

Order criterion 2: Forschung  
 Mette Pedersen Dr.Habil. HNO  
 Institution: The Medical Centre, Copenhagen K 1100 Dänemark  
 Email: [m.f.pedersen@dadlnet.dk](mailto:m.f.pedersen@dadlnet.dk). [www.mpedersen.org](http://www.mpedersen.org)



Title: **A discussion of the evidence based approach in research of the singing voice**  
 Title translated: **Eine Diskussion der Evidenz basierte Annäherung an die Forschung des Singens**



The studies in the literature of the most frequent diagnoses of pathology in the larynx were evaluated in 2 systematic Cochrane reviews.

The first review focuses on surgical versus non-surgical treatment of vocal fold nodules. (REF 2)

Using the methods of the Cochrane collaboration there is no evidence documenting the effects of neither surgical removal of vocal nodules nor speech therapy. There is a lack of prospective randomized studies with adequate control groups and follow-up.

No evidence was found of voice tests and objective acoustic measures.

The second review focuses on acid reflux treatment for hoarseness. (REF 3)

Even if a few studies were found with the correct research model the critics and reason for non-acceptance by the Cochrane collaboration was that the amount of patients in the different groups was too small, this means that the power of the studies was insufficient.

No evidence was found of voice tests, scores or objective measures.

This kind of research is very expensive.

A directive has earlier been suggested in the European Union dividing voice laboratories in three categories with defined functions:  
 1. standard equipped laboratories,  
 2. optimally equipped clinical laboratories  
 3. research laboratories, with adequate public funding.  
 (TABLE 1).

EF.1 Pedersen M (1995) Stimmfunktion vor und nach Behandlung von Hirngeschädigten. Mit Stroboskopie, Phonetographie und Luftstromanalyse durchgeführt. Sprache, Stimme, Gehör 19: 84-89  
 REF 2. Pedersen M, McGlashan J (2000) Surgical versus non-surgical interventions for vocal cord nodules: The Cochrane Library, Issue 1, 2004. Chichester, UK: John Wiley & Sons, Ltd.  
 REF.3 Hopkins C, Yousaf U, Pedersen M (2006) Acid reflux treatment for hoarseness; 25 January 2006 in Issue 1, The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Table 1

**Acoustical Area**

**Standard equipment:**

Recording procedure: Audio tape (analogue recording)  
 Fundamental frequency with jitter  
 Intensity with shimmer  
 Signal-to-noise ratio & signal-to-harmonics ratio, nasality  
 Spectral analysis (FFT, spectrography, LTAS, power spectrum)

**Optimal equipment also:**

Recording procedure: DAT or DVD (digital recording)  
 Phonetograms (2- or 3-dimensional) for speech, singing and shouting  
 Phonation index, diplophonia, multiphonia, voice breaks  
 Simultaneous video- and sound recording (for analysis)

**Research equipment also:**

Stroboscopy combined with phonetography (averaging of phonetograms)  
 Motor speech profile measurements  
 Voice efficiency measurements and others

**Physiological Area**

**Standard equipment:**

Stroboscopy  
 Airflow measurements (MFR and Phonation time)  
 Videokymography

**Optimal equipment also:**

Electroglottography  
 Respiratory measurements (long & short time)  
 Air pressure  
 Electromyography  
 Articulographic measurements (three-dimensional magnetic sensor)

**Research equipment also:**

Videostrobolaryngoscopy with quantitative computing  
 Instrumentation for brain stem-, brain flow- and other brain activity measurements  
 Ultrasound scanning, possibility of genetic studies and others

**Perceptual and Psychological Area**

**Standard methods:**

Listening standards (including GRBAS test)  
 Voice quality test (including nasality)  
 Standardized methods for registration of patients' subjective statements of illness (VHI)

**Optimal methods also:**

Objective speech acoustics related perception  
 Objective musical acoustics related perception  
 Video- and acoustic recording of speech and voice behavior (e.g. by stuttering)

**Research methods also:**

Objective registrations of moods at the physiological and acoustic level  
 In coordination with brain function research

A pilot study was made of the influence of the voice related musicality level of voice professionals on the clinical evaluation of the GRBAS test. A mixed blinded presentation was made of all kinds of voices. ([www.mpedersen.org](http://www.mpedersen.org), see presentations 2005)

Only the -strain- was evaluated with the same scores by 3 voice professionals.

Mark the performance of the speaker		Circle
		consistent / intermittent
Overall Severity	_____	C / I _____
Roughness	_____	C / I _____
Breathiness	_____	C / I _____
Strain	_____	C / I _____
Pitch soft/loud	_____	C / I _____
Loudness low/high	_____	C / I _____



Musical testing of tone jumps:

First test person:	2 mistakes in the musical test of 24 tone jumps (2/24)
Second test person:	0 mistakes in the musical test of 24 tone jumps (0/24)
Third test person:	8 mistakes in the musical test of 24 tone jumps (8/24)

The natural musical talent and the (musical) training cannot be divided from each other. The personal qualifications of the voice professionals of reproducing more and more difficult given tone jumps (Wøldike test) did affect the results of GRBAS test scores.

The Wøldike test, used for inclusion in the Royal Danish boys choir has been studied earlier, also systematically in brain damaged people. (REF 1)

Musicality of the voice professionals does affect singing and speech evaluation. That is why objective measures in Randomised Controlled Trials (RCTs) and not only scores of tests in the science of singing are AS necessary as in the science of overall dysphonia.

The aspect is even more necessary for advice and treatment of patients with brain disorders and e.g. cochlear implants, who want to sing.