Long-Term Evaluation of Cochlear Implantation in Subjects with Acquired Unilateral Hearing Loss and incapacitating tinnitus up to 10 Years

Focus on Tinnitus Outcomes

Paul Van de Heyning, MD, PhD
Griet Mertens, PhD

University Dept. Otorhinolaryngology, Head and Neck Surgery
Antwerp University Hospital (UZA)
Belgium Faculty of Medicine and Health Sciences
University of Antwerp (UA)
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**Experimental set-up**

- 30 acquired SSD/AHL& incapacitating tinnitus*; VAS>6/10
  - Duration > 2 year and <10 years
  - Irresponsive to drugs or TRT/CBT
  - 19 pt with SSD
  - 11 pt with AHL
  - CI with complete electrode insertion (MED-EL)
  - Regular fitting 4 weeks after CI

- 7 pt SSD with progressive electrode activation of CI
- 3EAS
- 1ABI
- 2 with major depression
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<th>Subjects</th>
<th>Tinnitus</th>
<th>T Annoyance</th>
<th>Conclusion</th>
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<tr>
<td><strong>Inclusion criteria</strong></td>
<td><strong>Exclusion criteria</strong></td>
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<tr>
<td>- SSD/AHL with Tinnitus</td>
<td>- Major depression</td>
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<tr>
<td>- Severe tinnitus: tinnitus loudness 6-10 on VAS for &gt;6 months</td>
<td>- Not willing to attend rehabilitation and follow-up</td>
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<tr>
<td>- Subjective tinnitus due to ipsilateral profound SNHL or partial deafness</td>
<td>Other types of tinnitus</td>
<td>Duration of deafness &gt;10 years?</td>
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<tr>
<td>- Standard treatments of tinnitus have no effect</td>
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<td>- Realistic expectations</td>
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<tr>
<td>- Normal hearing to moderate hearing loss contralaterally (AHL)</td>
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Subjects  

Tinnitus  

T Annoyance  

Conclusion  

Control  

CI off  

CI on  

- 12-24 mnths  

Tinnitus loudness (VAS)  

months after first fitting  

baseline  

1  

3  

6  

12  

18  

24  

36  

48  

60  

72  

84  

8,45  

8,57  

6,45  

2,17  

-
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<tr>
<td>Tinnitus characteristics</td>
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<tr>
<td>• No difference between pure tone type tinnitus noise type tinnitus polyphonic sensation</td>
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<tr>
<td>• No difference between Low pitch Mid pitch High pitch</td>
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<tr>
<td>• No difference of duration of deafness &amp; tinnitus</td>
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Figure 4. Scores of the Visual Analogue Scale (VAS) for assessing tinnitus loudness, preoperatively, 1, 3, 6, 12, 36 months postoperatively and at the Long-term test interval. White bars represent the CI OFF condition and grey bars the CI ON condition. Significant differences (p<0.01) are indicated with an asterisk (**).

Subjects
Tinnitus
T Annoyance
Conclusion

The mean difference in SRT in the non-tinnitus ear between the two conditions $(SRT_{\text{Cl off}} - SRT_{\text{Cl on}}) = 1.98 \text{ dB SNR}$ (SD 3.01 dB SNR)
The mean difference in SRT in the non-tinnitus ear between the two conditions \((SRT_{Cl\ off} - SRT_{Cl\ on}) = 1.98 \text{ dB SNR} (SD 3.01 \text{ dB SNR})\)
Tinnitus Questionnaire (TQ)
Lower is better
Figure 6. Median Tinnitus Questionnaire scores for the A_SSD Group and for the B_AHL Group, including the individual subscale scores; emotional distress, cognitive distress, auditory perceptual difficulties, intrusiveness, sleep disturbance, and physical complaints. Dark bars (●) indicate pre-operative scores and light bars (●) indicate long-term scores. Significant differences between both test moments are indicated with an asterisk (*).

Hyperacusis Q (Khalfi)

Figure 7. Median scores of the Hyperacusis Questionnaire for the A_SSD Group and for the B_AHL Group. Total scores and the three subscales: Attention, Social and Emotional are shown. Two conditions were surveyed; the CI ON condition (*) and the CI OFF condition (*). Significant differences between the CI ON and the CI OFF condition are indicated with an asterisk (*).
CI Use (n=23):
- 7 days a week
- 5h / day

CI Switch-on = first act when rising; CI Switch-off last act before bedtime

Type of tinnitus:
- Noise
- Polyphone
- Pure Tone

Tinnitus starts decreasing:
- ≤1 min.
- >1 - ≤10 min.
- When start concentrating

Tinnitus starts to return:
- ≤1 min.
- >1 - ≤10 min.
- When stop concentrating

Revealed from tinnitus

Tinnitus as primary advantage of CI

Hearing as primary advantage of CI

Cochlear implantation in Unilateral Hearing Loss

See Mertens S12 at 3.45PM

- Improved hearing capabilities
  - Speech perception in noise
  - Sound localization
- Decreasing the tinnitus loudness and distress

Unilateral hearing loss and incapacitating tinnitus is a new indication for CI.
Program directors
Griet Mertens PhD
Anouk Hofkens Ma Aud
Annick Gilles PhD
An Boudewyns MD PhD
Olivier Vanderveken MD PhD

Conference Organisation
Semico

Venue
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