

Student Name: Karen Linker

Student Number: 2119760

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Why should voice teachers use SOVT Exercises (SOVTEs), are all SOVTEs equal, and should SOVTEs be used universally or selectively?

Part 1: Research, Evaluation and Strategy

My Reasons for this Research

As a CCM voice teacher, with a diverse portfolio of clients, I wish to enhance my knowledge and understanding of the theory and science behind the use of SOVTEs. Further, I'm interested to see if relevant literature can help me determine if all SOVTEs are equally effective for all my students, regardless of factors such as vocal ability, experience, repertoire, vocal health and age.

I introduce SOVTEs at the beginning of each of my lessons, so they are already a well-established tool within my teaching studio, but I hope that this research will enable me to:

- a) better explain the benefits to my students, thereby encouraging them to practise SOVTEs diligently and regularly between lessons;
- b) use SOVTEs more effectively and knowledgeably for students struggling with particular vocal issues or dysphonia;
- c) knowledgeably consider whether the SOVTEs I currently recommend are suitable universally, or whether I should create individual SOVTE regimes for each of my students.

What are SOVTEs?

SOVT stands for Semi Occluded Vocal Tract, and during exercises of this nature, the vocal tract is partly occluded (the cross-sectional area is reduced) and sometimes

lengthened during phonation. This occlusion and/or lengthening of the vocal tract occurs at one or more sites, namely, the lips, epilarynx (the supraglottal part of the larynx) and the velopharyngeal sphincter (the passage between the nasopharynx and the oropharynx).

Regardless of how the occlusion is formed (lips, tongue, hand, or with devices such as straws or tubes), the occlusion introduces a resistance that raises the intraoral pressure, leading to optimal vocal fold vibration. Intraoral pressure is the difference between the pressure in the mouth and the pressure in the atmospheric environment (Fuentes et al, 2015). The increase in intraoral pressure raises pressure above the glottis, and affects other pressures within the vocal tract (Hiljeh and Pinto, 2021).

SOVTEs raise supraglottal pressure, which causes a corresponding decrease of subglottal pressure, reducing pressure overall across the glottis (trans-glottal pressure), softening the force of phonation. The impact upon vocal fold configuration, and the corresponding reduction in trans-glottal pressure and force of phonation, eases stress on the vocal folds, whilst enhancing acoustic power, and creates an environment more efficient for voice production (Titze, 2014).

To appreciate how SOVTEs work, it is crucial to consider and understand the concepts of impedance and inertance, explained below. It is known that SOVTEs cause a beneficial increase in acoustic impedance (Story, Laukkanen, & Titze, 2000) and that some of the positive benefits of this impedance are an increase in acoustic energy with less effort (Titze and Laukkanen, 2007; Titze, 2009).

Impedance

Impedance of the vocal tract describes the resistance in the vocal tract, at supraglottal level, to the transmission of sound or “a measure of the ratio of oscillating pressure to oscillating flows at the entry to the vocal tract” (Titze & Abbott, 2012). Impedance can be altered by modifying various parameters of the vocal tract including its shape, length and the presence of occlusion.

There are two components to impedance of the vocal tract, reactive (stores acoustic energy) and resistive (dissipates acoustic energy).

The resistive component assists vibration of the vocal folds by changing the form of the mucosal wave and increasing the trans-glottic sound pressure level which is generated due to the retroflex resonance at the vocal folds (Laukkanen et al, 2011). Retroflux resonance is considered significant because it changes the pattern of vocal fold vibration, enabling better alignment and less stressful, more economic phonation. (Laukkanen et al, 2011; Laukkanen et al, 2008; Cordeiro et al, 2010; Siracusa et al, 2011).

The reactive component of impedance breaks down further into two types, compliance (hinders phonation) and inertance (moves the stored energy back into phonation). Reactive inertance is enhanced through the lengthening of the vocal tract, and the narrowing of the cross-sectional area of the vocal tract and an inertive vocal tract is considered to be more efficient and powerful for singing (Hijleh & Pinto, 2021).

Although I will not refer to it substantively for the purposes of this assignment, I was interested to read Rothenberg's work discussing the voice source in singing, and his opinion that a breathy voice, due to incomplete glottal closure, cannot develop the additional projective power that inertive vocal tract loading can produce (Rothenberg, 1981). This is something that I will research further and perhaps consider when I prioritise vocal exercises for students who have breathy voices and who may need to reduce or resolve breathiness, in order to take full advantage of the benefits of SOVTEs.

What are the Benefits of SOVTEs?

Mounting evidence supported by a vast body of work published on SOVTEs, some of which will be reviewed in this assignment, suggests that practical benefits include smoother transition between registers (particularly important for my less experienced students), reduction in the amount of breath pressure required to phonate with projection, good resonance, clear tone, and reduction or eradication of vocal strain and fatigue (pertinent to all my students, but particularly perhaps to those who are professional performers with a demanding performance schedule).

Are all SOVTEs equal and universal?

My research revealed many interesting studies which described and compared the value of various SOVTEs, and I will highlight several studies which I believe are of particular interest and have caused me to reflect upon my use of certain SOVTEs as a teacher.

The SOVTEs I use regularly are Nasal continuants, Straw phonation and Lip trills. A brief description of each exercise follows.

Nasal Continuants

Nasal continuants are produced by simultaneously lowering the soft palate, allowing air to pass through the nose, and blocking off in the vocal tract to prevent oral egression of air. There are three nasal continuants in English, namely /m/ (bilabial), /n/ (alveolar) and /ŋ/ (velar).

During articulation of /m/ air is blocked by firm closure of the lips, and the soft palate lowers, enabling air to flow into the nasal cavity. During articulation of /n/ the back of the tongue elevates and connects to the front section of a lowered soft palate, preventing oral egress of air and pushing air through the nasal cavity. During articulation of /ŋ/, the tip of the tongue is elevated and connects to the back of the upper teeth ridge, preventing oral egress of air and pushing air through the nasal cavity.

As mentioned below, my research has indicated that this SOVTE may not be useful, and I intend to replace it with an alternative SOVTE.

Straw Phonation

Straw phonation, brought to the forefront of SOVTE research by Titze (Titze, 2000; 2002; 2010), was derived from the long-standing practice of tube phonation, a type of SOVTE widely used by voice clinicians.

A straw is placed between the lips and a tight seal maintained whilst phonation takes place. The straw extends the vocal tract (the distance between the vocal folds and the lips). Straws of varying diameters and lengths may be used to alter resistance (Titze,

2000), either leaving the end of the straw open to air, or submerging it in water, the latter increasing resistance and therefore intraoral pressure.

Straw exercises are used by healthy singers as a vocal warm up, or in voice training to achieve a powerful, resonant sound. They are also used for dysphonia and vocal fold pathologies, including correction of common issues such as hypernasality and breathiness.

I recommend the use of straw phonation to my students, because I have long believed that this is the best vocal workout/warm-up, particularly if both narrow diameter and wider straws are used, with the distal end of the straw both in and out of water. I was hoping that my research would provide further guidance and/or confirmation that my use of straw phonation was appropriate for each of my students. As mentioned below, the studies I have considered have confirmed the benefits of straw phonation and also inspired me to carry out my own investigations with my students, to determine which diameter size straws and applications might be most beneficial for each of them, depending upon the amount of resistance that would best serve each student's vocal health and development.

Lip Trills

Lip trills are produced by closing the mouth and occluding the vocal tract at this site and then continually vibrating the lips whilst maintaining phonation. The singer must balance pressures across the lips and the vocal folds. The minimum pressure required to establish phonation (known as phonation threshold pressure or PTP) increases as pitch gets higher. The forced increase in lung pressure exercises the respiratory system (Titze, 2009).

I use lip trills as a standard warm up/warm down for all students at the beginning and end of lessons. My research confirmed the significant benefits of this SOVTE. Further, as mentioned below, my research informed me that this SOVTE can be combined with certain other SOVTEs, for even greater benefit.

Comparisons between SOVTEs

One of my research objectives was to find out whether there was a significant difference in the value of various SOVTEs, both generally, and for my students individually, depending upon factors such as their vocal training and experience, age, vocal health, voice type and usual repertoire.

Intraoral pressure

I reviewed a study which reviewed thirteen different types of semi-occluded vocal tract exercises, including phonation through different size straws, the use of voiced fricatives, nasal continuants, lip trills and tongue trills (Maxfield et al, 2015). This study measured the intraoral pressure created by each SOVTE (via flexible vinyl tubing inserted orally behind the semi-occlusion), and used the results to rank the usefulness of each SOVTE, according to the amount of intraoral pressure generated.

From the Maxwell study, I discovered that intraoral pressures vary significantly between SOVTEs and that some SOVTEs, for example the use of nasal continuants /m/ and /n/, produce very low intraoral pressure, calling into question the value and even the credibility of this exercise as a SOVTE. This was useful information, as I have long used nasal continuants as a form of SOVTE, but will now further research this specifically and likely replace this SOVTE with an alternative SOVTE. By contrast, the results of this study indicated that phonation through tubes and straws provided resistance comparable to or greater than glottal resistance in the majority of the study participants, resulting in a measure of intraoral pressure which confirmed the value of this SOVTE and its beneficial impact upon vocal folds and voice production.

Several studies on SOVTEs have attempted to organise SOVTEs into groups. One such study (Nix and Simpson, 2007) allocated SOVTEs to three categories: sustained semi-occlusion (straw phonation, sustained phonation of fricative and nasal consonants), oscillatory semi occlusion (lip trills and tongue trills) and transitory semi-occlusion or occlusion (semi vowels and voiced stop consonants). Although this work purported to examine the pharyngeal and laryngeal changes brought about by various types of semi-occluded posture, I didn't learn anything new from it, as the authors posed questions without offering answers, and the study did not demonstrate a scientific basis for their hypotheses about the benefits of SOVTEs. However, although I didn't find many answers in this study itself (perhaps because it was conducted in 2007 prior to much of

the literature now published on SOVTEs), the questions it raised were interesting ones, and I intend to continue my research, to see if later studies have provided answers.

Single or Secondary Source of Vibration

A more comprehensive study (Andrade et al, 2014) compared and categorised SOVTEs, depending upon whether they produced continuous air pressure from a single source of vibration (eg. straw phonation with distal end in air, humming and hand over mouth), or produced pulsating air pressure from two sources of vibration (eg, lip trills, tongue trills and straw/tube phonation with distal end in water). The study also considered the results of combining both types of SOVTE, for example by carrying out tongue trills with fingers over mouth. The Andrade study mentioned the same query I had pondered, namely whether all SOVTEs are equally beneficial for all singers; “Despite great progress made toward understanding the effects of SOVTE, there is still uncertainty with regards to which of the SOVTE methods is best suited for each person or voice problem” (Andrade et al, 2014, p. 590).

In the Andrade study, all twenty three participants (male and female), undertook seven SOVTEs, including soft tube exercises with tubes of varying lengths, straw exercises with straws of varying diameter, lip and tongue trills, humming, hand over mouth and humming and tongue trills combined with hand over mouth. A control exercise was set by means of the participants all producing an /a/ vowel at their most comfortable pitch and projection (termed “comfortable phonation”).

The study measured its results by looking at the contact quotient for each exercise. Contact quotient, (“CQ”), is a measurement of the percentage that the vocal folds come into contact during any glottal cycle. The study also considered the range of the CQ, referred to as the “CQR”, which is the distance between the highest and lowest CQs for each exercise. It was discovered that all SOVTEs increased fundamental frequency values (the frequency at which vocal folds vibrate in voiced phonation). However, it was also found that SOVTEs which added a secondary source of vibration (eg. tongue trills) to a single source of vibration (e.g. hand over mouth) moved through a larger range of CQ values, which produced not only a massage effect on the vocal folds, but also brought the fundamental frequency of speech closer to the lowering of the first vocal tract formant, resulting in a more efficient vocal fold vibratory cycle. The more extensive

variability in CQr, caused by more dramatic changes in intraoral pressure, suggested a stronger massage effect on the vocal folds, leading the study to conclude that SOVTEs with a secondary source of vibration should be recommended for patients with excessive tension of the extrinsic laryngeal muscles. I found this study immensely useful as the results were scientifically obtained and the findings were clear. I intend to recommend a new SOVTE, namely both hands over the mouth whilst lip trilling, to those of my students who exhibit excessive laryngeal tension.

SOVTEs according to Voice Type

Another study I found interesting was one which examined, via self-perception of the participants, the immediate effects of three semi occluded vocal tract exercises, namely phonation through a latex tube, phonation through a high resistance straw and phonation through a finger kazoo, with comparisons being made between the high and low voice groups. (Martinho, Constantini, 2020). The twenty six participants were divided into groups depending upon voice type, and all participants performed all the exercises randomly for three weeks, during which time they completed a self-assessment questionnaire. All participants reported that all the exercises were beneficial. I was interested to read that eleven of the twelve tenors and basses who took part felt that latex tube phonation was the most beneficial, and high resistance straw the least beneficial exercise for them. By contrast, the sopranos and altos felt that the high resistance straw was far more effective than either the latex tube or finger kazoo phonation. The study concluded that the impact of these different SOVTEs varied, depending upon type of voice.

This was interesting information, however I would not rely upon this study alone to alter my own use of SOVTEs, because the number of participants was quite low, and possibly not representative, the results were based only upon subjective individual assessment without any scientific measurement, participants were not required to carry out the SOVTEs with equal regularity or duration, and their perceptions of the impact of the SOVTEs were not unanimous. Nevertheless, reading the study has made me curious as to whether certain SOVTEs might be of particular benefit to singers, depending on voice

type, and this is something I will further explore. Overall, this study indicated that the use of both tubes and straws was beneficial for vocal exercise, reinforcing my own view that

straw phonation is an appropriate SOVTE to recommend, and leading me to consider the addition of tube phonation to the SOVTE regime of some of my male students.

SOVTEs for Contemporary Commercial Music (“CCM”) Singers

My research produced only limited information regarding the value of SOVTEs to CCM singers. This surprised me, as CCM covers several genres where extreme vocal production is used, eg Metal singing or the belt employed by singers of Musical Theatre, Rock and Pop and I expected to find a large volume of literature on the benefits of SOVTEs for CCM singers. Furthermore, the relevant studies I did find (Saldias et al, 2018; Portillo et al, 2018) used only one type of SOVTE method, and, accordingly, were of limited value, since there is compelling research, as previously mentioned, indicating that SOVTEs vary in the amount of intraoral pressure they generate, and that different SOVTEs therefore produce different vocal tract behaviour and results.

It would have been interesting to read a comprehensive study such as the Andrade study (Andrade et al, 2014), focusing on CCM singers. Although a recent study (Portillo et al, 2018), which compared the effect of SOVTE warm-up and traditional warm-up exercises in CCM singers, looked promising, it was of limited value to my research, as only a single SOVTE method (5mm straw) had been used for the comparison between physiological and traditional methods. Similarly the study carried out by Saldias et al (2018), only compared straw phonation in water alongside traditional exercise methods. The Portillo study concluded that there was no discernible difference in the benefit of either exercise for any of the participants. The Saldias study reported that straw phonation in water might be more effective to avoid vocal fatigue, but did not find a significant difference in the overall impact of this SOVTE as compared to the traditional open vocal tract warm up. These findings appear to be supported by the recent study of Manternach et al, (2020) which also cast doubt on there being any significant difference in the benefit of SOVTE exercises versus traditional exercises for Musical Theatre singers. I was somewhat surprised by the findings of these studies.

Ageing Voices

I hoped to find a substantial body of work discussing the effect of SOVTEs upon the aging voice. Initially I was unable to find anything beyond cursory and unsubstantiated suggestions in unpublished works, suggesting that SOVTEs could be beneficial for older singers, but after purchasing an article from the Journal of Speech, Language and Hearing, and reading the results of a study conducted to evaluate the impact of straw phonation on elderly participants (Wu and Chan, 2020), I discovered a greater body of work, which I now intend to access and review, post this assignment, to further extend my understanding of how SOVTEs might benefit my students over the age of sixty. This study, which measured its results via speech software and participant self-perception, concluded that straw phonation in water was beneficial for all participants over the age of 60, but that the benefits were modest, and that further study over a longer period was required to reach better conclusions. I will continue to search for a study that scientifically measures the impact of SOVTEs on ageing voices.

Conclusion

I have ascertained from my research that the benefits of SOVTEs may not be universal and equal for all singers, and I consider therefore that I should offer a wider variety of SOVTEs to my students and ask them to indicate (utilising the same self-perception methods employed in several of the studies mentioned above) which SOVTEs they feel are most effective for them. In this way they can contribute to creating a personal SOVTE regime which will be of maximum benefit to them.

I reviewed the reports and studies above, together with a considerable volume of other relevant literature, which I have not had space to discuss within this assignment, hoping to obtain information that I could use to refine my own use of SOVTEs in my teaching practice. I have long recommended to my students a combination of nasal continuants, lip trills and straw phonation exercises. I have recommended these SOVTEs more or less universally, save that with some of my younger students I have focused on straw phonation and added kazoo phonation, because younger singers tend to find these SOVTEs easy and fun to do, and are therefore more likely to practice them in between lessons, which enhances their vocal development and health. My research on this topic has made me re-evaluate which SOVTEs I should use and also given me cause to reflect upon whether I should create individual SOVTE regimes for each of my students, based upon each student's physiological and vocal features.

Part 2: Reflection on Learning and Personal Development Plan:

Reflective practice requires consideration of practice experiences, reviewing them critically, to gain a better understanding of current practice, leading to improvement of future practice, thereby embarking upon a process of life-long learning (Finlay, 2008).

I began this process by considering the two types of reflection identified by Schön (Schön, 1983), namely 'reflection in action' (thinking while doing) and 'reflection on action' (retrospective thinking). As a professional singer for several decades, I have learnt much of what I now know to be good vocal technique and good vocal health "on the job". As an events singer, sometimes performing as many as 200 events a year, I have experimented with techniques and exercises, which have helped my vocal delivery and vocal health, and I have also identified mistakes, for example, not warming up sufficiently or efficiently (reflection in action). In my current role as a teacher, I have reflected upon that experience to try to promote good vocal health and performance amongst my students. On the other hand, my reflection upon the literature I have discovered has enabled me to theoretically underpin some of my experiences as a performer and teacher. As a teacher, I feel a responsibility to my students to understand the theory behind the methods and techniques I teach, and so I have in recent years devoted much of my time to this pursuit of better knowledge and understanding of the voice, and how best to nurture and train it, including enrolling upon this Masters Course (reflection on action). One important contribution to vocal health is the undertaking of appropriate and effective vocal exercise, and I wanted to learn more about the benefits of SOVTEs, which I have recommended to my students as a matter of good practice and on the basis of my personal experience of their benefits, but without a deeper understanding of the underlying science and theory.

As a musician, but one who had a first career in law, I have realized from my review of the reflective practice literature that I suffer from "Imposter Syndrome". This condition is discussed in works by Clance and Imes (1978) and Clance and O'Toole (1989), and the concept resonates with me, because even when my students achieve exceptional results, I often surmise that these successes cannot be attributable to my teaching

because I don't consider my knowledge and experience to be thorough enough. I have realised from my research of SOVTEs that I can improve and enhance all aspects of my existing knowledge and practice, by taking time to research and evaluate the literature available and making the effort to understand the theory and vocal science that underpins much of what I teach. I believe that having undertaken the research for this assignment, I know much more about the true value and impact of SOVT exercise, and I will immediately share this knowledge, in various ways, with my students.

As regards my chosen topic of SOVTEs, although I already use and recommend these to my students, I wanted to dive much deeper into the theory and science behind their common use. I hoped my research would move me away from "single loop learning" to "double loop learning" (Argyris ,1974). I now see that single loop learning has driven my recommendation of SOVTEs to my students, because I have taken it for granted that they will produce the exact same benefits for all. By digesting, critiquing and questioning the studies on SOVTEs I am trying to move towards double loop learning, and hope that my review, critique, and subsequent decisions about how best to proceed in my own practice, will improve my teaching skills and enhance the experience of students in my studio.

I realised early on into my research that the volume of literature on the use of SOVTEs is vast, and that I could not possibly read, review and critique it all. Initially I wondered if this would make my research redundant, or even irresponsible – what if I missed something and was therefore reaching conclusions without all the evidence to hand? What if I misunderstood some of the very science-based explanations involved in the studies that I had managed to find and read? I am confident about sharing information based upon my own personal experience and practice, but analysing and explaining relevant theories and science is more onerous and challenging. As I began to work my way through some very difficult literature and study reports, my confidence in my ability to digest and teach the relevant information began to diminish. I had already read the various materials suggested on reflective practice and so I was able to keep these in mind as I carried out my research. As I pondered the challenges of digesting some difficult literature on my chosen topic, I found it helpful to consider Schön's theory of the 'swampy lowlands' (Schön, 1983) which the everyday practitioner inhabits, and this helped me to see that my research and determination to understand and repackage my learning would help my students, and that even if I was not teaching from "high hard

ground”, my bringing these exercises into their everyday practice would still be of value to them. I concluded from reading Schön’s model that even if I did miss something along the way during my research on SOVTEs, by embarking on this research at all, I was becoming more expert in my practice as a teacher and that this was far preferable to me continuing to teach SOVTEs mechanically, without investigating the science behind their use, as presented in the studies I was considering. Further, I considered that commencing this research would not only enhance my current state of knowledge, but would also help identify further gaps in my knowledge of this important topic, and that such greater knowledge and understanding of the topic, even if incomplete, could assist me to ask better and more searching questions, to further explore and understand the benefit and best application of SOVTEs. In other words, I can effectively work in “swampy lowlands”, thinking about what and how I am teaching my students, and continuing to grow and improve as a teacher by applying helpful theory, obtained from the “high hard ground”, to my practice (Schon, 1983).

In addition to considering how Schön’s views could guide my reflective practice, I considered Driscoll’s approach of answering three questions to reflect upon the value of my learning: ‘What?’ ‘So What?’ and ‘Now What?’ (Driscoll, 2007). The ‘What’ and ‘So What’ concepts helped me to navigate the enormous volume of literature on my topic, and to try to stay on track as regards the enquiries I had framed for myself. The ‘So What’ lead me to the action plan below.

Personal Learning and Development Plan

Why am I doing this course	I want to underpin my teaching methods with a solid understanding of vocal anatomy and function, based upon vocal science, theory and good practice, to make me a better voice teacher.
What is the direct benefit to me	Undertaking this study has already improved my knowledge of vocal pedagogy, and its completion will make me a better teacher and also a better singer myself, the latter enabling me to demonstrate techniques more effectively and impressively to my students and to inspire

	them to seek better vocal development and health. My greater knowledge will improve my self-belief as a responsible and credible voice tutor.
Developmental Area	Action
Further enhance and improve my knowledge and understanding of the benefits and all SOVTEs	Research and read further into the enormous body of work on this topic and carry out regular update searches thereafter to ensure that my knowledge and practice remains up to date. Deadline: Ongoing task.
Reconsider the types of SOVTEs recommended in my teaching studio and apply what I've learnt about the value of certain SOVTEs to certain voices to my practice	Create and undertake with my own students a study, based upon their self-perception, to evaluate further the benefits of different SOVTEs for each student. Consider the results of the study to assist determining an appropriate SOVTE regime for each student. Deadline June 30 2022 Create a confidential table identifying voice types, characteristics and vocal faults/issues for each student and use, in conjunction with information obtained from study above, to devise individual SOVT exercise regimes. Deadline June 30 2022
Be more proactive as a teacher in encouraging use of SOVTEs amongst my students.	Procure stainless steel straws of appropriate dimensions for students. Dedicate 5 minutes of each student's lesson to appropriate selection of SOVT exercises, based upon individual student needs and requirements.

	Deadline 30 April 2022
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Bibliography

Andrade, P. A., Wood, G., Ratcliffe, P., Epstein, R., Pijper, A. and Svec, J.G. (2014). Electroglottographic Study of Seven Semi-Occluded Exercises: LaxVox, Straw, Lip-Trill, Tongue-Trill, Humming, Hand-Over-Mouth, and Tongue-Trill Combined With Hand-Over-Mouth. *Journal of Voice*, 28(5), pp.589–595.

Argyris, C. and Schön, D.A. (1974). *Theory in Practice : Increasing Professional Effectiveness*. San Francisco, Calif.: Jossey-Bass.

Clance, P.R. and Imes, S.A. (1978). The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention. *Psychotherapy: Theory, Research & Practice*, 15(3), pp.241–247.

Clance, P.R. and O'Toole, M. (1989). Review of The complex secret of brief psychotherapy. *Psychotherapy: Theory, Research, Practice, Training*, 26(2), pp.259–259.

Cordeiro, G.F., Montagnoli, A.N., Nemr, N.K., Menezes, M.H.M. and Tsuji, D.H. (2012). Comparative Analysis of the Closed Quotient for Lip and Tongue Trills in Relation to the Sustained Vowel /ε/. *Journal of Voice*, 26(1), pp.e17–e22.

Dargin, T.C. and Searl, J. (2015). Semi-Occluded Vocal Tract Exercises: Aerodynamic and Electroglottographic Measurements in Singers. *Journal of Voice*, 29(2), pp.155–164.

Driscoll, J. (2007). *Practising Clinical Supervision: A Reflective Approach for Healthcare Professionals*. Bailliere Tindall and Elsevier.

Finlay, L. (2008a). Reflecting on 'Reflective practice'. *Practice-based Professional Learning Paper 52*. The Open University.

Fuentes, R., Engelke, W., Flores, T. and Navarro, P. (2015). Description of Intraoral Pressures on sub-palatal Space in Young Adult Patients with Normal Occlusion. *International Journal of Clinical and Experimental Medicine*, 8(8).

Guzman, M., Laukkanen, A.-M., Krupa, P., Horáček, J., Švec, J.G. and Geneid, A. (2013). Vocal Tract and Glottal Function During and After Vocal Exercising With Resonance Tube and Straw. *Journal of Voice*, 27(4), pp.523.e19–523.e34.

Laukkanen, A.-M., Horáček, J., Krupa, P. and Švec, J.G. (2012). The effect of phonation into a straw on the vocal tract adjustments and formant frequencies. A preliminary MRI study on a single subject completed with acoustic results. *Biomedical Signal Processing and Control*, 7(1), pp.50–57.

Laukkanen, A.-M., Titze, I.R., Hoffman, H. and Finnegan, E. (2008). Effects of a Semi occluded Vocal Tract on Laryngeal Muscle Activity and Glottal Adduction in a Single Female Subject. *Folia Phoniatrica et Logopaedica*, 60(6), pp.298–311.

Martinho, D.H. da C. and Constantini, A.C. (2020). Efeitos imediatos de exercícios de trato vocal semiocluído em vozes graves e agudas: estudo sobre a autopercepção. *CoDAS*, 32(5).

Maxfield, L., Titze, I., Hunter, E. and Kapsner-Smith, M. (2014). Intraoral pressures produced by thirteen semi-occluded vocal tract gestures. *Logopedics Phoniatrics Vocology*, 40(2), pp.86–92.

Nix, J.P. and Simpson, C.B. (2007). Semi-occluded vocal tract postures and their application in the singing voice studio. *The Journal of the Acoustical Society of America*, 121(5), pp.3087–3087.

Pinto, C. and Hijleh, K. (2021). of Teachers of Singing Realizing the Benefits of SOVTEs: A Reflection on the Research. *Journal of Singing*, 77(3), pp.333–344.

Portillo, M.P., Rojas, S., Guzman, M. and Quezada, C. (2018). Comparison of Effects Produced by Physiological Versus Traditional Vocal Warm-up in Contemporary Commercial Music Singers. *Journal of Voice*, 32(2), pp.200–208.

Rothenberg, M. (1981). *Rothenberg, M. The Voice Source in Singing. Research Aspects of Singing, Pub. No. 33 of the Royal Swedish Academy of Music, Stockholm, pp. 15-31, 1981.*

Saldías, M., Guzman, M., Sandoval, G., Vergara, C., Lizana, J. and Quezada, C. (2019). Water Resistance Therapy as Vocal Warm-Up Method in Contemporary Commercial Music Singers. *Folia Phoniatrica et Logopaedica*, 72(1), pp.1–12.

Schön, D.A. (1983). *The Reflective Practitioner : How Professionals Think in Action.* New York: Basic Books.

Siracusa, M. das G. de P., Oliveira, G., Madazio, G. and Behlau, M. (2011). Efeito imediato do exercício de sopro sonorizado na voz do idoso. *Jornal da Sociedade Brasileira de Fonoaudiologia*, 23(1), pp.27–31.

Story, B.H., Laukkanen, A.-M. and Titze, I.R. (2000). Acoustic impedance of an artificially lengthened and constricted vocal tract. *Journal of Voice*, 14(4), pp.455–469.

Titze, I. (2010). Introducing a Video for Using Straw Phonation. *Journal Of Singing*, 66(5), pp.559–560.

Titze, I., Laukkanen, A., Finnegan, E. and Jaiswal, S. (2002). Raising Lung Pressure and Pitch in Vocal warm-ups: the Use of flow-resistant straws. *Journal of Singing*, 58(4), pp.329–338.

Titze, I.R. (1988). The physics of small-amplitude oscillation of the vocal folds. *The Journal of the Acoustical Society of America*, 83(4), pp.1536–1552.

Titze, I.R. (1996). Lip and tongue trills _what do they do for us? *journal of singing*, 52(3), pp.51–52.

Titze, I.R. (2000a). Phonation into a Straw as a Voice Building Exercise. *Journal of Singing*, 57(1), pp.27–28.

Titze, I.R. (2000b). *Principles of Voice Production.* Iowa City, Ia: National Center for Voice and Speech.

Titze, I.R. (2006). Voice Training and Therapy With a Semi-Occluded Vocal Tract: Rationale and Scientific Underpinnings. *Journal of Speech, Language, and Hearing Research*, 49(2), pp.448–459.

Titze, I.R. (2009). Phonation Threshold Pressure Measurement With a Semi-Occluded Vocal Tract. *Journal of Speech, Language, and Hearing Research*, 52(4), pp.1062–1072.

Titze, I.R. (2014). Bi-stable vocal fold adduction: a mechanism of modal-falsetto register shifts and mixed registration. *The Journal of the Acoustical Society of America*, 135(4), pp.2091–2101.

Titze, I.R. and Katherine Verdolini Abbott (2012). *Vocology the science and practice of voice habilitation*. Salt Lake City, Utah National Center For Voice And Speech.

Titze, I.R. and Laukkanen, A.-M. (2007). Can vocal economy in phonation be increased with an artificially lengthened vocal tract? A computer modeling study. *Logopedics Phoniatrics Vocology*, 32(4), pp.147–156.

Wu, C.-H. and Chan, R.W. (2020). Effects of a 6-Week Straw Phonation in Water Exercise Program on the Aging Voice. *Journal of Speech, Language, and Hearing Research*, 63(4), pp.1018–1032.