HP using short and long Flex electrodes in patients meeting EAS criteria

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Introduction
The benefits of preserving residual low-frequency hearing are well established. However, with greater understanding of the variance in initial outcomes and the likelihood of long-term maintenance of initially preserved hearing, a dichotomy is emerging between using short electrodes to deliver better hearing preservation (HP) and longer electrodes to provide better performance in the electrical stimulation-only (ES-only) condition should residual hearing be lost.

Methods
Single centre observational study
Patients meeting the traditional audiological criteria for electric-acoustic stimulation (EAS) (thresholds of 65dBHL or better at 250 and 500Hz) were included in this study. The primary outcome was success of HP using the HEARRING group classification system and the secondary outcome was changes in thresholds at individual frequencies.

6 patients receiving Flex28 electrodes and 11 patients receiving Flex24 electrodes were identified for further analysis in this retrospective study. Using the HEARRING group classification system success rates for HP were similar between both groups, and there were no cases of minimal or complete loss of residual hearing.

Results:Summary
6 patients receiving Flex28 electrodes and 11 patients receiving Flex24 electrodes were identified for further analysis in this retrospective study. Using the HEARRING group classification system success rates for HP were similar between both groups, and there were no cases of minimal or complete loss of residual hearing.

Results: Changes in thresholds at individual frequencies

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Pre op</th>
<th>Post Op</th>
<th>Range Pre op</th>
<th>Range post op</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>36.6</td>
<td>40.8</td>
<td>45</td>
<td>71.6</td>
<td>10.5</td>
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<tr>
<td>250</td>
<td>52</td>
<td>70</td>
<td>94</td>
<td>114</td>
<td>45</td>
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<tr>
<td>500</td>
<td>10-65</td>
<td>15-65</td>
<td>15-110</td>
<td>80-120</td>
<td>10-55</td>
</tr>
<tr>
<td>1000</td>
<td>25-80</td>
<td>40-90</td>
<td>65-105</td>
<td>80-120</td>
<td>10-55</td>
</tr>
</tbody>
</table>

Conclusion
Further study is needed to determine if comparable rates of HP can be achieved in EAS candidates between short electrodes specifically designed for HP surgery, and longer electrodes enabling Complete Cochlear Coverage (CCC).

Should this be the case, then EAS patients may be better served by using longer electrodes for HP.

Longer electrodes can be sequentially activated to match hearing deterioration over time in children, young people and younger adults.

Sequential activation would provide the benefits of CCC when residual hearing is no longer providing functional benefit.

Work is needed to determine the long-term impact on QoL and patient reported outcomes (PROs) of these 2 strategies.

Mean pre-op and best post-op PTA in Flex28

Mean pre-op and best post-op PTA in Flex24

Mean Pre-op PTA

Blue line- combined n=17
Black line- flex 24 n=11
Red line – flex 28 n=6