The US Electrical Acoustic Stimulation (EAS) clinical trial: Audiological results

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Purpose

- To assess residual hearing and speech perception of patients using the MED EL DUET processor and Flex EAS implant
- Multicenter study
Participating sites

- Boys Town National Research Hospital, Omaha, NE
- Duke University Medical Center, Durham, NC
- Hospital of the University of Pennsylvania, Philadelphia, PA
- Indiana University School of Medicine, Indianapolis, IN
- Medical College of Wisconsin, Milwaukee, WI
- New York Eye & Ear Infirmary, New York, NY
- Oregon Health Sciences University, Portland, OR
- Stanford University, Stanford, CA
- Swedish Neurosciences, Seattle, WA
- University of Kansas Medical Center, Kansas City, KS
- University of Miami Ear Institute, Miami, FL
- University of Michigan, Ann Arbor, MI
- University of North Carolina Hospitals, Chapel Hill, NC
- University of Texas SW Medical Center, Dallas, TX
Candidacy Criteria

CAUTION: Investigational device. Limited by US law to investigational use.

[Graph showing hearing levels and frequency in Hz with shaded areas indicating arm 1 and arm 2 criteria.]

0-50% on CNC words

51-60% on CNC words
Background

• DUET speech processor for electric-acoustic stimulation (EAS)
• DUET external system is used in conjunction with the Sonata receiver stimulator together with the FLEX electrode design.
• Longer than other hearing preservation electrodes

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Reported Results with DUET


Background: Sentences in noise


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## Subjects

<table>
<thead>
<tr>
<th>Patient</th>
<th>Gender</th>
<th>Ear implanted</th>
<th>Electrode</th>
<th>Duration of deafness (yrs)</th>
<th>Etiology</th>
<th>Age at implantation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>Right</td>
<td>FLEX EAS</td>
<td>13</td>
<td>Noise induced</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>Left</td>
<td>FLEX EAS</td>
<td>16</td>
<td>Unknown</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>Right</td>
<td>FLEX EAS</td>
<td>17</td>
<td>Viral</td>
<td>67</td>
</tr>
</tbody>
</table>
Procedures

• Speech perception was evaluated at the following visits:
  – Pre op (baseline), initial stimulation, 3, 6 and 12 months post initial stimulation
• CNC words and CUNY sentences tested in the following conditions:
  - CI only
  - HA only
  - EAS
Results: Change in hearing

![Graph showing change in hearing (dB) across different frequencies (Hz). The graph compares three patients (Pt 1, Pt 2, Pt 3).]
Results: Hearing preservation

Pt 1

Frequency (Hz)

Intensity (dB)

- Pre OP
- Init Stim
- 12 mos

Pt 2

Frequency (Hz)

Intensity (dB)

- Pre Op
- Init Stim
- 12 mos
Results: Hearing preservation
Results

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Results

CUNY Sentences at +5dB SNR

Score (% Correct)

- pre-op
- 3m
- 6m
- 12m

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Conclusions

• Despite initial loss at surgery, hearing thresholds are maintained.
• Even with longer array, there is stability in hearing levels.
• In noise conditions, EAS tends to yield better results than a traditional hearing aid.
Considerations and Directions

• ESRTs can be a valuable tool for use in programming CI patients, including EAS patients

• Consider the FLEX electrode arrays when hearing conservation is the aim

• The use of a longer array with complete cochlear coverage (ccc) still results in good hearing preservation and gives advantage of adequate electrical stimulation without the need of re-implantation.

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Discussion

- Evidence that electrode length is not correlated to hearing loss


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Thank you for your attention