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Field Study News

Benefits and technical feasibility of providing remote hearing aid support for follow-up appointments

This study was conducted in the United States at Vanderbilt University in Nashville, TN, using an early prototype of what we know today as 'Phonak Remote Support'. The overall technical feasibility and benefits of providing remote fitting of hearing aids during follow-up appointments was evaluated. On average, the participants and audiologist were satisfied with the Remote Support sessions, and the participants indicated a preference for remote appointments over face to face appointments.

Author: Jean Anne Schnittker, June 2019

Introduction

This field study news is a summary of the peer reviewed article by Angley, G., Schnittker, J.A., & Tharpe, A.M. (2017), "Remote Hearing Aid Support: The Next Frontier", published in the *Journal of the American Academy of Audiology*.

The journey to better hearing can include many follow-up visits to an audiologist to fine-tune the hearing aids optimally for each individual client. Attending multiple visits can be a challenge for some clients, especially those who have health issues, limited mobility, or those living in rural areas. eAudiology solutions may overcome some of these barriers by offering these clients additional access and added convenience to the services they require.

In general, eAudiology can be delivered synchronously or asynchronously. In a synchronous appointment, the audiologist and the client communicate with one another in real-time. This can be through the phone, a webcam, or other application. Asynchronous appointments are also known as store-and-forward appointments. During these appointments, data is collected at the remote site, stored on a device, like a computer or smart phone, and are sent securely to be analyzed or reviewed at a later time. The audiologist and the client do not interact with one another in real-time; however, the client will hear from the audiologist with required information, and may be assisted by a facilitator, depending on the service and equipment needed.

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Not all appointments are well-suited for remote follow-up care. During the client's hearing care journey, there are clinical tasks that require hands-on care (e.g., making of earmold impressions, real-ear measurement, physical inspection of the hearing aid, etc.). However, clinical tasks such as software adjustments can be done without seeing the client face to face, as long as the hearing aids can be accessed via a computer/Bluetooth connection. The aim of this study was to evaluate the feasibility and perceived benefits of remote hearing aid follow-up care.

Methodology

Participants
All participants were recruited and enrolled following approved Vanderbilt University Institutional Review Board procedures. 50 participants ranging in age from 32 to 88 years (mean age = 65; SD = 13), participated in the pilot study. There were 30 male and 20 female participants. The participants included 35 first time hearing aid users and 15 experienced hearing aid users. Hearing losses ranged in degree from mild to profound, and were sensorineural, conductive, or mixed in nature.

A sub group (n=21) of the recruited participants plus one additional participant, for a total of n=22, chose to take part in an in-home phase of the study. This group of participants ranged in age from 34 to 77 years (M=62; SD=12).

In-clinic appointment: equipment and materials
The participants agreed to be seen using Remote Support in the clinic for a follow-up appointment. During the Remote Support follow-up appointment, the participant was in a remote fitting room located in the hearing clinic and the audiologist was in a separate room in the same building. Each participant was given a Remote Support kit containing one Phonak iCube with a USB cable, one memory stick with the client Remote Support software and a brochure with instructions for installation of the software. The client software did not contain any functionality for the participant to make adjustments to the hearing aid.

During the installation and the set-up, the audiologist stayed in the room with the participant to observe and time the installation and set-up process. The audiologist informed each participant they should try to complete the installation on their own. However, if a participant could not complete the set-up and installation, the audiologist would document the issues and help the participant if there was no other option.

In-clinic appointment: procedures
At the start of the Remote Support appointment, the audiologist administered the Montreal Cognitive Assessment (MoCA), which is a cognitive screening test designed to assist health professionals detect mild cognitive impairment. MoCA scores were used for later analyses, not as selection criteria.

After installation of the client software was complete, the audiologist moved to a different room in the clinic. To begin the appointment, the audiologist called the participant on a landline or cellular phone. The audiologist then joined the session using a special version of Phonak Target, and connected to the participant's hearing aids remotely. The participant discussed any concerns or challenges with their hearing aids, and the audiologist could either make programming adjustments or counsel the clients. After completing the Remote Support appointment, the audiologist and participant completed their respective assessments online.

In-home appointment: equipment and materials
In this phase of the study, the appointments moved from a remote fitting room in the clinic, to the participant's home for a more 'real-world setting'. The age of the computer and internet connections varied across participants. In addition to the equipment and materials used in the in-clinic appointment, a secure teleconferencing program was provided, along with hearing aids identical or similar to the participant's purchased hearing aids. A webcam was provided if the participant did not own one. The participant's hearing aids were not used in the study in case there were connection issues that could not be repaired during the Remote Support session. Five programming scenarios were created to ensure a variety of programming and handling tasks (i.e. changing a battery) were covered among the participants.

In-home appointment: procedures
All in-home appointments took place after the in-clinic appointments. Before the in-home appointment, the participant was asked to install the needed software applications, for the hearing aids and teleconferencing program, on their personal computers. Some participants sought assistance with software installation from family or friends. Follow-up appointments were scheduled at the participant's convenience. The audiologist first contacted the participant by telephone, and once a connection was established using the teleconferencing system, telephone communication was stopped. If a stable connection could not be established or maintained, the appointment was continued using the telephone. Programming scenarios were randomized across participants. In addition, both the

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participant and audiologist completed their respective satisfaction assessments online.

Results

In-clinic appointment
Length of the appointment was compared for the first half of the 50 appointments and the last half of appointments. Time decreased by an average of 6 minutes for appointments in the second half (figure 1 & 2).
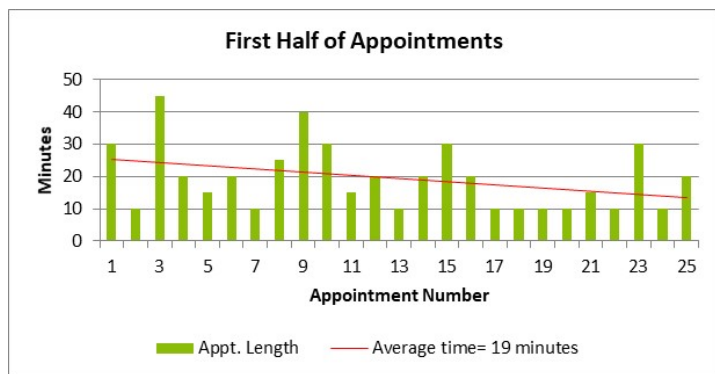

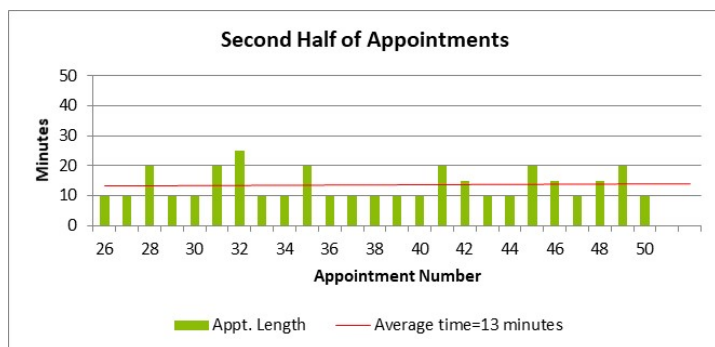Figure 1. Length of appointment for first 25 appointments of 50 total appointments

Figure 2. Length of appointment for last 25 appointments of 50 total appointments

When participants were asked if they would prefer to use Remote Support in the future, 64% reported they would prefer Remote Support, 32% were neutral, and 4% would not prefer Remote Support. However, when asked their preference during bad weather conditions, 88% would prefer Remote Support and 12% were neutral. When asked about the benefits of the appointment, 90% reported a benefit directly related to convenience and access. Weaknesses reported were loss of face-to-face contact (20%) and using technology (4%). Almost all participants, 92%, said they would recommend the service to friends and family (figure 3).

Subjects reported

Figure 3. Participant feedback after a Remote Support appointment

In general, the audiologist was satisfied with 82% of Remote Support appointments. For 16% of the sessions the audiologist's satisfaction rating was neutral. Comments from the audiologist with a neutral rating were:
- Physical contact with instrument not possible (visual inspection, cleaning, changing the dome)
- ComPilot adjustments not possible
- REM not possible
- Could not physically inspect the ear
- Once the HI did not connect
- Battery drain check not possible

There was one session in which the audiologist was not satisfied. In this session, the participant did not know how to use the computer and the daughter assisted the participant. The hearing aid also stopped working several times during the session. Regarding connectivity, the hearing aid connection was stable in 86% of appointments. The audiologist rated 80% of the appointments as being as efficient as a traditional face-to-face appointment (figure 4).

Audiologist reported

Figure 4. Audiologist feedback after each Remote Support appointment

In-home appointment
During the in-home appointments, a web camera was successfully used for 77% of appointments. For those who were able to use a webcam, all reported that they preferred camera use over communicating with the audiologist using a telephone.

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The 'Feelings about Computer' questionnaires revealed that, on average, 71% of participants in this phase of the study had positive feelings toward computers.

Participants were again asked about their satisfaction with Remote Support appointments by completing the in-home client assessment. Findings were similar to the in-clinic appointments; 86% of participants reported a preference for Remote Support appointments under difficult conditions, 90% reported willingness to recommend Remote Support appointments to others, and 60% preferred Remote Support appointments in the future over face-to-face appointments. The most frequently cited reason for this preference was time savings.

Discussion

The Remote Support prototype worked, demonstrating technical feasibility. Connection issues observed in this study have been resolved by the commercially released version of Phonak Remote Support. Technology is not fool-proof, and there is always a risk that technical problems outside the control of the audiologist, or client, will be encountered. What is important is that the audiologist feels confident and comfortable to troubleshoot during a session and determine if the technical issue is something that can be resolved quickly. It should also be noted that the connection issues encountered in this study impacted the satisfaction of the audiologist more than the client.

In regards to Remote Support appointment time, the audiologist reported she became more familiar with the workflow, troubleshooting, and tools available. It is possible this contributed to the shorter appointment time. This serves as a nice case study and suggests that a study on audiologists' adaptation to using Remote Support might be beneficial.

The reported benefits from participants in this study centered around convenience and accessibility to services. The frequency of visits to see an audiologist can be seen as a barrier to hearing aid use, and services such as Remote Support can potentially reduce this barrier for some clients. 40% of clients also reported they would seek services more often if Remote Support was available. It is hypothesized that remote hearing aid support could improve satisfaction if clients are getting the follow-up care they need.

The audiologist felt one of the benefits for the clinic could be scheduling efficiency. 'No-show' rates have a high impact on scheduling and clinic flow. If remote clients forget about

their appointment, it is more likely they will be available at a moment's notice if contacted by the audiologist.

It is possible that the individuals who chose to participate in this study were already positively biased toward the use of computers, thereby resulting in their agreement to participate in this study. Furthermore, the use of short-term measures of satisfaction, such as those used in this study, might be influenced by the novelty of telehealth for some participants. It is possible, for example, that when clients have real concerns that are more complex than those presented in this study, clients would prefer to have face-to-face contact with their audiologists. Such considerations will require additional large-scale and longitudinal investigations.

Conclusion

It should be noted, that the commercially released version of Phonak Remote Support does not require using a Phonak iCube or client software installation procedures described in this study.

As technology advances, and clients become more technically savvy, eAudiology service offerings will become more common place. Remote hearing aid support does not, and cannot, replace face-to-face appointments altogether. Phonak Remote Support is an additional tool that audiologists can offer clients when they deem appropriate. This study showed promise that both audiologists and clients are satisfied with this new service delivery method. In fact, under certain circumstances, it is preferred over traditional face-to-face appointments. These results indicate that Phonak Remote Support provides services in the way that clients sometimes prefer, whilst maintaining a good standard of care. If clients can obtain the hearing aid services they need from their audiologist, it could lead to increased satisfaction on the journey to better hearing. Convenience and access to services are two benefits that Phonak Remote Support can offer.

References

Angley G., Schnittker, J.A., Tharpe, A.M. (2017) Remote Hearing Aid Support: The Next Frontier. *Journal of American Academy of Audiology* 00:1-8. DOI: 10.3766/jaaa.16093

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Dr. Gina Angley is an audiologist and Associate Director, Adult Hearing Aids in the Department of Hearing and Speech Sciences, Vanderbilt University Medical Center. Her clinical interests include adult diagnostic and rehabilitative services. Her research interests include telehealth, and technological interventions with patients of all ages with hearing loss. Dr. Angley has presented her work at state and national meetings.

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Dr. Anne Marie Tharpe is an audiologist and Chair, Department of Hearing and Speech Sciences, Vanderbilt University School of Medicine in Nashville Tennessee. Her research interests are in the area of pediatric hearing loss. Specifically, she has explored the developmental impacts of minimal and mild hearing loss on children, children with hearing loss and additional disabilities, and more recently, the sleep patterns in those with hearing loss. Dr. Tharpe has published extensively in national and international professional journals, has published numerous books and book chapters, and has presented to over 250 audiences around the world on pediatric audiology issues.

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