PEVOC 2017
Auditorium Horta, ground level

EVIDENCE-BASED PRACTICE APPLIED TO VOICE THERAPY

Dominique.Morsomme@ulg.ac.be
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)*
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)
SATTERFIELD & AL (2009)

FIGURE 5. Our Revised EBP Model
EVIDENCE BASED PRACTICE (3/4) - DÉFINITION

CLINICAL EXPERTISE

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« 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:
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**

  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
30 years of research on efficiency.

**BTW 1980 & 2006: 47 STUDIES**
- 1990 – 1999: 17 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

**EVIDENCE BASED PRACTICE IN VOCOLOGY (2/5) THE BEST RESEARCH EVIDENCE**

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.

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## Levels of Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>Well-designed meta-analysis of &gt;1 randomized controlled trial</td>
</tr>
<tr>
<td>Ib</td>
<td>Well-designed randomized controlled study</td>
</tr>
<tr>
<td>Ila</td>
<td>Well-designed controlled study without randomization</td>
</tr>
<tr>
<td>Iib</td>
<td>Well-designed quasi-experimental study</td>
</tr>
<tr>
<td>III</td>
<td>Well-designed non-experimental studies, i.e., correlational and case studies</td>
</tr>
<tr>
<td>IV</td>
<td>Expert committee report, consensus conference, clinical experience of respected authorities</td>
</tr>
</tbody>
</table>

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

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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.


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LARYNX EXAMINATION

- 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?
  - Subtle dysphonia?
  - Subtle 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?
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
**FRAMING THE CLINICAL QUESTION**

<table>
<thead>
<tr>
<th>Population</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher primary school (nodules) - Woman</td>
<td>Reduce vocal load</td>
<td>/</td>
<td>(\downarrow) roughness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assessed by voice profile (TMP, Jitt, GRBAS, VLS)</td>
</tr>
<tr>
<td>Educator - W</td>
<td>PPI</td>
<td>/</td>
<td>(\downarrow) hoarseness</td>
</tr>
<tr>
<td></td>
<td>(oméprazole)</td>
<td></td>
<td>Assessed by VLS, Jitt, SD</td>
</tr>
<tr>
<td>Lawyer - W</td>
<td>Manual therapy</td>
<td>/</td>
<td>SPL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assessed by perceptual scale and SPL parameters</td>
</tr>
<tr>
<td>Presbyphonic - W</td>
<td>SPL</td>
<td>/</td>
<td>(\downarrow) vocal breathiness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assessed by VLS, Jitt, TMP</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Pathologies</th>
<th>Pre</th>
<th>Therapy types</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nodules</td>
<td>28/06/2013</td>
<td>Voice amplifier</td>
<td>04/10/2013</td>
</tr>
<tr>
<td>DD due to PLR</td>
<td>17/05/2016</td>
<td>PPI</td>
<td>29/08/2016</td>
</tr>
<tr>
<td>Fibrosis</td>
<td>30/09/2010</td>
<td>MT - 30’</td>
<td>30/09/2010</td>
</tr>
<tr>
<td>Presbyphonia</td>
<td>05/11/2014</td>
<td>22 sessions</td>
<td>12/05/15</td>
</tr>
</tbody>
</table>
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 +++

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

PATIENT EVIDENCE BASED PRACTICE IN VOCOLOGY – MANUAL THERAPY EVIDENCE

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

CLINICIAN
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- Facilities to come to the hospital
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EVIDENCE MT
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EVIDENCE BASED PRACTICE IN VOCOLOGY – MANUAL THERAPY EVIDENCE
- Manual therapy (I) help the FVD
- Soprano
- 6 years of practice
- Manual therapy certification
- Eutonie
- LSVT

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

Decision making

Will Manual therapy (I) help the FVD patient (P)?

EVIDENCE MT
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

<table>
<thead>
<tr>
<th>List of References for Tables B1–B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Casper and Murry (2000)</td>
</tr>
<tr>
<td>2 Thomas and Stemple (2007)</td>
</tr>
<tr>
<td>3 Verdolini-Marston, Burke, Lessac, Glaze, and Caldwell (1995)</td>
</tr>
<tr>
<td>4 Verdolini, Druker, Palmer, and Samawi (1998)</td>
</tr>
<tr>
<td>5 Roy et al. (2003)</td>
</tr>
<tr>
<td>6 Verdolini Abbott et al. (2012)</td>
</tr>
<tr>
<td>7 Chen, Hsiao, Hsiao, Chung, and Chiang (2007)</td>
</tr>
<tr>
<td>8 Yiu, Chen, Lo, and Pang (2012)</td>
</tr>
<tr>
<td>9 Kotby, El-Sady, Basiouny, Abou-Rass, and Hegazi (1991)</td>
</tr>
<tr>
<td>10 Fex, Fex, Shiromoto, and Hirano (1994)</td>
</tr>
<tr>
<td>12 Roy et al. (2001)</td>
</tr>
<tr>
<td>14 Ramig, Countryman, Thompson, and Horii (1995)</td>
</tr>
<tr>
<td>16 Ramig, Sapir, Fox, and Countryman (2001)</td>
</tr>
<tr>
<td>17 El Sharkawi et al. (2002)</td>
</tr>
<tr>
<td>18 Roy and Leeper (1993)</td>
</tr>
<tr>
<td>19 Roy, Bless, Heisey, and Ford (1997)</td>
</tr>
<tr>
<td>21 Mathieson (2011)</td>
</tr>
<tr>
<td>22 Mathieson et al. (2009)</td>
</tr>
</tbody>
</table>

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**TABLE INCLUDING 7 THERAPEUTIC PROGRAMMES FOR VOICE**

<table>
<thead>
<tr>
<th>Voice therapy programs</th>
<th>Auditory</th>
<th>Vocal function</th>
<th>Somatosensory</th>
<th>Musculoskeletal</th>
<th>Respiratory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conduction</td>
<td>Sensory-neural</td>
<td>Glottal contact</td>
<td>Pitch modification</td>
<td>Vegetative vocalization</td>
</tr>
<tr>
<td>LSVT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>VFE</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Accent Method</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Confidential Voice Therapy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RVT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>LMT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MCT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>


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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)


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<table>
<thead>
<tr>
<th>Studies</th>
<th>Study design</th>
<th>N</th>
<th>Diagnosis</th>
<th>Sessions</th>
<th>Measures</th>
<th>Conclusion concerning Manual Therapy</th>
</tr>
</thead>
</table>
Acoustical analysis | Significant decrease of severity ratings
Acoustic measurements improved |
<p>| Van Lierde &amp; 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 &amp; al (2010)        | CS Control group | 10 | MTD 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 combined with voice production, can be considered as an indirect method to decrease the laryngeal tension. |
| Mathieson &amp; al (2009)         | CS           | 10 | 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 .... |</p>
<table>
<thead>
<tr>
<th>Studies</th>
<th>Study design</th>
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<th>Diagnosis</th>
<th>Sessions</th>
<th>Measures</th>
<th>Conclusion concerning Manual Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Houtte &amp; al (2011)</td>
<td>R</td>
<td></td>
<td>MTD</td>
<td></td>
<td></td>
<td>« 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. »</td>
</tr>
<tr>
<td>Silverio &amp; al (2014)</td>
<td>CS</td>
<td>20</td>
<td>Bilateral vocal fold nodules</td>
<td>12 (20min)</td>
<td>Intensity of pain Auditory perceptual analysis</td>
<td>« There was no significant change in acoustic parameters after both treatments were applied. »</td>
</tr>
<tr>
<td>Reimann &amp; al (2015)</td>
<td>CS</td>
<td>15</td>
<td>different pathologies (12W)/15CG (12W)</td>
<td>1 (20 min)</td>
<td>Musculoskeletal Pain Questionnaire Intensity of the pain on each muscles (VAS) F0 and INT on /a/ and 2 phrases.</td>
<td>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.</td>
</tr>
<tr>
<td>Tomlinson &amp; Archer (2016)</td>
<td>CR</td>
<td>9</td>
<td>MTD</td>
<td>9</td>
<td>NRS:numeric rating scale PSFS: Patient specific Functional scale VHI</td>
<td>« Findings suggest that physical therapists can feasibly implement an intervention to improve outcomes in patients with MTD » 9P =&gt; + PSFS; 3 better VHI</td>
</tr>
<tr>
<td>Ribeiro &amp; al (2017)</td>
<td>SR MA</td>
<td></td>
<td>Behavioral dysphonia</td>
<td></td>
<td>- Auditory perceptual evaluation - Vocal and laryngeal symptoms - Musculoskeletal pain</td>
<td>« 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. »</td>
</tr>
</tbody>
</table>
WHAT I RETAIN?

- Manual therapy => MTD, ...
- Manual therapy => \( \downarrow \) tensions
- Manual therapy => voice program
- ENS = MT => effectiveness (Silverio et al, 2016)
- Scientific evidence => LOW
PATIENT
- W - 74 years old, choral singer since 7 y

COMPLAINTS
- Musculo skeletal pain
- Difficulties to produce high notes

VLS
- Constriction of the laryngeal vestibule
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- Slight presbyphonia

Voice Profile
- DSI: 2.3  VHI: 24 GRBAS: 1-1-1-0-1


PATIENT EVIDENCE
- Lieberman, 2002 – Principles & techniques
- Piron, 2007 - Ostéovox
- Mathieson et al, (2009) - CS
- Silverio et al, (2015) - CTrial
- Reimann et al, (2016) - CS
- Tomlinson et al, (2016) - CS
- Ribeiro et al, (2017) – S R & Meta A

We decide to apply MT

EVIDENCE MT
- Lieberman, 2002 – Principles & techniques
- Piron, 2007 - Ostéovox
- Mathieson et al, (2009) - CS
- Silverio et al, (2015) - CTrial
- Reimann et al, (2016) - CS
- Tomlinson et al, (2016) - CS
- Ribeiro et al, (2017) – S R & Meta A

Will Manual Therapy (MT) help the FVD patient? (P)
- No insurance reimbursement
- Facilities to come to the hospital
- Motivation ++++
What I mean by manual therapy?

Set the goals
Manual Therapy
Respiratory system
Resonance system

Vibrator
Vocalisation exercises
How to do?

VIDEO CLIPS
VOCOLOGIST: CATHERINE JANSEN
PATIENTS: YVONNE, MORGANE
COMMENTATOR: DOMINIQUE MORSOMME
VIDEO EDITOR: J. VAN DE POËL & P. MARTIN

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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.


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