Cost action 2103, advanced voice function assessment.

Conference in Crete
26th-27th April 2007
Cost action 2103

Work group 5

- Coordinator M. Pedersen MD
- Ear-Nose-Throat specialist.
- Dr. Med. Sci
- delegate, Denmark, Ministry of Science
- www.mpedersen.org

- Co-coordinator G Kubin Prof.
- Dr. Techn.
- Institut für Signalverarbeitung
- und Sprachkommunikation
- www.spsc.TUGraz.at
Workgroup 5

1. Coordination of actions in the Signatory countries (15 in EU) for raising public concern about evidence based voice disorders and quality of life.

2. Provision of feedback of these new aspects to policy makers (and social services, legislators and others).
A directive has 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.**
Acoustical Area

**Standard equipment:**
- Recording procedure: Audio file/digital recording
- Fundamental frequency with jitter
- Intensity with shimmer
- Spectral analysis (FFT, spectography, LTAS, power spectrum)

**Optimal equipment also:**
- Recording procedure: digital recording
- Phonetograms for speech, singing and shouting
- Phonation index, diplophonia, multiphonia
- (Irregularity index), voice breaks
- Simultaneous video- and sound recording (for analysis)
- Signal-to-noise ratio & signal-to-harmonics ratio, nasality

**Research equipment also:**
- Stroboscopy combined with glottography
- Averaging of phonetograms
- Speech profile measurements
- Voice efficiency measurements in running speech (SPEAD)
- and others
Physiological Area

- **Standard equipment:**
  - Stroboscopy
  - Airflow measurements (Phonation time)

- **Optimal equipment also:**
  - Electroglottography
  - Respiratory measurements (long & short time)
  - Air pressure and MFR
  - Electromyography
  - Articulographic measurements (three-dimensional magnetic sensor)
  - Videokymography

- **Research equipment also:**
  - Highspeed video films
  - Videostrobolaryngoscopy with quantitative computing
  - Instrumentation for brain flow- and other brain activity measurements
  - Ultrasounds scanning, possibility of genetic studies
  - and others
Perceptual and Psychological Area

- **Standard methods:**
  - Listening *standard* voice quality test (GRBAS test?)
    (Including nasality)
  - Standardized methods for registration of patients’ subjective statements of illness
    (VHI)

- **Optimal methods also:**
  - Objective speech acoustics related perception (Eyscholt)
  - 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
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. (reference 1)

- 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. (reference 2)

- 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.
The references

- This kind of research is very expensive.


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Ongoing research in Lab

- Mette Pedersen
  - Daniel Heine Feddersen
  - Rune Frederik Hagen Sterling
  - Shazleen Rajan
  - Roma Yousaf
  - Anders Overgård Jønsson
  - Christian Frederik Larsen
  - Lennart Bo Naurholm
  - Aja Guldhammer Henderson
  - Joachim Fisker
High-Speed Video
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High-Speed Kymography

M. Pedersen, FRSM Dr.med.Sci. ENT specialist, The Medical centre, Østergade 18 3. DK – 1100 Copenhagen Denmark
Url:www.mpedersen.org
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Closure state
Phonetography - Table
Phonetography - Plots

+ Airflow at all measures

New instrument (FJ-Electronics)

1. Save recording on disk.
2. Print recording as chart.
3. Print recording in table.
4. Return to main menu.
5. Select function.

Name: 0511 dB x semitones
Area: 0023 dB
Dynamic range: 0511 dB
Lowest tone d#: 156 Hz
Highest tone f#2: 740 Hz
Identification: A: 030255.01
Phonetography – diagram of the voice

1. Save recording on disk.
2. Print recording as chart.
3. Print recording in table.
X. Return to main menu.
- Select function.

Name: METTE PEDERSEN
Area: Phonetography
Dynamic range: 0023 dB
Lowest tone d#: 156 Hz
Highest tone f#2: 740 Hz
Identification: A:030255.01

M. Pedersen, FRSM Dr.med.Sci. ENT specialist, The Medical centre, Østergade 18 3. DK – 1100 Copenhagen Denmark
Url: www.mpedersen.org
Phonetography – 2 compared

1. Save recording on disk.
2. Print recording as chart.
3. Print recording in table.
X. Return to main menu.
- Select function.

Name: 
Area: 0515 dB x semitones
Dynamic range: 0021 dB
Lowest tone d#: 166 Hz
Highest tone A#: 940 Hz
Identification: A:030255,02
METTE PEDERSEN

Phonetography - Average

1. Print statistics as chart.
2. Print statistics in table.
3. Enter headings for chart and table. Area:
4. Return to main menu.

Select function: 

Average Deviation

593 ± 116 dB x semitones
Dynamic range 27 ± 0.6 dB
Database
Ary Regions 1-5
from left to right