Voice Therapy - Wednesday 30th augustus 2017 – 15h -15h45
WS11

PEVOC 2017

Auditorium Horta, ground level



EVIDENCE-BASED PRACTICE APPLIED TO VOICE THERAPY

LIÈGE université

ULV
Unité Logopédie de la Voix
WWW.logopedie-voix.be

CHU de Liège

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PLAN

1. **Is our therapy efficient?**
   - ✳ Evidence-Based Practice *(Sacked, 2002 - ASHA)*
   - ✳ How I became a vocologist?
   - ✳ Levels of evidence
2. **How to implement Evidence-Based Practice in our practice?**
   - ✳4 steps
     - Framing the clinical question
     - Finding evidence
     - Assessing evidence
     - Clinical decision-making
3. **What I mean by manual therapy?**
   (Video clip with Catherine Jansen, Vocologist at Liège CHU, Comments Dominique Morsomme, Video Editing: IFRES, ULg)

HTTP://WWW.ASHA.ORG/RESEARCH/EBP/

- EBP is the integration of **clinical expertise**, **patient values**, and the best research evidence into the decision making process for patient care.

1. **Clinical expertise** refers to the clinician's cumulated experience, education and clinical skills.
2. The **patient** brings to the encounter his or her own personal preferences and unique concerns, expectations, and values.
3. The **best research evidence** is usually found in clinically relevant research that has been conducted using sound methodology.

(Sackett D, 2002)

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SATTERFIELD & AL (2009)

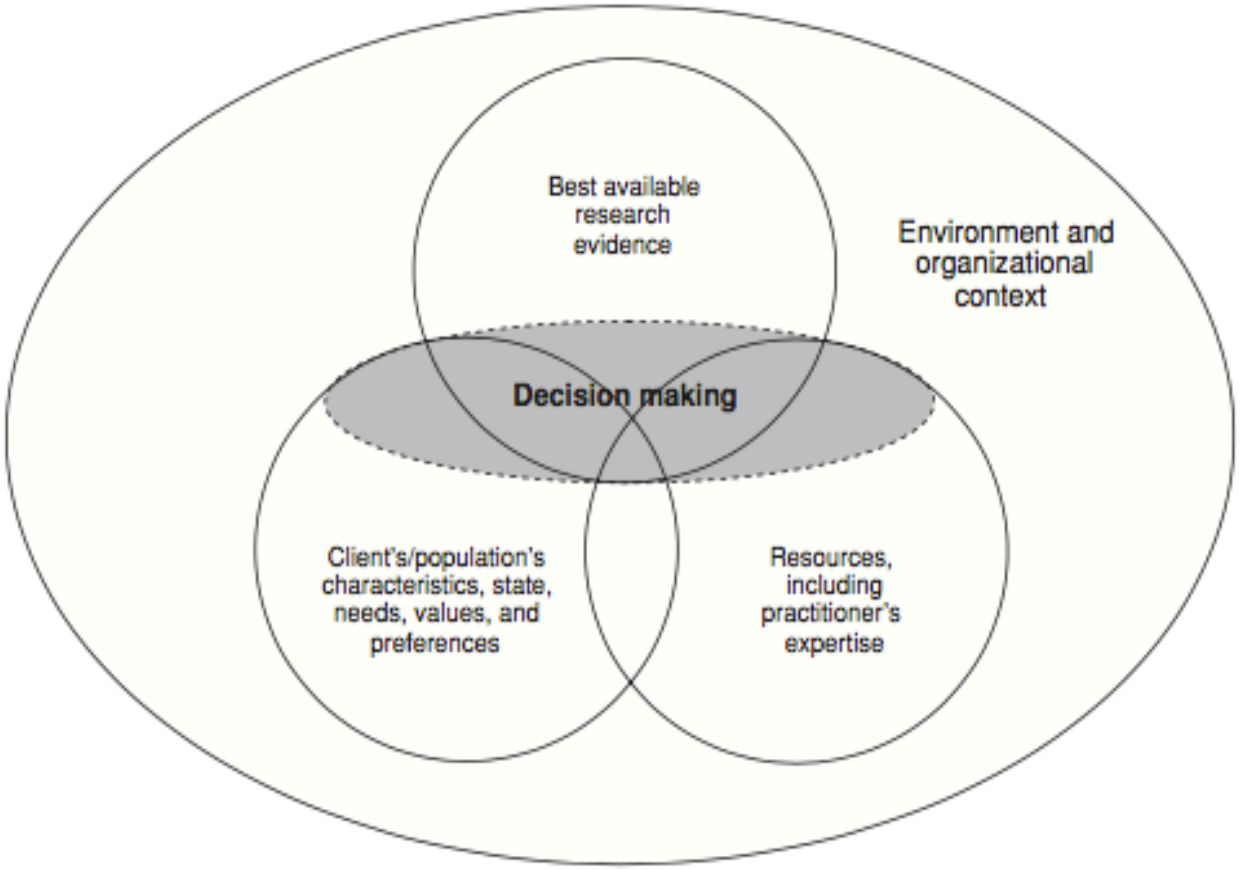

FIGURE 5. Our Revised EBP Model

CLINICAL EXPERTISE

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PREFERENCES AND VALUES OF EACH PATIENT

- *« Preferences can be complex because the triggering attributes are multifaceted; these include one's values, culture, abilities, resources, knowledge of options, social networks, etc. »*
- *« Preferences are further influenced by past experiences, the present context, and a consideration of the future; as such an individual's preferences are dynamic and may change over time. »*
- Reference: https://www.va.gov/nursing/ebp/docs/DefiningPatientPreferencesCurriculum_www.pdf)

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IS OUR THERAPY EFFICIENT?

- Few studies
- Cochrane data base, systematic review:

Comparison of speech and language therapy techniques for speech problems in Parkinson's disease

New search | Review | Intervention

Clare P Herd, Claire L Tomlinson, Katherine HO Deane, Marian C Brady, Christina H Smith, Catherine M Sackley, Carl E Clarke

First published: 15 August 2012

Editorial Group: Cochrane Movement Disorders Group

- Few systematic review

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Effects of Voice Therapy: A Systematic Review

R. Speyer, *Maastricht, The Netherlands*

Summary. Medical as well as paramedical treatments should be evaluated by scientific methods. This systematic review focuses on the effects of voice therapy, excluding pharmacological or surgical treatments. In general, statistically significant positive but modest and varying therapy effects are found. Many of these effect studies cope with diverse methodological problems. Furthermore, the conclusions of most studies cannot be generalized easily or compared to one another. As a consequence, many issues in the field of effects of voice therapy have yet been unanswered.
Key Words: Systematic review–Dysphonia–Voice disorder–Voice therapy–Therapy effect–Therapy outcome.

- 30 years of research on efficiency.

BTW 1980 & 2006:
47 STUDIES
1980 – 1989: 6 STUDIES
1990 – 1999: 17 STUDIES
2000 – 2006: 24 STUDIES

HIGH CONTROL DEGREE: 11

Randomized
Control groups
Detailed and adapted statistical analysis

GOOD DESIGN: 36

Non randomized
With detailed statistical analysis: 21
With descriptive statistical analysis: 15

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LEVELS OF EVIDENCE

Level	Description
Ia	Well-designed meta-analysis of >1 randomized controlled trial
Ib	Well-designed randomized controlled study
IIa	Well-designed controlled study without randomization
IIb	Well-designed quasi-experimental study
III	Well-designed non-experimental studies, i.e., correlational and case studies
IV	Expert committee report, consensus conference, clinical experience of respected authorities

http://www.asha.org/Research/EBP/

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BENNINGER, 2011

Levels of Evidence in the Voice Literature

Michael S. Benninger, *Cleveland, Ohio*

Summary: Objective. The purpose of this study was to evaluate the levels of evidence in the voice literature.
Study Design. Retrospective literature review.
Methods. Retrospective review of all original articles published between January 2004 and December 2009 from four general otolaryngology journals and one subspecialty voice journal. All abstracts related to voice were evaluated and rated as to evidence-based medicine rating, graded levels A–D and 1a–5. Articles were also stratified by time over two consecutive 3-year intervals to assess changes over the time period.
Results. Of the 6052 articles published, 950 (15.6%) were related to voice. Six hundred seventy-three articles (10.2%) were clinical articles, and 277 (4.6%) were basic science. Only 1% of the clinical articles were level A, 17% were level B, 73% were level C, and 9% were level D. No noticeable changes occurred in the levels of evidence over the interval of the first 3 years of the study in comparison to the last 3 years, although there was an increase in the number of basic science articles from 24.4% to 32.4%.
Conclusion. Despite strong recent interest in improving the quality of the evidence in the literature, the voice literature remains primarily level C and D with no appreciable change over the past 6 years.
Key Words: Voice–Literature–Evidence–EBM–Evidence-based medicine–Quality.

BENNINGER, 2011

TABLE 2.
Levels of Evidence for the Voice Literature, 2004–2009 (673 Clinical Articles)

Level	Number	% Including BS	% Without BS
1 (1a, 1b)	7	0.7	1
2 (2a, 2b)	24	2.5	3.6
3 (3a, 3b)	91	9.6	13.5
4	493	51.9	73.3
5	58	6.1	8.6
BS	277	29.2	

Abbreviation: BS, basic science.

Benninger, M. S. (2011). Levels of evidence in the voice literature. *Journal of Voice, 25*(6), 653-656. doi:10.1016/j.jvoice.2010.09.006

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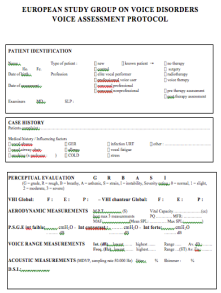
LARYNX EXAMINATION


EUROPEAN STUDY GROUP ON VOICE DISORDERS
VOICE ASSESSMENT PROTOCOL

PATIENT IDENTIFICATION

CASE HISTORY

PERCEPTUAL EVALUATION G R B A S I

VHI Global: F: E: P: VHI elsatzer Global: F: E: P:

AERODYNAMIC MEASUREMENTS

VOICE RANGE MEASUREMENTS

ACOUSTIC MEASUREMENTS

- Video Laryngo Stroboscopy
  - Based on optical illusion
  - Protocols (Hirano, 1989; Poburka, 1999; Dejonckere et al, 2001)
- High Speed Imaging 
  - Protocol under development (Mendelsohn et al,2013)
- Artificial tasks:
  - Sustained vowel, [e] higher frequency, stress
- A picture at one point of time

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VOICE PROFILE – REFLEXIONS

- Are all the voice profile parameters adapted to what we want to measure?
  - Voice feminisation ?
  - Singing voice ?
  - Subtil dysphonia?
  - Subtil immobility vocal fold?
- In post treatment, does the patient get better on all the parameters?
- Can therapy sessions be conditioned by the parameters of the voice profile?
- No universal consensus on selected parameters.

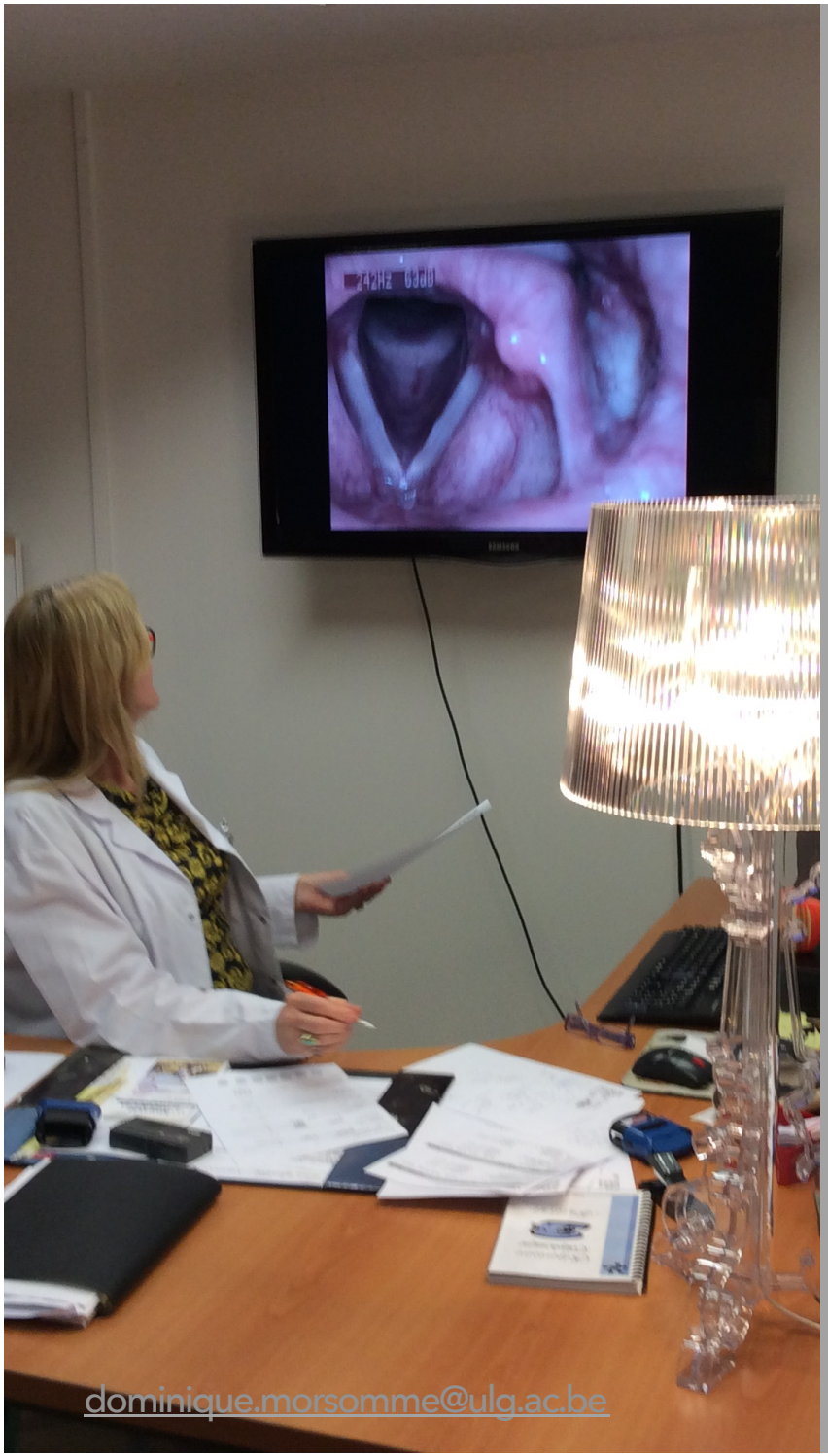
PARAMETERS OF THE VOICE PROFILE (1/2)

- Perceptual measure (GRBAS-I) :
  - Subjective
  - Internal standard => unstable
  - No universal perceptual reality
- Acoustical measures (Jitter, SD):
  - For treatment of pathological voice: imperfect data
  - Artificial tasks

PARAMETERS OF THE VOICE PROFILE (2/2)

- Aerodynamic Measures:
  - Objective
  - Depending on several variables
  - Depending on surrounding environment
  - Calibration is required

- Self rating-scales (Behlau et al, 2016)
  - VHI, VOISS, VRQoL, ….
  - Belafsky - RGO
- Voice Quality Index
  - DSI (Wuyts et al, 2000) (based on 4 measures)
  - AVQI (Maryn et al, 2010) (does not take into account glottal attack)



HOW TO IMPLEMENT EBP IN OUR PRACTICES ?

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PROCEDURE: 4 STEPS

1. Framing the clinical question (P.I.C.O.)
2. Finding evidence
3. Assessing evidence
4. Clinical decision-making:
   - Patient's perspective
   - Available scientific evidence
   - Clinical expertise

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FRAMING THE CLINICAL QUESTION

Population	Intervention	Comparison	Outcome
Teacher primary school (nodules) - Woman	Reduce vocal load	/	↘ roughness Assessed by voice profile (TMP, Jitt, GRBAS, VLS)
Educator - W	PPI (oméprazole)	/	↘ hoarsness Assessed by VLS, Jitt, SD
Lawyer - W	Manual therapy	/	SPL Assessed by perceptual scale and SPL parameters
Presbyphonic - W	SPL	/	↘ vocal breathiness Assessed by VLS, Jitt, TMP

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CLINICAL QUESTIONS

1. Will reduce vocal loading (I) help the teacher (P)
   to decrease her roughness (O) ?
2. Will taking an PPI (I) help the patient with reflux (P) to reduce her hoarseness (O)?
3. Will manual therapy (I) help the lawyer (P) to enhance her intensity level (O)?
4. Will therapy focused on SPL (I) help the presbyphonic woman to decrease her voice breathiness?

RESULTS OF EACH TREATMENTS

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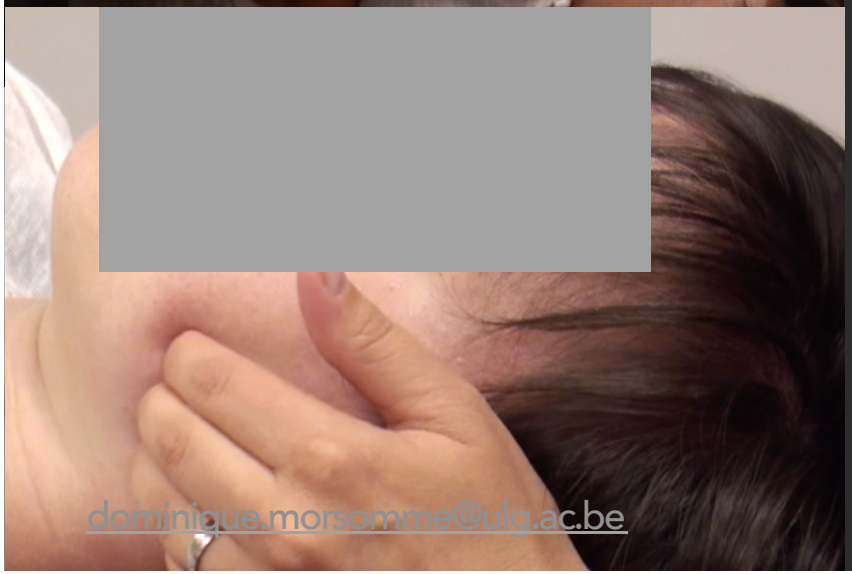
Pathologies	Pre	Therapy types	Post
Nodules	28/08/2013	Voice amplifier	04/11/2013
DD due to PLR	17/05/2016	PPI	29/08/2016
Fibrosis	30/09/2010	MT - 30'	30/09/2010
Presbyphonia	05/11/2014	22 sessions	12/05/15



Manual Therapy

FINDING EVIDENCE

ASSESSING EVIDENCE

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PATIENT

- W - 74 years old, choral singer since 7y

COMPLAINTS

- Musculo skeletal pain
- Difficulties to produce high notes

VLS

- Constriction of the laryngeal vestibule
- Imbalance of the laryngeal and perilaryngeal musculature
- Slight presbyphonia

Voice Profile

- DSI:2.3 VHI: 24 GRBAS: 1-1-1-0-1
  ESGP: C9.78/83 DB, S: 6.12/78dB/L:16-84 dB

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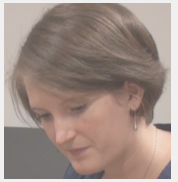
CLINICIAN



- Vocologist
- Soprano
- 6 years of practice
- Manual therapy certification
- Eutonie
- LSVT

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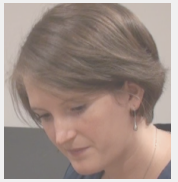
CONTEXT

- No insurance reimbursement
- Facilities to come to the hospital
- Motivation +++

CLINICIAN



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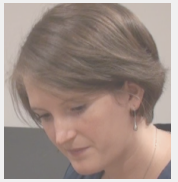

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EVIDENCE MT

?

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- Motivati +++

EVIDENCE MT

?

Will Manual Therapy (I) help the FVD patient (P) reduce her glottic gap (O)?

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  ESGP: C9.78/83.

Decision making

Will Manua apy (I) help the FVD patient (P) her glottic gap

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- Motivati +++

EVIDENCE MT

?

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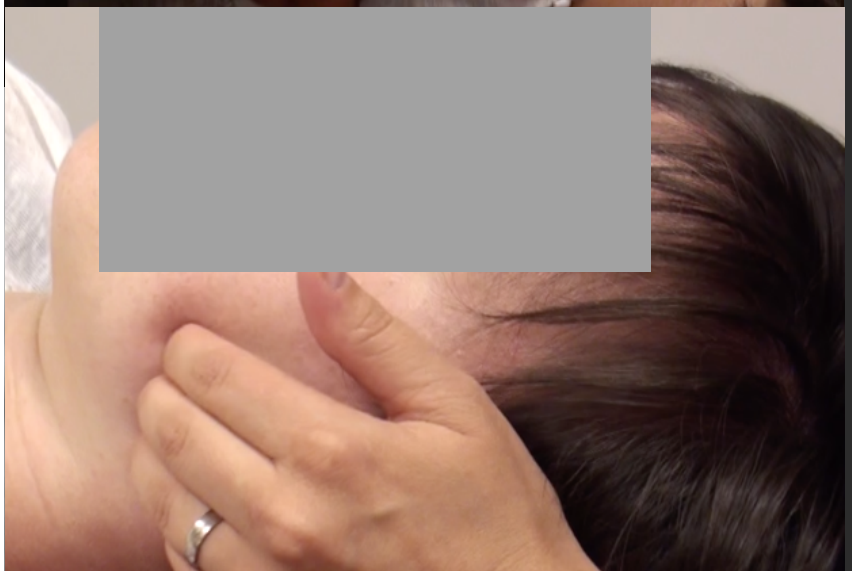
PROCEDURE TO FIND THE EVIDENCE

- Bibliographic databases
  - Cochrane =>http://www.cochranelibrary.com/cochrane-database-of-systematic-reviews/
  - Pubmed
  - Scopus
- Discovery tool: Ulg Library
- Specialised electronic database: Google scholar



Manual Therapy

SPEAK THE SAME LANGUAGE AND BE ON THE SAME WAVELENGTH

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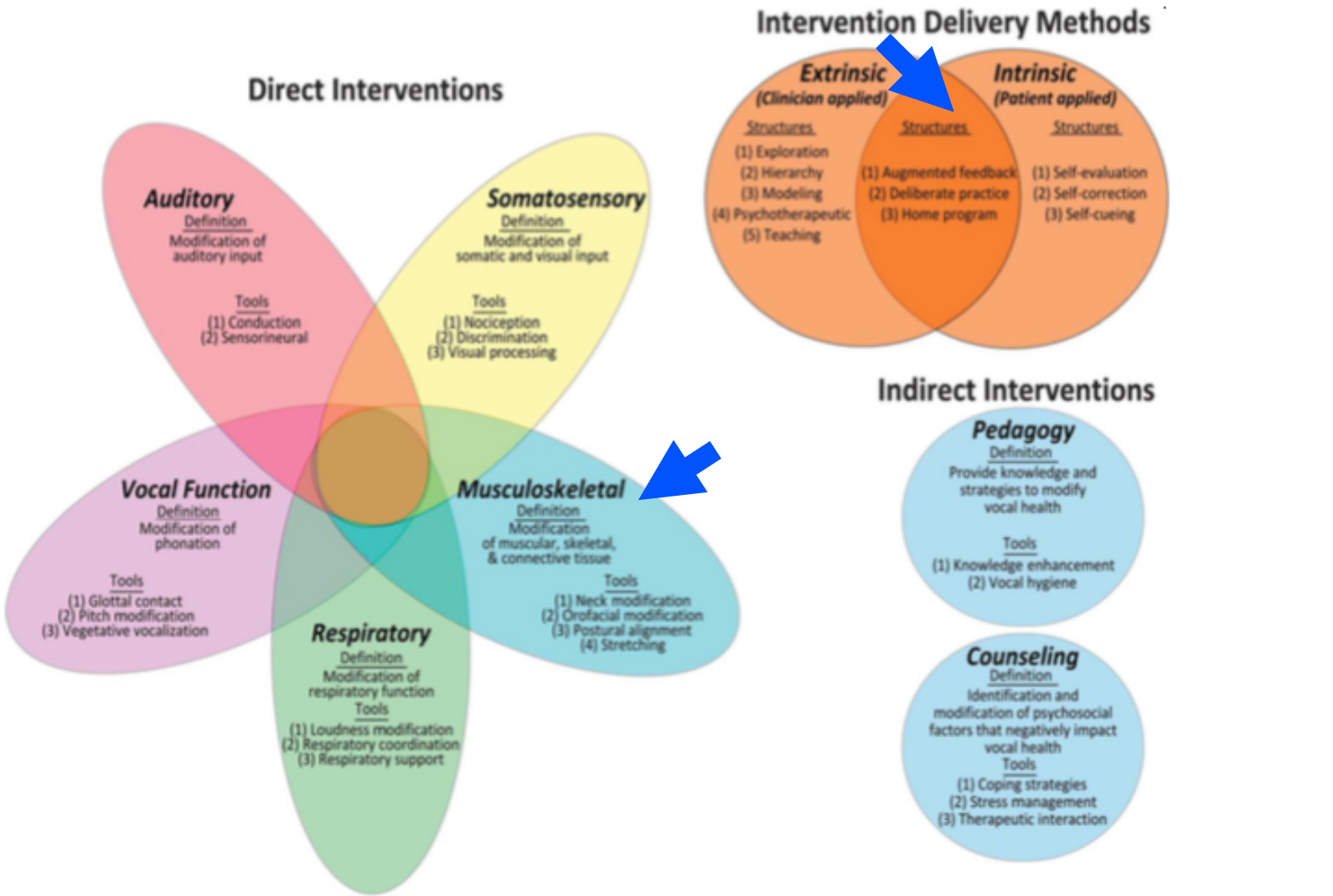
Figure 1. Demonstration of the structure and organization of the first layer of a taxonomy of voice therapy. In the direct intervention categories, notice that the pathways of voicing are temporally ordered from inferior to superior (e.g., the feedforward pathways are the three inferior categories, and the feedback pathways are the two most superior categories).



VOICE TREATMENTS- AUTHORS

Classification of Voice Therapy Treatments

List of References for Tables B1–B4

[1] Casper and Murry (2000)
[2] Thomas and Stemple (2007)
[3] Verdolini-Marston, Burke, Lessac, Glaze, and Caldwell (1995)
[4] Verdolini, Druker, Palmer, and Samawi (1998)
[5] Roy et al. (2003)
[6] Verdolini Abbott et al. (2012)
[7] Chen, Hsiao, Hsiao, Chung, and Chiang (2007)
[8] Yiu, Chen, Lo, and Pang (2012)
[9] Kotby, El-Sady, Basiouny, Abou-Rass, and Hegazi (1991)
[10] Fex, Fex, Shiromoto, and Hirano (1994)
[11] Stemple, Lee, D'Amico, and Pickup (1994)
[12] Roy et al. (2001)
[13] Sabol, Lee, and Stemple (1995)
[14] Ramig, Countryman, Thompson, and Horii (1995)
[15] Ramig, Countryman, O'Brien, Hoehn, and Thompson (1996)
[16] Ramig, Sapir, Fox, and Countryman (2001)
[17] El Sharkawi et al. (2002)
[18] Roy and Leeper (1993)
[19] Roy, Bless, Heisey, and Ford (1997)
[20] Van Lierde, De Ley, Clement, De Bodt, and Van Cauwenberge (2004)
[21] Mathieson (2011)
[22] Mathieson et al. (2009)

TABLE INCLUDING 7 THERAPEUTIC PROGRAMMES FOR VOICE

	Auditory		Vocal function			Somatosensory			Musculoskeletal				Respiratory		
Voice therapy programs	Conduction	Sensorineural	Glottal contact	Pitch modification	Vegetative vocalization	Nociception	Discrimination	Visual processing	Neck modification	Orofacial modification	Posture	Stretching	Loudness modification	Respiratory coordination	Respiratory support
LSVT		X	X	X			X						X	X	X
VFE		X	X	X			X			X			X	X	
Accent Method		X	X	X			X			X	X		X	X	X
Confidential Voice Therapy		X	X				X			X			X	X	X
RVT		X		X	X		X		X	X	X	X	X		X
LMT		X	X	X		X	X		X	X	X			X	X
MCT		X	X	X		X	X		X					X	

Note. LSVT = Lee Silverman Voice Therapy; VFE = Voice Function Exercises; RVT = Resonant Voice Therapy; LMT = Laryngeal Manual Therapy; MCT = Manual Circumlaryngeal Therapy.

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INTRODUCE MANUAL THERAPY IN OUR THERAPEUTIC PLAN

- Manual Therapy, définition:
- According to Piron, 2007: « … *restoring the mobility of the various structures involved in the vocal apparatus* …» by maneuver derived from osteopathy.
- Neck Manipulation: « *A direct intervention tool that requires the modification of muscular, skeletal, and connective tissue by directing the patient's attention to the physical movement of their anterior, lateral, and posterior neck.* » (in Van Stan & al, 2015, p.111)
- Manual Circumlaryngeal Therapy (MCT) (in Van Stan & al, 2015, p. 122)
- Laryngeal Manual Therapy (LMT) (in Van Stan & al, 2015, p.123)

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Studies	Study design	N	Diagnosis	Sessions	Measures	Conclusion concerning Manual Therapy
Roy & al (1993)	CS	17 MCT	Functional voice disorders	Single treatment approach	Perceptual evaluation Acoustical analysis	Significant decrease of severity ratings Acoustic measurments improved
Roy & al (1997)	CS	25 MCT	Functional voice disorders		Short and Long term (subj. Obj. Measures)	*« These results replicate and extend previous research suggesting the **utility of manual circumlaryngeal therapy for functional voice disorders.** »*
Van Lierde & al (2004)	CS	4 LMT	MTD (medium to severe)	25	Short term VLS, GRBAS, DSI	*« … the voice treatment program outlined in this report following careful diagnosis was **an effective treatment for symptoms of moderate-to-severe muscle tension dysphonia** in four professional voice users. … »*
Van Lierde & al (2010)	CS Control group Experimental group	10 4M 6W LMT	MTD	1 (45 min)	MPT, VRP, Jitt, Shim, DSI	*As Aronson pointed out, MCT is a direct method to treat laryngeal hyperfunction. A **direct decrease of laryngeal tension and an immediate voice improvement can be expected.** The treatment technique abdominal breath support **co**mbined with voice production, can be considered as an indirect method to decrease the laryngeal tension.*
Mathieson & al (2009)	CS	10 (8W) MCT	MTD (mild to moderate)		Formants, Vocal tract muscle gene scale, Manual therapy assessment scale After and 1 w after	*« This pilot study showed **positive evidence for LMT as a method of therapy** in the treatment of hyperfunctional voice disorders. »*
Mathieson (2011)	Current opinion					*There is **evidence that laryngeal manual therapy,** in various form, can be a **useful** primary intervention in cases of muscle tension dysphonia ….*

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Studies	Study design	N	Diagnosis	Sessions	Measures	Conclusion concerning Manual Therapy
Van Houtte & al (2011)	R		MTD			*« The advantage of this treatment is in that patients who received no benefit from voice therapy can be treated.* ***Secondly, patients are motivated to follow this type of therapy because CMT is probably the most direct approach to ameliorate their voices****. »*
Silverio & al (2014)	CS	20 G1: LMT G2 TENS	Bilateral vocal fold nodules	12 (20min)	Intensity of pain Auditory perceptual analysis	*« There was no significant change in acoustic parameters after both treatments were applied. »*
Reimann & al (2015)	CS	15 LMT	different pathologies (12W)/15CG (12W)	1 (20 min)	Musculoskeletal Pain Questionnaire Intensity of the pain on each muscles (VAS) F0 and INT on /a/ and 2 phrases.	*LMT could* ***decrease the intensity of musculoskeletal pain in the following regions****: … in dysphonic individuals, which did not occur for individuals without vocal changes.* *As to voice quality after LMT, the roughness parameter became worse in the dysphonic group. Besides, positive sensations were reported in the larynx and in the articulation by dysphonic individuals after LMT.*
Tomlinson & Archer (2016)	CR	9 PT - MT	MTD	9	NRS:numéric rating scale PSFS: Patient specific Functional scale VHI	*« Findings suggest that physical therapists can feasibly implement an intervention to improve outcomes in patients with MTD » 9P => + PSFS; 3 better VHI*
Ribeiro & al (2017)	SR MA		Behavioral dysphonia		- Auditory perceptual evaluation - Vocal and laryngeal symptoms - Musculoskeletal pain	*«* ***Various types of laryngeal manual therapies are available with similar objectives and effects, but their effectiveness is equivalent*** *to that of other interventions involving direct voice therapy in the rehabilitation of adults with behavioral dysphonia. »*

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WHAT I RETAIN?

- Manual therapy => MTD, …
- Manual therapy => ↘ tensions
- Manual therapy => voice program
- ENS = MT => effectiveness (Silverio et al, 2016)
- Scientific evidence => LOW

PATIENT

- W - 74 years old, choral singer since 7y

COMPLAINTS
- Musculo skeletal pain
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- N sement
- Fac to the
  hospit
- Motivati +++

EVIDENCE MT

- Roy et al, (1993, 1997) - CS
- Lieberman, 2002 – Principles & techniques
- Piron, 2007 - Ostéovox
- Mathieson et al, (2009) - CS
- Van Lierde et al, (2004, 2010) - CA
- Van Houtte et al, (2011) – R
- Silverio et al, (2015) - CTrial
- Reimann et al, (2016) - CS
- Tomlinson et al, (2016) - CS
- Ribeiro et al, (2017) – S R & Meta A

Will Manua apy (I) help the FVD patient (P) her glottic gap

We decide to apply MT

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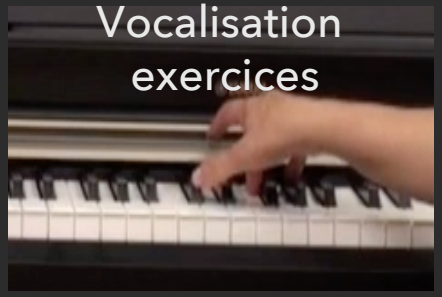
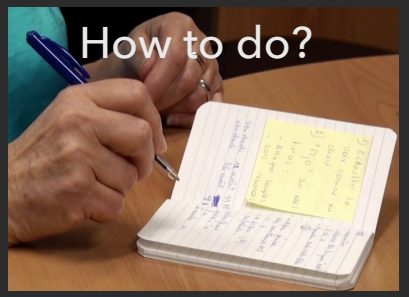
What I mean by manual therapy?





VIDEO CLIPS

VOCOLOGIST: CATHERINE JANSEN
PATIENTS: YVONNE, MORGANE
COMMENTATOR: DOMINIQUE MORSOMME
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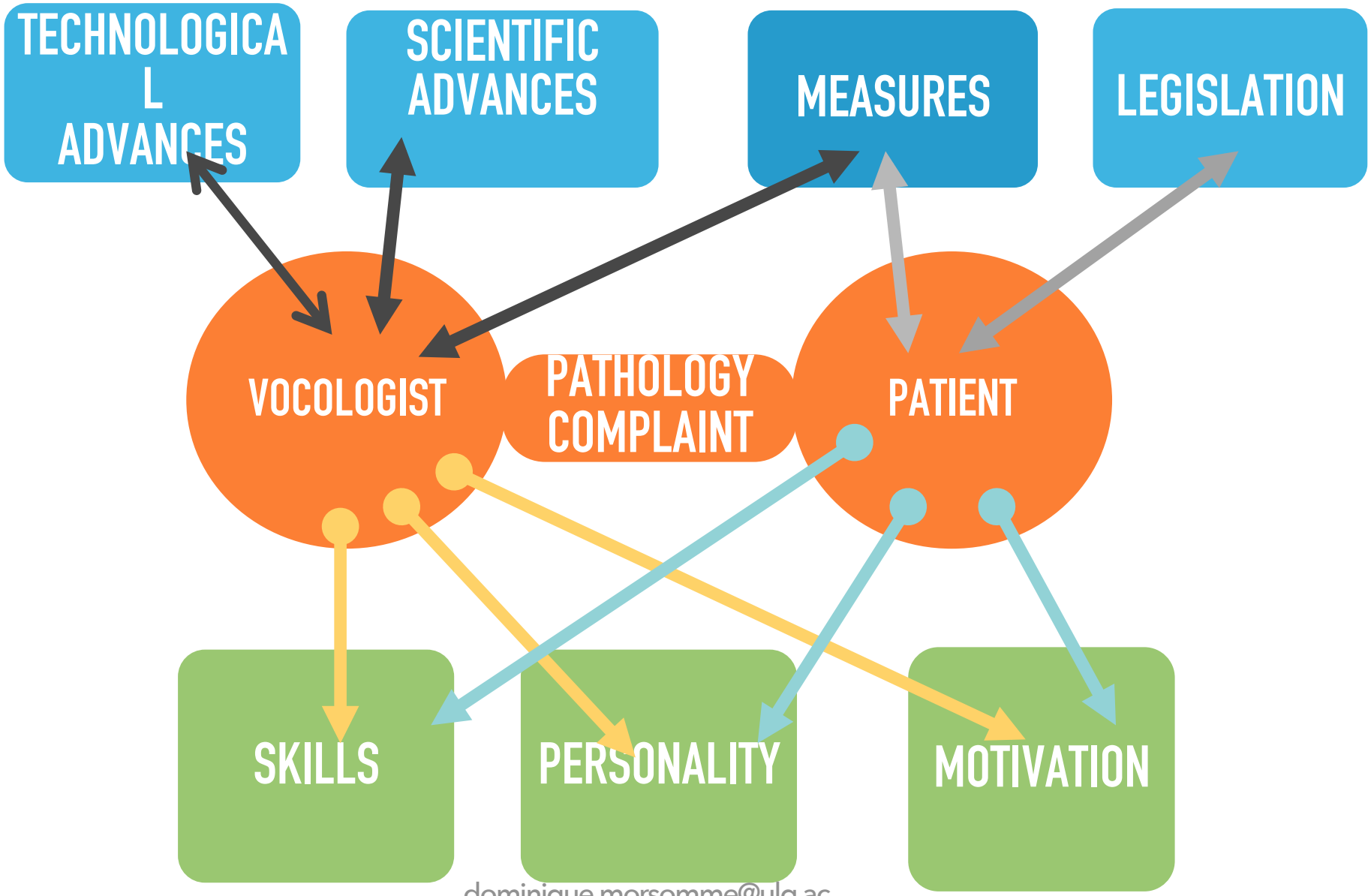

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THANKS A LOT!

Vocology is an art ... but also a science.
« Adequate mix of theoretical knowledge, technical skills, relational talent and can not be only summarized in scores ... »

I. Fraiteur, Vocologist.

REFERENCES – 1-

Adriaenssens J, Eyssen M, Mertens R, Benahmed N, Paulus D, Ameye F, Bossens M, Cauwenberg C, Cools A, Doms K, Everaert E, Gheysen M, Haelterman M, Laloup M, Malonne H, Meeus P, Penninckx W, Roisin T, Walraevens M. Vers un plan intégré d'evidence based practice en Belgique – Première partie : plan de gouvernance – Synthèse. Health Services Research (HSR). Bruxelles: Centre Fédéral d'Expertise des Soins de Santé (KCE). 2017. KCE Reports 291Bs. D/2017/10.273/55.

Behlau, M., Zambon, F., Moreti, F., Oliveira, G., & Couto, E. (2017). Voice Self-assessment Protocols: Different Trends Among Organic and Behavioral Dysphonias. *Journal of Voice, 31*(1), 112.E113. doi:10.1016/j.jvoice.2016.03.014

Benninger, M. S. (2011). Levels of evidence in the voice literature. *Journal of Voice, 25*(6), 653-656. doi:10.1016/j.jvoice.2010.09.006

Desjardins, M., Halstead, L., Cooke, M., & Bonilha, H. S. (2017). A Systematic Review of Voice Therapy: What "Effectiveness" Really Implies. Journal of Voice, 31(3), 392.e313-392.e332. doi:10.1016/j.jvoice.2016.10.002

Dejonckere, P. H., Bradley, P., Clemente, P., Cornut, G., Crevier-Buchman, L., Friedrich, G., . . . Woisard, V. (2001). A basic protocol for functional assessment of voice pathology, especially for investigating the efficacy of (phonosurgical) treatments and evaluating new assessment techniques. Guideline elaborated by the Committee on Phoniatrics of the European Laryngological Society (ELS). European Archives of Oto-Rhino-Laryngology, 258(2), 77-82.

Graves, R. S. (2002). Users' Guides to the Medical Literature: A Manual for Evidence-Based Clinical Practice. Journal of the Medical Library Association JMLA., 90(4), 483.

Hirano, M. (1981). Clinical examination of voice. Wien [usw.]: Springer.

Lieberman J. Principles and techniques of manual therapy: application in the management of dysphonia. In Harris H, Rubin, Howard, (Ed). The Voice Clinic Handbook. New York: Whurr Publication 2002:91-138.

Maryn, Y., De Bodt, M., & Roy, N. (2010). The Acoustic Voice Quality Index: Toward improved treatment outcomes assessment in voice disorders. J Commun Disord, 43(3), 161-174. doi:10.1016/j.jcomdis.2009.12.004

dominique.morsomme@ulg.ac.be

Mathieson, L., Hirani, S. P., Epstein, R., Baken, R. J., Wood, G., & Rubin, J. S. (2009). Laryngeal Manual Therapy: A Preliminary Study to Examine its Treatment Effects in the Management of Muscle Tension Dysphonia. *Journal of Voice, 23*(3), 353-366. doi: 10.1016/j.jvoice.2007.10.002

Mathieson, L. (2011). The evidence for laryngeal manual therapies in the treatment of muscle tension dysphonia. Current Opinion in Otolaryngology & Head and Neck Surgery, 19, 171–176.

Mendelsohn, A. H., Remacle, M., Courey, M. S., Gerhard, F., & Postma, G. N. (2013). The diagnostic role of high-speed vocal fold vibratory imaging. Journal of voice., 27(5), 627-631. doi:10.1016j. jvoice.2013.04.011

Piron, A. (2007). Techniques ostéopathiques appliquées à la phoniatrie. Lyon, France: Symétrie.

Poburka, B. J. (1999). A new stroboscopy rating form. *Journal of voice., 13*(3), 403-413.

Reimann, A. P., Siqueira, L. T. D., Rondon, A. V., Brasolotto, A. G., & Silverio, K. C. A. (2016). Immediate effect of laryngeal manual therapy in dysphonic individuals. *CoDas, 28*(1), 59-65. doi:10.1590/2317-1782/20162015089

Ribeiro, V. V., Pedrosa, V., Silverio, K. C. A., & Behlau, M. (2017). Laryngeal Manual Therapies for Behavioral Dysphonia: A Systematic Review and Meta-analysis. *Journal of Voice*. doi:10.1016/j.jvoice.2017.06.019 S0892-1997(97)80011-2

Roy, N., & Leeper, H. A. (1993). Effects of the manual laryngeal musculoskeletal tension reduction technique as a treatment for functional voice disorders: Perc eptual and acoustic measures. Journal of Voice, 7, 242–249.

Roy, N., Bless, D. M., Heisey, D., & Ford, C. N. (1997). Manual circumlaryngeal therapy for functionaldysphonia: An evaluation of short- and long-term treatment outcomes. *Journal of Voice, 11*(3), 321-331. doi:10.1016/S0892-1997(97)80011-2

Sackett, D. L. (2000). Evidence-based medicine : how to practice and teach EBM (2nd ed. ed.). Edinburgh: Edinburgh : Churchill Livingstone. **Siqueira, L. T. D.**, Silverio, K. C. A., Brasolotto, A. G., Guirro, R. R. J., Carneiro, C. G., & Behlau, M. (2017). Effects of laryngeal manual therapy (LMT) and transcutaneous electrical nerve stimulation (TENS) in vocal folds diadochokinesis of dysphonic women: A randomized clinical trial. *CoDas, 29*(3), <xocs:firstpage xmlns:xocs=""/>. doi: 10.1590/2317-1782/20172016191

REFERENCES – 3 –

Satterfield, J. M., Spring, B., Brownson, R. C., Mullen, E. J., Newhouse, R. P., Walker, B. B., & Whitlock, E. P. (2009). Toward a Transdisciplinary Model of Evidence−Based Practice. Milbank Quarterly, 87(2), 368-390. doi:10.1111/j.1468-0009.2009.00561.x

Silverio, K. C. A., Brasolotto, A. G., Thaís Donalonso Siqueira, L., Carneiro, C. G., Fukushiro, A. P., & Roberto de Jesus Guirro, R. (2015). Effect of Application of Transcutaneous Electrical Nerve Stimulation and Laryngeal Manual Therapy in Dysphonic Women: Clinical Trial. Journal of Voice, 29(2), 200-208. doi:10.1016/j.jvoice.2014.06.003

Tomlinson, C. A., & Archer, K. R. (2015). Manual therapy and exercise to improve outcomes in patients with muscle tension dysphonia: a case series. *Physical therapy, 95*(1), 117. doi:10.2522/ptj.20130547

Van Houtte, E., Van Lierde, K., & Claeys, S. (2011). Pathophysiology and Treatment of Muscle Tension Dysphonia: A Review of the Current Knowledge. *Journal of Voice, 25*(2), 202-207. doi:10.1016/j.jvoice.2009.10.009

Van Lierde, K. M., De Ley, S., Clement, G., De Bodt, M., & Van Cauwenberge, P. (2004). Outcome of laryngeal manual therapy in four Dutch adults with persistent moderate-to-severe vocal hyperfunction: a pilot study. *Journal of Voice, 18*(4), 467-474. doi:10.1016/j.jvoice.2004.02.003

Van Lierde, K., De Bodt, M., Dhaeseleer, E., Wuyts, F., & Claeys, S. (2010). The Treatment of Muscle Tension Dysphonia: A Comparison of Two Treatment Techniques by Means of an Objective Multiparameter Approach. *Journal of Voice, 24*(3), 294-301.

Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A Taxonomy of Voice Therapy. American Journal of Speech-Language Pathology, 24(2), 101-125. doi:10.1044/2015_AJSLP-14-0030

Wuyts, F. L., De Bodt, M. S., Molenberghs, G., Remacle, M., Heylen, L., Millet, B., . . . Van De Heyning, P. H. (2000). The Dysphonia Severity Index: An Objective Measure of Vocal Quality Based on a Multiparameter Approach. Journal of Speech, Language, and Hearing Research, 43(3), 796-809.

https://hsl.lib.umn.edu/biomed/help/understanding-research-study-designs
http://speechbite.com/speechbite/search/adv/
http://www.asha.org/Research/EBP/