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

Focus on Binaural Auditory Outcomes

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Company:
Grant MED-EL (Innsbruck, Austria) paid to UZA.
Subjects

Speech Perception

Sound Localization

Conclusion

✗ Single-sided deaf ear

✓ Normal Hearing Ear

n= 23
All subjects were implanted because of their major complaint: ipsilateral incapacitating tinnitus.
Subjects

Speech Perception

Sound Localization

Conclusion

SSD

n= 12

AHL

n= 11

Single Sided Deafness

Asymmetric Hearing Loss
Tinnitus as primary advantage of CI
Hearing as primary advantage of CI

SSD subjects
- Tinnitus as primary advantage of CI: 83%
- Hearing as primary advantage of CI: 17%

AHL subjects
- Tinnitus as primary advantage of CI: 45%
- Hearing as primary advantage of CI: 55%
Subjects

Speech Perception

Sound Localization

Conclusion

0 5 10 15 20

7 days a week
100%

5h / day

CI Switch-on, as soon as they got up in the morning
4%

CI Switch-off, only before going to bed at night
96%
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<tbody>
<tr>
<td>Summation Effect</td>
<td>Squelch Effect</td>
<td>Headshadow + Squelch Effect</td>
<td>Spatial Release from masking</td>
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<tr>
<td><strong>S+N</strong></td>
<td><strong>S</strong></td>
<td><strong>N</strong></td>
<td><strong>(A) aided – (B) aided</strong></td>
</tr>
<tr>
<td><strong>(A)</strong></td>
<td><strong>(B)</strong></td>
<td><strong>(C)</strong></td>
<td><strong>(D)</strong></td>
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**Redundancy benefit:**
- Same acoustic stimulus is presented to both ears
- 2-6 dB

**Effect:**
- ‘Extracting’ input of non-informative background noise.
- 2-3 dB

**Acoustic Shadow**
- 5 dB

**Ability to use spatial separation between speech and noise**
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**Speech Perception**:
- Summation Effect
- Squelch Effect

**Sound Localization**:
- Headshadow + Squelch Effect

**Conclusion**:
- Spatial Release from masking

**Notes**:
- Reduced benefit: when acoustical axis is presented to both ears
- 2-6 dB
- 'Extra gain' effect of uniform noise 2-3 dB
- Acoustic 5 dB
- Sensitivity to spatial separation between speech and noise
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<td>UHL Study Cohort</td>
<td>1.34 dB SNR**</td>
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<td>0.33 dB SNR</td>
<td>3.34 dB SNR**</td>
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*dB* dB SNR**
Set-up

- Sound isolated booth
- Stimulus = Broad band noise
- 9 Broadband Fostex loudspeakers
- Frontal semicircle in a horizontal plane
- 0.8 m from subject
- Stimulus coordinates ranged -90° - +90°
- 22.5° intervals
- 27 trials
Subjects

Speech Perception

Sound Localization

Conclusion

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<th>Better</th>
<th>MAE (°)</th>
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<tr>
<td>CI only</td>
<td>70</td>
</tr>
<tr>
<td>AH only</td>
<td>90</td>
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SSD
n= 12

AHL
n= 11

Antwerp University Hospital
University of Antwerp
Cochlear implantation in Unilateral Hearing Loss

- 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.
Cochlear implantation in Unilateral Hearing Loss

Unilateral hearing loss and incapacitating tinnitus is a new indication for CI.
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