING TECHNIQUES FOR REDISCOVERING THE PHYSICAL NATURE OF LANGUAGE & BRINGING WRITTEN TEXT TO LIFE IN READING, ORATORY, AND PERFORMANCE***
Category: Voice Pedagogy

Abstract:

Objective: Professional actor and voice coach Acacia Danielson takes you inside the actor's studio to learn how to bring the words on a page to life. Every act of speech is an act of incarnation, the enfleshing of a thought, image, or idea into the sensible realities of sound, space, and gesture. Writing helps us preserve language and thought, but it can also deaden the impact of the spoken word. Each act of performance is a "resurrection" of language confined to a page, a rediscovery of its living and active quality. Come explore the nature of language and practice simple techniques drawn from theatrical and rhetorical training methods to make reading poetry, prose, drama, and oratory aloud a more invigorating act of communication.

Methods: N/A

Results: N/A

Authors:

Acacia Danielson	

Title: ***Restoring Balance Post Heavy Voice Load: Vocal Cool Down***
Category: Voice Pedagogy

Abstract:

Objective: Objectives: To return balance and unloading muscle tension post heavy voice load and hyper-functional singing through vocal cool down.

In this workshop, principles and techniques for cooling down and unloading muscle tension post heavy voice load and hyper-functional singing in musical theatre will be explored in a hands-on demonstration with the audience participation. We understand that vocal warm up exercises are essential for developing healthy vocal function. There is no debate that athletes and dancers warm up and cool down to prepare, improve performance and prevent injury. Singers are 'vocal athletes' needing warmups to improve the performance, endurance and prevent injury as well. However, 'vocal athletes' tend to overlook cooling down as a necessary aspect of maintaining vocal health. The injury prevention aspects cool-downs offer are essential to maintaining good vocal health and return balance to the laryngeal muscles. Participants in this workshop will enhance their pedagogical skills and teaching performance in working with musical theatre singers.

Methods: Methods: The use of cool down exercises, including massage, relaxation exercises, tongue stretches, SOVT's and soft floaty five tone scales to return balance to voice.

Results: Results: The expected results project the singer will maintain good vocal health and prevent injury.

Conclusions: Singers are 'vocal athletes' needing cool downs to improve the performance, endurance and prevent injury.

Authors:

Edrie Means Weekly	

Title: ***Manual therapy for voice disorders: Appreciating the complexities of a seemingly simple model***
Category: Basic Science

Abstract:

Objective: Manual therapy (MT) has been used as an intervention strategy for voice disorders since the early 1990s. How MT entirely influences voice and voice disorders, however, is unclear. While it is perceived to impact excess muscle tension locally, there are enough competing narratives to question such simplistic explanations. This workshop aims to explore those narratives and put forth a blended model of impact, one that includes both local, tissue-based effects, as well as neurocentric and behaviorally based understandings. For those using manual therapy or other approaches, understanding multifactorial explanation allows a broader vision of how change is fostered in the treatment of voice. Evidence for such an approach will be provided. A self-guided hands-on component will be included in this workshop.

Learning objectives would include:

Expose the learner to the many explanations for how manual therapy can impact voice.

Provide the learner with a broader model that allows acceptance of existing evidence models while including SDM from a BPS perspective.

Provide opportunities to experience self-driven treatment.

Methods: Virtual workshop with hands-on learning

Results: N/A

Authors:

Walt Fritz, PT	

Title: ***MYOFASCIAL RELEASE AS A THERAPEUTIC MODALITY FOR TREATING JAW AND TONGUE TENSION IN SINGERS***
Category: Speech Language Pathology

Abstract:

Objective: Maladaptive compensatory muscle tension is a common response to voice injury in singers. Muscle tension may also be a primary cause of voice disorders. Many singers struggle with muscle tension in the tongue and/or jaw, which are often locations for excessive effort in singing, unconsciously recruited to stabilize the larynx or assist in vocal control. Tension in the tongue/jaw can result in increased laryngeal effort.

Myofascial release (MFR) provides an effective treatment modality for addressing painful phonation, tissue tightness, and maladaptive muscle tension directly through manual manipulation, gentle pressure and stretching, and tissue movement.

Participants will:

Describe basic principles and theories of Myofascial Release (MFR).

Describe how mechanical pressure, stretch and stimulation of tissue is used to address muscle tension and/or tightness.

Identify 3-4 types of manual treatments that can be applied

Methods: Workshop format. The presenter will provide hands-on demonstration of various techniques and strategies for addressing muscle tension in the tongue/jaw (including TMJ) through the manual therapy modality known as MFR.

Results: Attendees will learn:

How/why MFR can be an effective treatment modality for remediation of pain, movement disorders and voice disorders.

Importance of collaborative process between clinician and singer in collecting history (e.g. patient directed evaluation and therapy).

How the clinician uses palpation to evaluate muscle tension and/or tightness.

Importance of patient validation in identifying relevant areas to target for treatment.

Different types of manual treatments that can be applied (e.g. cross or single handed, compression, gathering/lifting, traction, etc.).

Combining vocalization and standard voice therapy approaches with MFR.

Authors:

Leda Scearce	

Title: ***Let Diction Ring! Strategies for Effective Singer's Diction in the Studio, Classroom, and Choral Rehearsal***
Category: Voice Pedagogy

Abstract:

Objective: Let Diction Ring!

Strategies for Effective Singer's Diction in the Studio, Classroom, and Choral Rehearsal

This interactive workshop will investigate ways to bring the words we sing to life. Singers deliver the composer's musical representation of a poet's words. Singer's diction is much more than the mere pronunciation of those words. The words set to music are the raw materials of effective vocal performance. Every element of text contains opportunities for interpretation and expression. Efficient diction skills contribute to vocal health and healthy vocal performance. We will study the ways these elements reveal the deeper meaning of words and music for solo and choral singing in English, Italian, German and French. The workshop will include exercises that develop pronunciation skills in each language.

The strategies will be demonstrated through video recordings of student performances. Come prepared to delve into the world of poetry and song. The concepts are applicable to teaching in the private studio, the classroom and the choral rehearsal. Resources for further study are included.

Brenda Smith, DMA, Associate Professor of Music, University of Florida, 435 Newell Road, Gainesville, FL 32611, (352) 374-4855, bsmith@arts.ufl.edu

Methods: This is an interactive workshop that can be done on Zoom or in person. If on Zoom, I would provide videos of student lessons and performances.

Results: Results TBD

Authors:

Brenda Smith	

Title: ***TO TEACH OR NOT TO TEACH, STRATEGIES TO IMPROVE YOUR EXTREME VOCALS***
Category: Voice Pedagogy

Abstract:

Objective: The objective of this workshop is to learn how to produce extreme vocals with sounds that are familiar with the popular culture, based on sensory motor learning.

Methods: The present workshop will be based on modern vocal techniques strategies and it will be compound in 3 main parts:

Contextualization about the vocal drives: Definitions will be given, and information about how to avoid vocal injuries will be provided.

Access memories and distortions: Specific access memories for each distortion will be demonstrated). Practical voice exercises will be done, so that the listeners begin to develop their own skills to be able to access each of the vocal effects that will be proposed.

3) Work for each distortion: Exercises for the training of the proposed vocal distortions will be performed.

Results: Results: The expected results for this Workshop are that attendees will be able to recognize and train different types of vocal distortion. Also, to facilitate the production of vocal distortions proposed through the access memories. The listeners will be able to elaborate training routines of vocal distortions through the proposed exercises.

Conclusions: Training based on access memories facilitates the identification of vocal distortions. The effectiveness of the training is based on access memories. Teachers can give the knowledge to their students through the analysis of sounds that they already know and putting them in a musical context these strategies will reduce considerably the time of learning

Authors:

Nicolás Hormazábal	

Title: ***Use of a Vortex Whistle for Measures of Respiratory Capacity and Control - Update & Demonstration***
Category: Speech Language Pathology

Abstract:

Objective: This workshop will focus on a demonstration of the vortex whistle as a low-cost device by which airflow may be measured. The vortex whistle provides a tone which has a frequency proportional to the airflow moving through the whistle. We will demonstrate custom software that is able to capture the frequency of the vortex whistle tone and result in measures of both airflow and volume in a relatively "automatic" and user-friendly manner.

Methods:

A vortex whistle was designed using 3D modeling software and manufactured using a 3D printer with non-toxic, biodegradable polylactic acid (PLA). The digitized vortex whistle tone was analyzed using custom software to produce a flow vs. time contour, whose integral provides an estimate of the overall volume.

Results: This workshop will provide the following:

1. A brief review of the diagnostic value of measures of VC, FEV1, and PQ with the voice disordered patient.

2. A brief review of research which has established the validity of the vortex whistle.

3. Extensive demonstration of the use of the vortex whistle and our accompanying software that generates a flow contour and the subsequent integration of the flow curve that results in a measure of volume.

4. Demonstration of patient instructions and recording technique necessary to result in valid and reliable measures of airflow and volume.

5. Examples of normative data re: VC, FEV1, and PQ obtained using the vortex whistle.

Authors:

Shaheen Awan Jordan Awan	

Title: ***Aging Voice Therapy, Where does PhoRTE Fit?***
Category: Speech Language Pathology

Abstract:

Objective: Age-related voice problems (presbyphonia) negatively impact communication effectiveness and voice-related quality of life. Reduced loudness, increased vocal effort, and voice quality changes pose a significant challenge to occupational voice demands and remaining integrated socially for older adults. An efficacious behavioral approach known as Phonation Resistance Training Exercises (PhoRTE) has emerged as a vocal rehabilitation option for presbyphonia. PhoRTE - a homophone to the Italian word forte meaning loud and strong – consists of a series of vocal exercises targeting degenerative muscular changes of the respiratory and laryngeal systems through resistance exercise training.

Methods: This workshop will present a decision-making paradigm in managing aging voice through audio and video demonstrations, interactive discussions and hands-on experience. Using an efficacious behavioral approach known as Phonation Resistance Training Exercises (PhoRTE) as a vocal rehabilitation option for presbyphonia. PhoRTE - a homophone to the Italian word forte meaning loud and strong – consists of a series of vocal exercises targeting degenerative muscular changes of the respiratory and laryngeal systems through resistance exercise training.

Results: PhoRTE has demonstrated improved voice quality of life and reduced vocal effort following four weeks of exercise training in people with presbyphonia in two clinical trials (Ziegler et al, 2014 and Gillespie et al in preparation 2020). Clinicians will leave this workshop with a clear understanding factors that suggest exuberant voice therapy will be a useful tool in the treatment of presbyphonia.

Authors:

Aaron Ziegler Edie Hapner	

Title: ***TWANG AS A STRATEGY FOR HIGH NOTES PRODUCTION IN CCM SINGERS***
Category: Voice Pedagogy

Abstract:

Objective: The present workshop aims to demonstrate through specific exercises how twang sounds and how is capable to enhance high notes for CCM singers.

Methods: The workshop will be divided in three parts:

1) Brief presentation: Showing an image that explains what happen anatomically during twang. Specifically, what Titze found in his investigation about this technique. (5 minutes)

- A narrowing and shortening of the pharynx.

- A retraction of the tongue.

- A narrowing of the vocal tract.

2) Vocal exercises: Two volunteers will sing a CCM song chosen by themselves and then 3 exercises looking for twang. (20 minutes).

The strategies I will use are exercises like scales and slides that contains:

The vowel [i:] narrowing the mouth and lifting the tongue's root.

The consonant ŋ that produces a lower soft palate.

jaʊŋ sound, that creates vocal tract position for twang.

3) Negative practice and applying twang: They will be asked for produce a "breathy sound". Slides exercises with vowel [a:] will be used. (10 minutes)

Finally, participants will alternate between both vocal qualities (twang/breathy) first in an exercise and then in the same song they sang before twang exercise. (20 minutes)

Results:

Participants will explore twang as a tool through understanding the physiologic mechanic that produces twang, identify how it sounds, and experience an easy voice production to enhance high notes.

Twang is a good strategy for CCM singers. It promotes a bright sound, that is able to produce a loud voice without being detrimental for the vocal folds.

Authors:

Carolina Avilés	

Title: ***After Covid-19 Intensive Functional Voice Treatment***
Category: Medical

Abstract:

Objective: Complications of Covid-19 are important in the airways system.

There are symptoms like diminishing the capacity of column of air, the vocal fold flexibility,the changes in voice loudness and timbre.

Methods: 1.-Respiratory exercises with inspirometer, balloon and use of therapeutical band, after improving inspiratory strength and espiratory capacity and sustained column of air there are also vocal exercises.

2.-Therapeutical band and body movements for vocal fold flexibility.Humming exercises,triads,staccato and legato arpeggios with soft consonants like B,F,s and hard consonants like K P T Ch.

3.-Pianissimo exercises with therapeutical band.Crescendi and diminuendi vowel exercises.

4.-Placing exercises with therapeutical band using ng, m, n

Posture of body and head, support,

correct articulation and resonance are crucial.

Results: Suggestion to have a 15 minutes routine 3 times a day.

Authors:

Eugenia Chavez	

Title: ***SINGING BRAZILIAN JAZZ: A BETTER UNDERSTANDING OF THE VOCAL STYLE AND THE BRAZILIAN PORTUGUESE PRONUNCIATION*****.**
Category: Voice Pedagogy

Abstract:

Objective: The objective of this Workshop is to promote a better understanding of the main characteristics of Brazilian Jazz Vocal Style and to offer for non-Portuguese-speakers singers a way to sing it more confidently in its original language (Brazilian Portuguese).

Methods: In this worshop we will work with two Bossa Nova Style songs: Corcovado (Quiet Nights of Quiet Stars) from Antonio Carlos Jobim and Chega de Saudade (No More Blues) from Antonio Carlos Jobim and Vinicius de Moraes. After discovering the cultural context of these songs and some important Bossa Nova Vocal Style aspects, the participants will receive a quick instruction about the sound of the vowels and the consonants in Brazilian Portuguese, finding some similar sounds in English language. Finally, they will be challenged to explore these sounds into the two songs proposed.

Results: At the end of this workshop the participants will be able to know some important characteristics of the Brazilian Jazz Vocal Style and increase their Brazilian Portuguese pronunciation vocabulary, exploring these sounds into the songs.

Authors:

Maíra Jaber	

Title: ***UNLOCKING ARTISTRY: TRAUMA INFORMED VOCAL PEDAGOGY***
Category: Voice Pedagogy

Abstract:

Objective:

Voice teachers are not therapists, though there is an undeniable emotional component to our work with emerging artists. As rates of depression, anxiety, and emotional trauma continue to climb among undergraduate populations, it is inevitable that students' mental well-being will become a factor in their training.

How can voice teachers ethically engage in their students' emotional lives while remaining within their prescribed scope of practice?

While some teachers attempt to distance themselves from emotional work, we can no longer deny that as singing teachers, we are in the feelings business. It is therefore a moral imperative that teachers avail themselves of emerging research on trauma informed pedagogy and emotional intelligence.

Methods: Informed by the work of psychologists Peter Levine and Diane Poole Heller, and armed with data from the Yale Center for Emotional Intelligence, this session will lead participants through exercises in orientation and sensation tracking, two critical elements of somatically based trauma healing.

Results: By focusing on the nervous system process instead of the details of traumatic events, teachers can be empowered to create a safe container for students to begin to learn to process their emotions and unlock their innate artistry.

Authors:

Emily Jaworski Koriath	

Title: ***REAL-TIME MAPPING OF PHONATION ACROSS THE VOICE RANGE***
Category: Basic Science

Abstract:

Objective: Phonation is highly variable across all or even parts of the voice range, making it challenging to obtain a representative and reproducible assessment. We demonstrate how voice maps across f_o and SPL may facilitate such analysis.

Methods: The workshop video will demonstrate live mapping of selected voice metrics, including EGG contact quotient, peak dEGG, phonation stability including voice break detection, audio spectrum balance, and more. For the voice studio, there are several modes of visual feedback. For research work, FonaDyn is a multichannel acquisition and pre-processing front-end, with extensive preview facilities and simple script control. All outputs can be exported to signal files or text matrices, to other mathematics software.

Uniquely, the system 'learns' on the fly to categorize incoming or recorded EGG pulses; or, classifies them into previously learned categories. This lets the user rapidly explore the effects of arbitrary conditions; for example, changing vocal register, the acoustic load (semi-occlusion or vowel), or the volitional posturing of the larynx or of the respiratory system. The classification feature makes it easier to make comparisons pre-post intervention or inter-subject. Required: a low-noise electroglottograph with analog output, a good microphone, a high-end audio interface, and a fast computer. The software is freeware that runs on Windows and MacOS (Linux compilation is possible). Since the first TVF FonaDyn workshop in 2017, the software has developed considerably.

Results: We are eager to discuss how real-time voice mapping might be useful to clinicians and voice teachers. If you wish, download FonaDyn from www.kth.se/profile/stern.

Authors:

Sten Ternström	

Title: ***The Use of Rough Vocal Effects in Singing – How to Train Noises such as Distortions, Grunts, Growls, Screams, and Many Others in a Healthy Manner***
Category: Voice Pedagogy

Abstract:

Objective: This workshop will detail exercises allowing each participant to establish rough vocal effects in a sustainable and consistent manner that does not harm the voice.

Methods: Many genres and styles of music make use of intentional rough sounding vocal effects. While they may sound hoarse or harmful, they can be produced healthily and sustainably if performed with correct technique. In Complete Vocal Technique rough vocal effects are classified according to physiological activity, the audible sound, specific ways of teaching, and recommendations for use. Some effects typically used are:

Distortion (e.g. Janis Joplin in Piece of my heart or Metallica in Enter Sandman)

Growl (e.g. Stevie Wonder in Living for the City or Christina Aguilera in Fighter)

Grunt (e.g. Arch Enemy in My Apocalypse or Tom Waits in Hoist that Rag)

Rattle (e.g. Jennifer Holiday in I Am Changing or Jeff Buckley in Grace)

Creak and Creaking (e.g. Pink Floyd in One of My Turns or Pink in The One that Got Away)

Screams (e.g. James Brown in Brother Rapp or Halestorm in I Miss the Misery)

Results: All of these vocal effects can be learned, trained, combined, and performed in a healthy manner when controlled using specific vocal tract configurations added to healthy phonation types. Complete Vocal Technique has been pioneering pedagogical and research work within this area of teaching and singing for more than 30 years, with multiple publications in research outlets such as Journal of Voice and in books/apps in 10 languages. This workshop will give a brief introduction to the CVT approach to vocal effects and all participants will get a chance to try out the effects in their own voice and get familiarised with tips and tricks for how to work with these advanced singing techniques in a healthy way.

Authors:

Cathrine Sadolin Mathias Aaen	

Title: ***Cricothyroid Visor Maneuver (CVM): A New treatment protocol for Muscle Tension Dysphonia***
Category: Speech Language Pathology

Abstract:

Objective: Introduction:

Muscle tension dysphonia (MTD) is used as a clinical and diagnostic descriptive label for a diverse range of vocal fold behaviors caused by increased tension of the (para) laryngeal musculature. (1) MTD is one of the frequent complaints at voice clinics and between 10–40% of the patients at a voice clinic have MTD (2) Psychological, social, or physiological problems play the main role in the development of MTD (3). The intrinsic and extrinsic laryngeal muscles are responsive to emotional triggers and can easily become hypercontracted. The treatment of MTD has two main approaches, direct and indirect. Direct therapy consists of specific exercises to control and coordinate the different aspects of voice production, based on a broad multidimensional evaluation. (4, 5) CVM approach as a direct method shows potential to provide clinicians with an effective method for voice rehabilitation in the patient with MTD (6,7).

Methods: The course curriculum includes:

Muscle Tension Dysphonia (MTD) and types

The rationale behind the manual therapy.

Laryngeal examination

Bed-side diagnosis - things to listen for in the absence of a camera.

The subjects to be discussed include

- A detailed review of the functional anatomy of the larynx and the

Breathing apparatus,

- Referral criteria to an Otolaryngologist,

- Points in history taking,

The course demonstrates how “Manual” therapy can be used for: examination, diagnosis, treatment, and an additional tool to gather insights and understanding of the patient's perspective and concerns.

The course is based on lectures and experience in laryngeal examinations.

The aim of the course is the development of sensitive palpatory skills so that examination and treatment become “tissue specific” to the level of the individual muscle or joint.

The final aim: for participants to have a good knowledge and understanding of the laryngeal mechanisms, and to be able to physically examine the larynx to enable use of the Cricothyroid Visor Maneuver.

Once palpatory skills are at a satisfactory level, specific techniques become much more efficient, tissue specific, SAFE, and most important, can be tolerated by the voice patient.

Required equipment: Portable laryngoscope, laptop, audio amplifying room big enough for participants to move around for the practice part, sitting and/or lying (on plinths or on yoga mats on the floor, for breathing practice) and a patient bed.

The topics covered in detail will include:

3.1 Posture related voice problems

3.2 Supra-Hyoid mechanism

3.3 Floor of mouth,

3.4 Base of tongue,

3.5 The hyoid bone,

3.6 Thyro-hyoid mechanism,

3.7   Crico-thyroid muscles and joint and Visor mechanism

3.8   Inferior straps

3.9 Breathing mechanism.

- Beside the details of above mechanisms; the palpation and key points of palpation of the structures and manual therapy in detail will be discussed.

- Dependent on participants' experience, basic procedures will be practiced: puberphonia, Globus, diaphragmatic breathing.

- After learning of palpation, the method of manual therapy in detail will be said.

-Acoustic measurement and documentation of pre and post of each patient improvement.

Results: Results TBD

Authors:

Ali Dehqan Ahmad Abad	

Title: ***WHAT IS AUTHENTIC "CROSSOVER" SINGING?***
Category: Voice Pedagogy

Abstract:

Objective: When someone who has been trained to sing classical literature ventures into singing Contemporary Commercial Music styles, is the sound the same? Is understanding the style sufficient or does an authentic transition require a new use of the instrument from inside out?

When shifting from singing styles driven by finding specific resonance strategies and a definite use of the breathing mechanism to one that is always electronically amplified, are vocal behaviors the same? If they are not, how are they different?

Methods: This workshop will demonstrate one vocalist singing in a classical sound, a music theater sound and a pop/rock sound (all different) and will include discussion and demonstration of how the vocalist changes her sound.

Results: I will provide at least one vocalist to demonstrate online. If there is time, I may be able to work with two people.

Authors:

Jeannette LoVetri	