Clinical Use of Electrically Evoked Stapedial Reflex Threshold Measures for Cochlear Implant MAPping Optimization

Principal Investigators: Katrina Stidham, MD; Rivka Bornstein, AuD

Co-Principal Investigator: Mindy Schmelzer, AuD

Significance and Background:

Cochlear implantation is widely regarded as the standard of care for individuals with severe to profound hearing loss and limited benefit from standard amplification. Patient outcomes are strongly influenced by the stimulation levels set by the cochlear implant audiologist (Moog & Geers, 2003; Tobey, Geers, Brenner, Altuna, & Gabbert, 2003). These levels have been shown to be widely variable, as they are often dependent on the subjective response of the listener, as well as the clinical acumen of the cochlear implant audiologist (Tobey, Geers, Brenner, Altuna, & Gabbert, 2003; Zwolan, O'Sullivan, Fink, Niparko, & Team, 2008; Wolfe, et al., 2017). The electrically-evoked stapedial reflex threshold (eSRT) has been shown to be successful in providing an objective measure of the upper stimulation levels for cochlear implants (Battmer, Laszig, & Lehndhardt, 1990; Wolfe, et al., 2017; de Andre, et al., 2018; Zwolan, O'Sullivan, Fink, Niparko, & Team, 2008). Many studies have demonstrated improvements in speech understanding scores when patients listen with MAPs created using eSRT versus their previous behaviorally measured programs (Moog & Geers, 2003; Wolfe & Kasulis, 2008).

Despite the multitude of data describing the benefits of eSRT measures, it remains an under-utilized tool by most cochlear implant audiologists (Hemmingson & Messersmith, 2018; Vaerenburg, et al., 2014). In a survey of pediatric audiologists from around the United States, only 46% of the respondents indicated that they performed eSRT (Hemmingson & Messersmith, 2018). Only 14% of reporters on a global survey indicated that they use eSRT to obtain maximum levels (Vaerenburg, et al., 2014). Perhaps the primary reason for the infrequent clinical use of the eSRT, is the limited knowledge clinical audiologists possess regarding the procedure and its application for general implant programming (Messersmith, Entswile, & Stout, 2018). Another significant factor is that eSRT cannot be measured in approximately 30% of patients (Van Den Abbeele, et al., 2012; Battmer, Laszig, & Lehndhardt, 1990). This is thought to be largely related to the presence of abnormal middle ear findings as well as the stimulus frequency used to measure eSRT (Wolfe, et al., 2017).

The proposed study looks to evaluate the clinical usage of the eSRT measure as a regularly utilized programming tool. Its impact on patients' speech understanding, as evaluated by AzBio Sentences, HINT Sentences, and CNC Words, will be discussed.

Aims:

The purpose of this study is to examine the feasibility of the eSRT measure as a clinically viable programming tool. Comparisons will be made between test scores completed using patients' behavioral MAPs and those created using eSRT. The findings obtained in this study will provide useful insight for

future cochlear implant MAPping optimization of all patients; and in particular, the pediatric and difficult-to-test population.

Hypothesis:

The eSRT measure can be performed with limited difficulty on most cochlear implant recipients. Test scores of patients using eSRT MAPs are expected to improve or be similar to those obtained with their behavioral MAPs. Most patients will prefer the MAPs created using eSRT compared to their behavioral MAPs.