Round Window versus Extra-tympanic Electrocochleography in Auditory Neuropathy Spectrum Disorder

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ABSTRACT
Eight ANSD patients participated in the study. Figure 3 show the ECochG responses recorded at TM and RW from one ANSD patient (S8) using four types of stimuli. Figure 4 show the ECochG (ECochG) recordings obtained simultaneously at the round window (RW) and tympanic membrane (TM) in patients with auditory neuropathy spectrum disorder (ANSD) children. Patients were implanted between 1 and 11 years of age. A clear CAP was recorded from S1, S5, S7, and S8. The CAP amplitude decrement in the click train condition indicates neural adaptation in ANSD.

METHODS AND MATERIALS
Common techniques for assessing auditory function in ANSD patients include auditory brainstem response (ABR) testing and electrically evoked (ECochG) responses. However, in these studies, ECochG responses were measured on the promontory or at the round window (RW) using invasive techniques. ECochG responses can also be recorded from electrodes placed on or near the TM or in the middle ear. This latter technique has the advantage of being non-invasive and easily applicable to most patients. We hypothesize that similar response patterns can be derived from invasive recordings but still showed significant positive correlation in most cases.

RESULTS
ECochG responses were successfully recorded from eight ANSD patients using all four paradigms. Both sites (TM and RW) revealed similar response patterns although RW responses were at least one order of magnitude greater than the TM responses. For all patients and conditions tested, the TM and RW ECochG recordings were significantly correlated in 90.3% of cases. A clear CAP was recorded from 4 of 8 patients. Also, in the click train condition, a subset of our subjects is consistent with previous literature. The CAP amplitude decrement in the click train condition indicates neural adaptation in ANSD.

CONCLUSIONS
Extra-tympanic recordings have larger amplitudes and better morphology than TM recordings but still showed a robust correlation in most cases. The CAP morphology recorded from a subset of our subjects is consistent with previous literature. This pattern suggests neural adaptation. Whether similar patterns are found in children with severe noise exposure than ANSD patients will require future investigation.

REFERENCES
1. The Deafness Research Foundation.