Use of Direct-Connect for Remote Speech-Perception Testing in Cochlear Implants

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INTRODUCTION

Many clinical visits are required within the first year following cochlear implantation, with 1–2 visits per year thereafter. Due to the limited number of centers offering cochlear implant (CI) services, remote mapping has been investigated as an alternative for CI recipients who limited number of centers offering cochlear implant (CI) services, remote CI service delivery. Many clinical visits are required within the first year following cochlear implantation, with 1-2 visits per year thereafter. Due to the limited number of centers offering cochlear implant (CI) services, remote CI service delivery. Results from two recent studies in our laboratory showed that speech-perception scores were poorer in a remote testing room than in a sound booth (in person) due to differences in the acoustical environment (e.g., background noise and reverberation). This study investigated whether direct audio input (DAI) of speech stimuli to the CI sound processor can be used as a substitute for sound-booth speech-perception testing for remote CI service delivery. We hypothesized that remote DAI and in-person sound-booth results will be equivalent.

METHODS

PARTICIPANTS:
- N = 30 adults and older children with CIs
- ≥ 6 months of CI use
- Proficient in spoken English

STIMULI:
- CNCs (words and phonemes); HINT and AZBio sentences.
- List number and condition order were randomized for each subject.

STUDY DESIGN:
- Prospective, split-half (N=15 remote first; N=15 in-person first)
- Participants used daily clinical map including all front-end processing (e.g., ADRO, ASC).
- The map for the remote DAI condition was programmed for auxiliary processing (e.g., ADRO, ASC).

RESULTS

Figure 1. Schematic of test setup for the in-person Sound-Booth and remote Direct Audio Input (DAI) conditions for speech perception testing. A = audiologist; P = participant.

Figure 2. Scatter plots for Sound-Booth vs. Remote HINT scores in quiet and noise conditions.

Figure 3. Mean HINT scores for Remote vs. Sound-Booth conditions. Significant differences (p < 0.05) are indicated by asterisks. The Sound-Booth condition yielded poorer performance than Remote in 3 of the 6 conditions.

Figure 4. Scatter plots for Sound-Booth vs. Remote AZBio scores in quiet and noise conditions. Shaded regions indicate scores outside the list-equivalency confidence intervals.

Figure 5. Mean AZBio scores for Remote vs. Sound-Booth conditions. Significant differences (p < 0.05) are indicated by asterisks. The Sound-Booth condition yielded poorer performance than Remote in 3 of the 6 conditions.

SUMMARY/CONCLUSIONS

For both sentence tests, Sound-Booth results were poorer than Remote for the 50+5, 60+10, and 60+5 conditions. In contrast, Sound-Booth results were better than Remote for CNCs at 50 dB SPL. Further testing is underway to investigate potential sources of the extreme outliers in our data. These might include front-end processing, or changes in list equivalency in different noise conditions. Better performance in the remote condition could be due to elimination of small reverberation effects in the Sound-Booth.

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REFERENCES


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