Artificial Intelligence-Assisted Cochlear Implant Mapping: Implications for Clinic Efficiency and Future Directions

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Disclosures

• Financial:
  - University of Michigan, Employer
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• Nonfinancial:
  - Executive Board Member, Michigan Audiology Coalition
  - Volunteer, American Academy of Audiology PAC
Introduction

• Differences in MAPping across clinicians & clinics may impact recipient outcomes and clinic efficiency
  – Programming procedures, use of default MAP parameters, and frequency and length of post-operative programming sessions

• Standardization of post-operative management procedures may improve or equalize patient outcomes across clinicians/clinics while promoting efficient clinical service delivery

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Demographics & Methods

- 8 newly implanted adult unilateral CI recipients
  - Enrolled in study Clinical Investigation of New CI Delivery Models in an Adult Nucleus CI Population
- Post-operative programming used the FOX clinical support tool and a streamlined visit schedule
- Performance was evaluated pre-operatively and at 3 & 6 months post-activation in the soundfield using CNC monosyllabic words presented at 60 dB SPL in quiet.

<table>
<thead>
<tr>
<th>Subject Demographics (N=8)</th>
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<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>68;8 (48;11-87;1)</td>
</tr>
<tr>
<td>Male/Female</td>
</tr>
<tr>
<td>3/5</td>
</tr>
<tr>
<td>Duration of Hearing Loss</td>
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<tr>
<td>20;7</td>
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FOX – Fitting to Outcomes Expert

- Artificial Intelligence (AI) based clinical support tool
- Assists the audiologist with making MAP changes based on the recipient’s performance on direct-connect tests performed outside the sound booth

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FOX Mapping Process

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Results

- Improvement in CNC monosyllabic word scores was observed for all subjects at 3 and 6 months post-activation.

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Subjective Experience

- Clinician-patient relationships were not subjectively compromised
- Appointment lengths were similar to traditional programming

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Clinical Relevance

- Day 2 Activation appointment was eliminated for all recipients as a result of our experience in this study.

Opened approximately 340 clinic hours per year.

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Conclusions

• Recipients can have their performance optimized with fewer programming sessions

• It is possible to efficiently utilize an AI-assisted clinical support tool during mapping sessions

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Limitations & Future Directions

• Limitations
  – Statistical analysis was not possible due to the low number of subjects
  – Subjects were selected from individuals presenting for traditional CI evaluation, however selection bias may have been a factor

• Further research is necessary to identify appropriate clinical populations for use of AI-assisted clinical support tools.

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• Questions?
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