

Phonak

Field Study News

Speech improvement using Roger NeckLoop with different brands of hearing aids

The benefits of Roger technology for speech intelligibility in noise and over distance are well-established. However, just a small percentage of that research has examined the impact of using Roger technology with non-Phonak hearing aids. In a new study, Roger NeckLoop and Roger Table Mic II were combined with hearing aids from three different manufacturers. Results of objective and subjective testing demonstrated a significant advantage for Roger use with non-Phonak hearing aids in noise and over distance than hearing aids alone.

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Key highlights

- Roger NeckLoop can be used with virtually any hearing aid or cochlear implant sound processor with a t-coil.
- Speech intelligibility improved from 27% to 81% using a Roger system in 60 dB A of background noise compared to hearing aids alone.
- 100% of participants preferred using the Roger system compared to hearing aids alone.

Considerations for practice

- Regardless of which brand of hearing aids your clients wear, Roger can help improve their hearing outcomes in noise and over distance.
- Demonstrating Roger in the clinic is a great way to show clients the benefit they will experience in real-world listening environments.
- Use Roger NeckLoop with headphones to allow friends and family to have a Roger demo alongside your clients.

Introduction

Over the past decade, hearing aid technology has become increasingly advanced. Directional microphone systems and noise reduction algorithms continuously gather information about the listening environment and carefully adjust parameters to optimize the listening experience for the wearer. Additionally, direct connectivity to smartphones, tablets, and computers have resulted in the ability to adjust hearing aids and cochlear implants with a connected app. Recent surveys of those wearing hearing aids have shown a steady increase in hearing aid satisfaction over the past several years (Powers & Rogin, 2019), possibly aided by these technologies. However, even with the most advanced technology and custom settings, following a conversation in background noise is still a significant challenge for many hearing aid wearers (Abrams & Kihm, 2015).

While understanding speech in background noise can sometimes present a challenge for normal hearing listeners, those with hearing loss can find it especially difficult. Even with well-fit hearing aids, 31% of hearing aid wearers report continued difficulty hearing in noise (Abrams & Kihm, 2015). For them, it is important to have another solution that directly addresses these challenging listening situations. One way to address this problem is the use of a remote microphone system, and many hearing aid manufacturers offer such a microphone to complement their hearing aids. Unfortunately, these microphones are often quite simplistic, only work to a limited degree in noise, and use proprietary wireless technology that is only compatible with that brand's hearing aids.

Roger technology was designed to address these problems. Roger is a digital adaptive microphone technology that wirelessly transmits a speaker's voice directly to a listener's hearing aid(s) or cochlear implant sound processor via a Roger receiver. Roger is not limited to only one hearing aid manufacturer but is compatible with virtually any hearing instrument with a telecoil program. There is an assortment of Roger microphones to choose from, with uses ranging from one-on-one conversations to large-scale meetings and events with multiple active talkers, and are ideal for use in classrooms, the workplace, and everywhere in between. Several Roger microphones can also be used together in a Roger MultiTalker network, allowing for greater coverage in large spaces and dynamic situations in which there are multiple speakers of interest and the format of the conversation change rapidly.

Multiple studies have shown the ability of Roger technology to improve speech intelligibility in noise and over distance

with Phonak hearing aids. (Thibodeau 2014, Thibodeau 2020) However, the extension of research with Roger and non-Phonak hearing aids is much more limited. With the launch of the all-new Roger NeckLoop, we sought to better understand the benefit of Roger technology for those not wearing Phonak hearing aids. Roger NeckLoop is designed for use with any telecoil-enabled hearing instrument and is comprised of a body-worn Roger receiver connected to an electromagnetic induction loop, allowing the Roger signal to be transmitted to hearing aids or cochlear implant sound processors via a telecoil program. When paired with a Roger microphone, Roger NeckLoop allows the benefits of Roger technology to be experienced by millions of hearing aid wearers who do not have Phonak hearing aids.

The primary objective of this study was to specifically understand the improvement in speech intelligibility and subjective preference using a Roger system with non-Phonak hearing aids in a complex workplace listening environment.

Methodology

Participants

A total of 14 participants (11 male and 3 female) ranging in age from 37 to 70 participated in the study, with an average age of 55 years. All participants had bilateral sensorineural hearing loss and were experienced hearing aid wearers, having used hearing aids for at least 6 months. Of the 14 participants, 5 had previous Roger experience or were currently using Roger technology, however none had used Roger for longer than 6 months. All participants were native Swedish speakers.

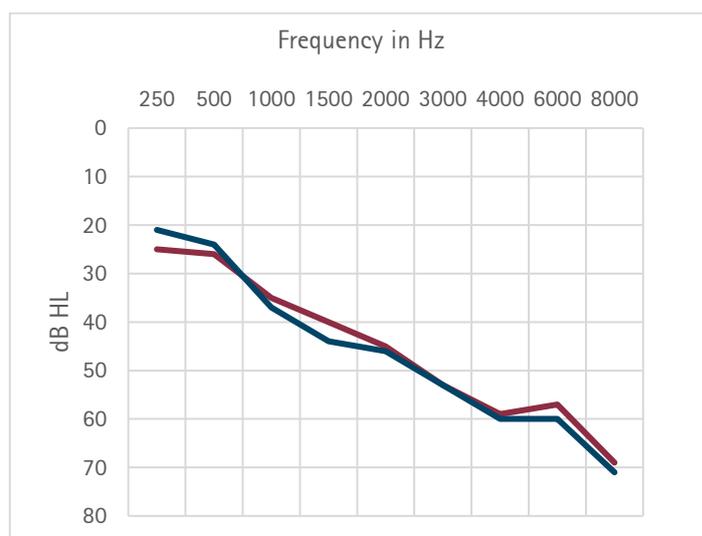


Figure 1. Average audiometric thresholds of participants. The red line represents the right ear and the blue line represents the left ear.

Equipment

Each participant was fitted with one pair of Phonak and two pairs of non-Phonak hearing aids from two different manufacturers. These hearing aids were fitted to the participant's hearing loss according to the first-fit suggestions of that particular manufacturer's fitting software. A manual microphone + telecoil program was added as a separate program and no other fine-tuning changes were made. All hearing aids included in the study, were of the same performance level and each participant was tested wearing three different brands by the end of the study.

All participants used a Roger system consisting of Roger NeckLoop worn around the neck in every test condition and Roger Table Mic II.

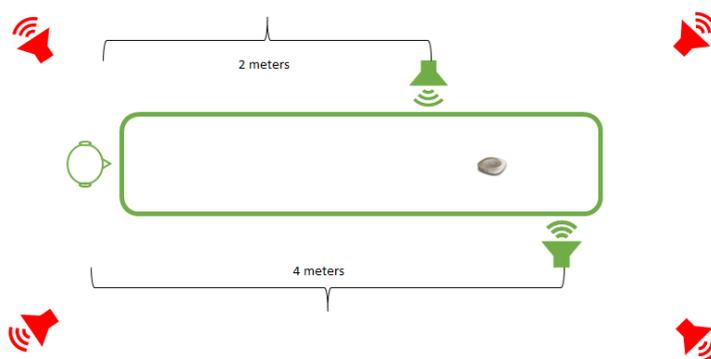


Figure 2. Layout of laboratory test setup. The layout was designed to mimic the real-world environment of an office meeting.

Procedures

A layout of the testing conditions can be seen in Figure 2. Participants were seated at a long table and asked to repeat Swedish HINT sentences randomly played from one of two loudspeakers placed either 2 or 4 meters in front of them, simulating a workplace conversation in a noisy room. The level of the target speech was 65 dB A as measured from a distance of one meter from the loudspeaker presenting speech. The Roger Table Mic II was placed 1,25 meters from the loudspeakers presenting speech. Background HINT noise was presented simultaneously from four ceiling-mounted loudspeakers, resulting in a uniform and fixed background noise level of 60 dB A for each test condition. Two HINT sentence lists were presented for each test condition.

All tests were completed in a 48 m² room.

The study included objective measurement of speech intelligibility in background noise and a subjective component where the participant was asked to choose their preferred listening condition. For the objective measures, speech recognition was measured as a percentage-correct

score in two different listening conditions for each of the three brands of hearing aids: hearing aids alone and hearing aids plus Roger system.

After each set of hearing aids were tested in both listening conditions, participants were asked which of the two conditions they preferred.

Results

Results were analyzed using an independent t-test. Figure 3 shows the impact of Roger plus hearing aids versus hearing aids alone on overall speech intelligibility in noise. The results indicate that using a Roger system consisting of Roger NeckLoop and Roger Table Mic II in combination with hearing aids of various brands significantly improves speech intelligibility (M = 83, SD = 12.9) compared to hearing aids alone (M = 27, SD = 12.5), $p < .03$ in background noise at a level of 60 dB A. There were no significant differences between different non-Phonak hearing aids indicating a huge advantage when using the Roger system independent of the hearing aid brand.

The results of subjective preference testing showed that 100% of study participants preferred the Roger plus hearing aids condition, no matter which brand of hearing aids they were wearing.

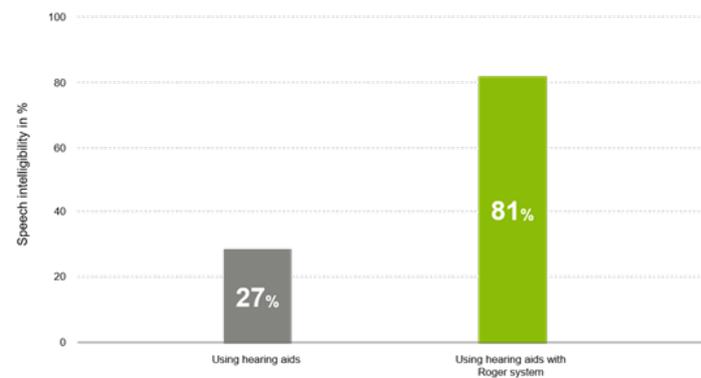


Figure 3. Average of speech intelligibility scores across three brands of hearing aids alone versus hearing aids plus Roger.

Discussion

The results of this study indicate wearers of both Phonak and non-Phonak hearing aids with mild to moderate hearing loss can expect significant improvements in speech intelligibility using a Roger system in noise and over distance. This is in line with similar research examining the benefits of Roger technology when used with Phonak hearing aids in similar complex listening environments. These findings are important, not only because a majority of hearing aid wearers do not wear Phonak technology, but

also because the COVID-19 pandemic has introduced additional distance to everyday communication.

When asked which condition they preferred, it was obvious that participants saw a clear advantage using Roger. This highlights the unique utility of in-clinic demos. When clients experience the benefit of Roger, even in a simulated noise environment, the difference will be clear.

Conclusion

With almost one-third of hearing aid wearers experiencing difficulty hearing in background noise (Abrams & Kihm, 2015), Roger represents a unique opportunity to exceed their expectations and help them along their hearing journey. With the all-new Roger NeckLoop, hearing care professionals have a versatile solution for their clients who struggle hearing in complex listening situations. Roger NeckLoop specifically allows those who do not wear Phonak hearing aids to experience the benefits of Roger using just their telecoil program. Roger NeckLoop paired with a Roger microphone adds an additional level of hearing performance on top of their current hearing aid or cochlear implant.

On top of the benefits Roger NeckLoop offers the client, it can also be leveraged by hearing care professionals in the clinic. It provides a simple way to demo Roger technology for those not wearing hearing aids at all, allowing friends and family to participate in Roger demos alongside their loved one. That interaction supports familial involvement in the treatment process, and can reinforce the need of the client to adopt a Roger system for themselves. With incredible hearing performance for virtually any hearing aid or cochlear implant sound processor with a telecoil program, Roger is the solution for difficulty hearing in complex listening environments.

References

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Anna Karlsson Lejon completed her Master in Audiology 2002 at Lund University in Sweden. Anna has experience from audiological diagnostics and rehabilitation with hearing aid fittings for adults. Since

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Chase Smith received his Doctor of Audiology from Northwestern University in 2016. After graduation he spent one year in a formalized development program at Sonova, working at Advanced Bionics, Phonak US, and Sonova headquarters in

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