Benefits of Telecoil

Staying in the loop

Telecoil, and other wireless technologies, are able to provide tremendous benefit in a variety of challenging listening environments. The current study demonstrates this benefit, with discussion around how best to counsel on telecoil for maximum retention and uptake.

Introduction

It is well documented that as hearing loss worsens, the signal-to-noise ratio (SNR) required to accurately recognize speech also increases[1]. This difficulty may contribute to listening fatigue and the avoidance of difficult listening situations like group meetings, lectures, religious services, and the theater. Even with directional microphones, patients may still have difficulty understanding speech in these types of complex listening environments.

There are numerous wireless assistive listening technology options which help to effectively improve the SNR for the patient. Hearing aids can be wirelessly connected to remote microphones, FM systems, and induction hearing loops via a telecoil mode. It is important for clinicians to understand not only the realistic and relative efficacy of these systems[2], but also factors that impact their patients' understanding and utilization of these systems. Lab-based speech recognition tests and a simulated movie theater/auditorium listening experience were conducted to compare the standard hearing aid microphone configuration to wirelessly delivered audio inputs.

Methods

A total of 28 participants were recruited into two primary groups based on the style of hearing aid used in the study. Participants in the first group (n=14) used binaural Evolv AI Power Plus BTE 13 hearing aids, and the second group (n=14) used binaural Evolv AI wireless CIC hearing aids.

A subset of the BTE Group's participants (n=7) was provided with a demonstration of the telecoil functionality during their hearing aid fitting session (i.e., "Telecoil demo group"). The other BTE users (n=7) only received a verbal explanation of their telecoil function.

Lab Testing – Two phases of this study were completed. The first testing phase took place in a laboratory setting, where speech recognition testing was administered. Participant performance (percent correct) was compared between standard hearing aid microphone settings, a 2.4 GHz remote microphone system, and a hearing loop system using a telecoil function. AzBio sentences were presented to the participants at 65 dBA, with a +10 dB SNR. However, the participants were seated 3 meters from a talking manikin, in a reverberant room that had a critical distance of only 1.5 meters.

Retention of telecoil knowledge was also evaluated during the laboratory visit, using a reteaching assessment method.

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Movie Theater and Auditorium Experience – During the second phase of the study, CIC and BTE Participants (n=27) were invited to participate in a simulated movie theater and auditorium listening experience. Participants provided subjective ratings for the standard hearing aid microphone configuration and the hearing loop/telecoil setting. For these comparisons, BTE hearing aid users utilized the embedded telecoil in the hearing aids, while the CIC users accessed the hearing loop using the "T" mode of the 2.4 GHz Remote Microphone + accessory. Participants rated both modes for different types of audio presentations, including amplified live speech, film dialogue, and music.

Results

Wireless assistive listening technology significantly improved (P<0.001) word recognition in noise for both BTE and CIC users (Figure 1). BTE microphones were set to directional mode while CIC microphones were omnidirectional. The remote microphone device and the hearing loop microphone were placed six inches and four inches, respectively, from the mouthpiece of a talking manikin. Post-hoc analysis revealed no significant difference between the remote microphone and telecoil audio source inputs.

Participants were asked to recall the purpose of the telecoil mode. The group that received an initial demonstration of the telecoil showed better recall after one month than the group who were only informed about the telecoil verbally (Figure 2). After two months, participants were observed for self-initiated use of their hearing aids' telecoil mode at a simulated movie theater experience. Observations were made following the presentation of realistic clips of "movie trailers" and several minutes of the film (Figure 3).

Conclusions

Findings from these observations validate the recommendation of wireless assistive listening systems for hearing aids, even for individuals with more mild degrees of hearing loss. Results also underscore the importance of counseling and in-office demonstration of how to utilize these systems with hearing aids. Encouraging patients to make paired-comparison evaluations in realistic scenarios, may improve perceived benefit and lead to lasting behavior changes.

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Figure 1

Wireless assistive listening technology significantly improved (P<0.001) word recognition in noise for both BTE and CIC users. BTE microphones were set to directional mode while CIC microphones were omnidirectional. Post-hoc analysis revealed no significant difference between the remote microphone and telecoil audio source inputs.

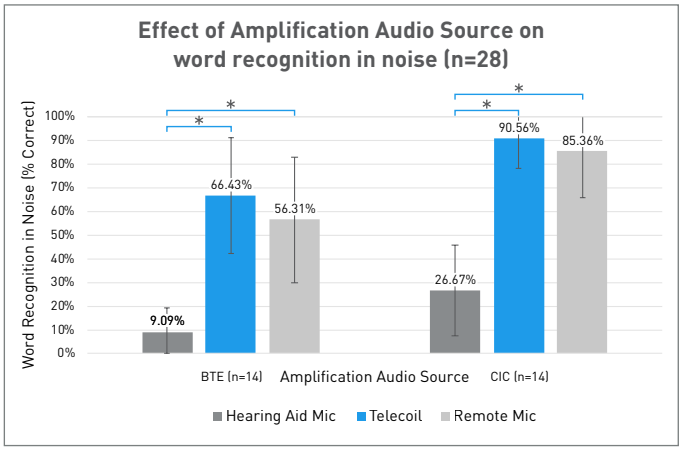


Figure 2

Participants were asked to recall the purpose of the telecoil mode. The group that received an initial demonstration of accessing a hearing loop with a telecoil showed better recall after one month than the group of participants who were only informed about the telecoil verbally.

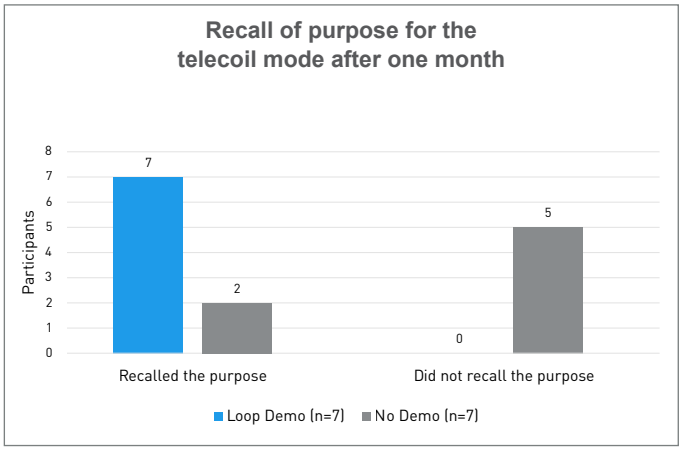
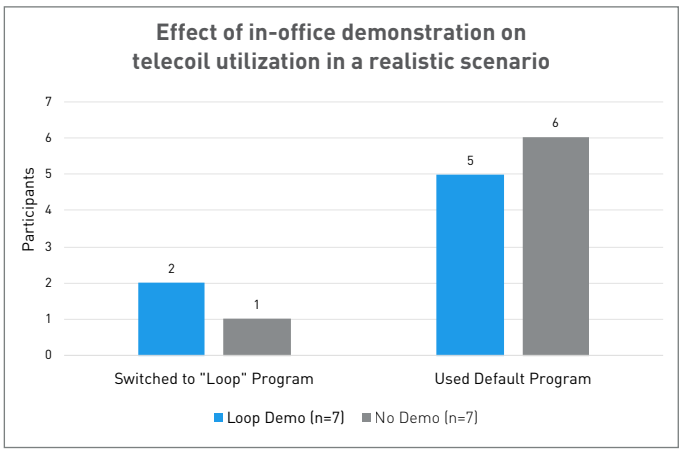


Figure 3

Participants were observed for self-initiated use of their hearing aids' telecoil mode during the presentation of realistic clips of "movie trailers" and several minutes of the film.



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