Cost action 2103, advanced voice function assessment. Conference in Crete 26\textsuperscript{th}-27\textsuperscript{th} April 2007
Cost action 2103

Work group 5

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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.
This kind of research is very expensive.


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
METTE PEDERSEN

High-Speed Kymography

Sequence position in ms
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Closure state
Phonetography - Table

<table>
<thead>
<tr>
<th>Tone No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone</td>
<td>G A HC D E F G A H C d e f g a h c d e f g a h c d e f g a h c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
+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: Ø511 dB x semitones
Area: 0023 dB
Dynamic range: 156 Hz
Highest tone: 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: 0511 dB x semitones
Area: 0023 dB
Dynamic range: 156 Hz
Lowest tone: f#2 = 740 Hz
Identification: A: 030255,01
# Phonetography – 2 compared

**Graph: **

<table>
<thead>
<tr>
<th>Tone No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>dB(A)</td>
<td>120</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

**Table: **

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Save recording on disk.</td>
<td>Name: Mette Pedersen</td>
</tr>
<tr>
<td>2.</td>
<td>Print recording as chart.</td>
<td>Area: 0515 dB x semitones</td>
</tr>
<tr>
<td>3.</td>
<td>Print recording in table.</td>
<td>Dynamic range: 0021 dB</td>
</tr>
<tr>
<td>X.</td>
<td>Return to main menu.</td>
<td>Lowest tone A#: 166 Hz</td>
</tr>
<tr>
<td></td>
<td>Select function.</td>
<td>Highest tone A#: 900 Hz</td>
</tr>
<tr>
<td></td>
<td>Identification</td>
<td>A: 030255.02</td>
</tr>
</tbody>
</table>
Phonetography - Average

1. Print statistics as chart.
2. Print statistics in table.
3. Enter headings for chart and table. Area Ø533 ± 116 dB x semitones
X. Return to main menu. Dynamic range 27 ± 06 dB

Select function: _

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### Database

<table>
<thead>
<tr>
<th>First Examination</th>
<th>Second Examination</th>
<th>Third Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>My throat does not function</td>
<td>Has this sensation</td>
<td>Pain or burning sensation in the throat</td>
</tr>
<tr>
<td>Globus</td>
<td>Has this sensation</td>
<td>Dysphagia</td>
</tr>
<tr>
<td>Hoarseness</td>
<td>Has this sensation</td>
<td>Continuous dry cough</td>
</tr>
<tr>
<td>Mucus and need to clear throat</td>
<td>Has this sensation</td>
<td>Voice analysis</td>
</tr>
<tr>
<td>Larynx spasm and hick spasm</td>
<td>Has this sensation</td>
<td>Any region</td>
</tr>
</tbody>
</table>

**SPED**

<table>
<thead>
<tr>
<th>Talé</th>
<th>12.54</th>
<th>17.92</th>
<th>49.92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jitter voice 1</td>
<td>12.54</td>
<td>17.92</td>
<td>49.92</td>
</tr>
<tr>
<td>Shimmer voice 1</td>
<td>17.92</td>
<td>49.92</td>
<td>53.24</td>
</tr>
<tr>
<td>Coarse voice</td>
<td>15.89</td>
<td>11.15</td>
<td>0.15</td>
</tr>
<tr>
<td>Overall irregularity</td>
<td>0.15</td>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>

**Treatment**

- Naxium 40 mg 1 gange dagligt
- Lifestyle Guidance

**Image:** Laryngoscopy photo.
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Ary Regions 1-5
from left to right