

Phonak

Field Study News

Breaking down barriers with RogerDirect™

Roger™ is the gold-standard in remote microphone technology and now with RogerDirect it is more seamless than ever. A recent field trial revealed that clinicians found RogerDirect faster and easier to configure than previous Roger systems using external receivers.

Charlotte Gordon & David Crowhen, June 2020

Key highlights

- 75% of participants were faster at installing a Roger receiver via RogerDirect than an external Roger receiver.
- 81% of participants rated installing a receiver via RogerDirect 'easier' or 'far easier' than attaching an external receiver, even though it was a 'novel' task.
- The greatest perceived benefit for HCPs themselves was 'faster and easier fitting', and included 'easier to demo' and 'smaller size'.
- The greatest perceived benefit by the HCPs for their clients was the smaller size, followed by robustness and ease of use.

Considerations for practice

- Discuss far-field hearing needs with all clients to ensure you are providing the best solution for all their listening environments.
- Be comfortable with demonstrating RogerDirect in the clinic, so that the client can experience the benefit of Roger for themselves.
- RogerDirect overcomes many perceived barriers for remote microphone use for both the clinician and client, hopefully improving the uptake of remote microphone technology.

Introduction

Hearing-impaired individuals wearing hearing aids commonly report difficulty with speech understanding in noise (Bradley & Sato, 2008; Wolfe et al, 2015; Kochkin, 2010). The need for a higher signal-to-noise ratio (SNR) in noise or over a distance is met by remote microphone (RM) technology and has been shown to improve speech recognition by an average of 40–60% relative to hearing aids alone (Wolfe, Morais, Neumann, et al., 2013; Wolfe, Morais, Schafer, et al., 2013).

Features that set Roger apart from other RM systems include: 1) – Multiple transmitter options and microphone modes, including the Small Group mode in Roger Touchscreen Mic and MultiBeam Technology in the Roger Select™ and Roger Table Mic II, 2) – the ability to create MultiTalker networks for access to multiple speakers and 3) – its adaptive behavior, which varies gain (and hearing aid microphone sensitivity in Dual Adaptive mode) to ensure optimal signal-to-noise ratio as a function of different levels of background noise. These features underpin the superior performance in noisy environments (70 dB and greater) relative to other RM technology as evidenced by Thibodeau (2014) (Figure 1).

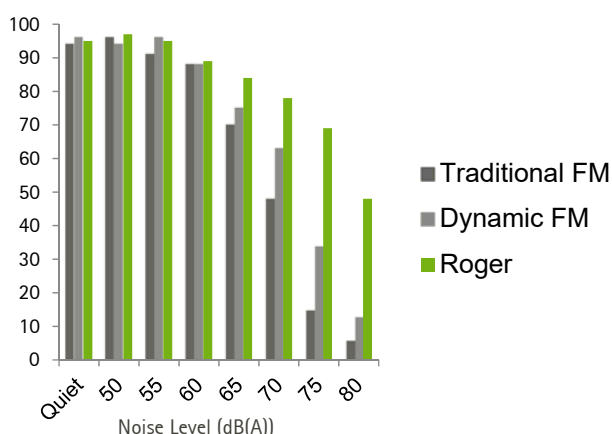


Figure 1. HINT percent correct scores for total words correct as a function of noise level for traditional fixed FM, Dynamic FM and Roger. At the 80 dB(A) noise level 9 participants scored <10% for traditional FM, 6 scored <10% for Dynamic FM, and only 1 scored <10% for Roger. (Thibodeau, 2014)

Roger technology caters to the far-field hearing needs of both adult and pediatric populations. For school-aged children, we know they spend ~40% of their day listening at distance and noise (Mulla & McCracken, 2014). We also know that children learn through a combination of serve and return interactions. A serve and return interaction describes the unique back and forth experiences between the child and a significant other. These 'serve and return' interactions are hugely important in brain, speech and language development (Zombek 2019). Consequently, it is important that a hearing-impaired child has unfettered

access to these encounters which can be supported through the benefits provided by RM technology. Studies have also revealed that caregivers report a significant ease of communication when RM technology is used in the home (Benítez-Barrera, Angley, & Tharpe, 2018; Thompson et al., 2020). These complex listening needs are not limited to children, and when surveyed, 31% of adult hearing aid wearers reported that they continued to have difficulty hearing in background noise (Abrams & Kihm, 2015). Furthermore, survey results show that for HCPs who regularly explore the dimension of distance, about 40% said that over half their clients have far-field hearing needs (Crowhen & Turnbull, 2018). Roger provides the perfect solution to support both children and adults seamlessly engaging in these complex listening environments.

While it is increasingly common to see RM solutions used with pediatric populations, overall uptake could still be improved, and even more so for adult hearing aid wearers (Crowhen & Turnbull, 2018). Potential barriers to uptake include lack of understanding around limitations of hearing aids for far-field hearing (Crowhen & Turnbull, 2018) as well as increased hearing aid size due to the need for an external receiver, complexity of ordering and set-up by the clinician (e.g., determining receiver compatibility, physically attaching the external receivers, etc), and ease of use (Fabry & Dijkstra 2007).

RogerDirect has been designed to remove many of these barriers. The technology in Phonak Marvel hearing aids has enabled direct transmission of the Roger signal to the hearing aid without the need for an external receiver. This means that, compared to previous Phonak technology, with Roger receivers, hearing aids are up to 42% smaller and consume 27% less power whilst still delivering 100% Roger performance. Furthermore, RogerDirect should result in a reduction of complexity around ordering and set-up, enabling greater ease of use for both clinicians and patients. To this end, the objectives of the current study were to:

- 1) Determine if RogerDirect is faster to set up than traditional Roger systems using external receivers.
- 2) Determine if RogerDirect is rated easier to set up than traditional Roger systems using external receivers.
- 3) To evaluate the benefits HCPs feel RogerDirect provides.

Methodology

At three Marvel launches across New Zealand, 47 HCPs took the opportunity to get hands-on practice using the new RogerDirect system. The launch events included both pediatric and adult audiologists. For this reason, a mix of both methods, Roger X and Roger iN, were trialed. Thirty HCPs installed a Roger receiver into a Marvel hearing aid using a Roger X and Roger Installer, and the remaining 17 used the Roger Select iN transmitter. Step-by-step instructions were provided to each HCP and time was allowed for instructions to be read prior to starting. As a comparison, participants were asked to remove a battery door from a Naida V UP hearing aid and attach a Roger 19 external receiver.

The HCPs were timed on each task from beginning to completion of the transfer of a RogerDirect receiver or attachment of an external Roger receiver to the hearing aid. Subjective ratings were also taken on the ease of use, as well as the comparison between the new RogerDirect technique and previous receiver attachment.

Results

Data were checked for adherence to a normal distribution, and parametric or non-parametric statistical tests applied accordingly. Because no significant difference was found in terms of the time taken to install Roger receivers using either a Roger X and Roger Installer or a Roger Select iN transmitter (Kolmogorov-Smirnov test, $P=0.1174$), data were pooled for subsequent analysis. Approximately 75% of participants were faster at installing a Roger receiver into a Marvel hearing aid with RogerDirect versus attaching an external Roger 19 receiver to a Naida V-UP hearing aid (Figure 2). The median time taken for installing a Roger receiver into a Marvel device was 27.49 seconds, compared with 37.59 seconds for attaching a Roger 19 external receiver to a Naida V-UP hearing aid. A Wilcoxon matched-pairs signed rank test showed this difference was highly significant ($P < 0.0001$). It follows that the median time for setting up a binaural Roger system using a Select iN transmitter should be less than 1 minute.

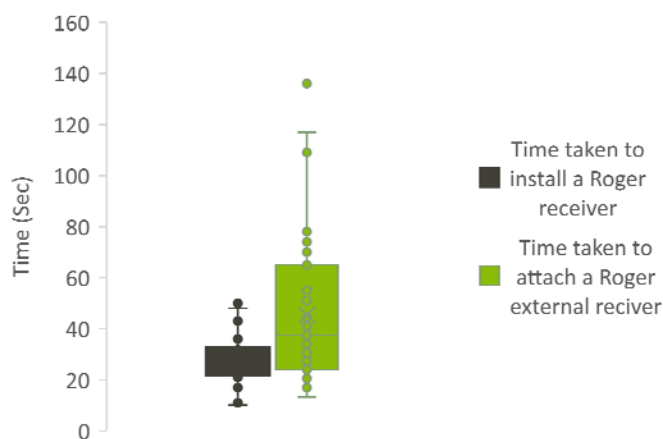


Figure 2. Time taken (seconds) to install a Roger receiver to a Marvel hearing aid using RogerDirect method versus attaching an integrated receiver to a Legacy instrument.

When using Roger, a X receiver and Roger installer, an additional step is required after installing the Roger receivers into the hearing aids: the transmitter must be connected to one of the hearing aids. To estimate approximate total set-up time when using Roger X, a cohort of 12 people were timed while connecting a Roger transmitter to a Marvel hearing aid containing a Roger receiver. The median time was 17.76 seconds with a lower quartile of 13.74 seconds and an upper quartile of 27.98 seconds. Accounting for this additional step, the total median time for setting up a binaural Roger system using a Roger X and Roger Installer, should be less than 1 minute and 20 seconds.

Subjective ratings revealed that 93% of participants rated installing a receiver via the RogerDirect method as either 'very easy' or 'easy' (Fig 3A). In comparison, only 38% found attaching an external receiver 'very easy' or 'easy' (Fig 3B).

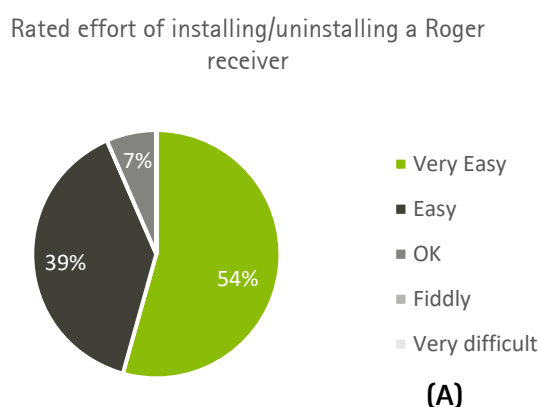


Figure 3A. Subjective effort ratings for installing a RogerDirect receiver code into a Marvel Hearing aid

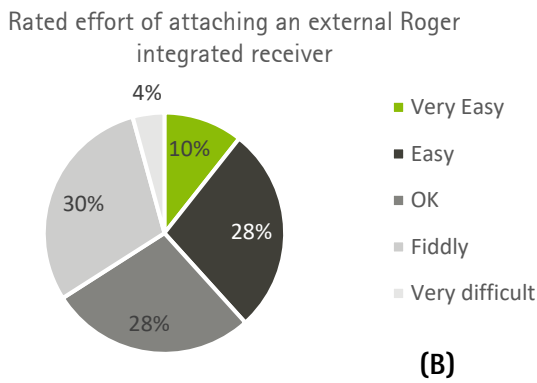


Figure 3B. Subjective effort ratings of attaching an external Roger 19 receiver to a Naida V-UP.

Surprisingly, there was no significant relationship between the perceived ease of installation and the time taken to install a RogerDirect receiver (Kolmogorow-Smirnow test, $P=0.2612$). This may be due to the finding that even for HCPs who did not experience a time advantage in the RogerDirect method, 64% still rated installing the Roger receiver as either 'far easier' or 'easier' than attaching an external receiver (Figure 4A). Further, out of all participants, 81% rated it was either 'far easier' or 'easier' to install a RogerDirect receiver compared to an integrated receiver (Figure 4B). This suggests that perceptually, the process of RogerDirect is easier relative to traditional external receiver attachment, but it is likely a time benefit is not seen instantaneously due to the initial novelty of the task, especially for clinicians experienced in attaching external receivers.

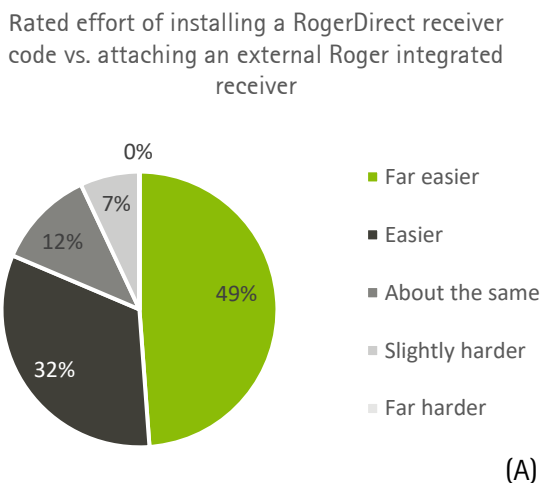


Figure 4A. Subjective rating of installing RogerDirect versus attaching an external integrated Roger receiver for those who perceived no time benefit with RogerDirect installation.

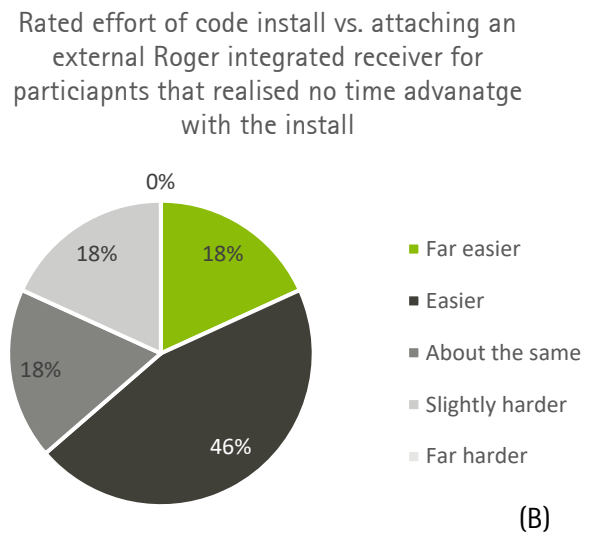


Figure 4B. Subjective rating of installing a RogerDirect receiver versus attaching a Roger integrated receiver.

A significant relationship was found between rated ease of effort and the time taken to attach an external receiver to a Naida V UP (Spearman $r=0.6057$, $p<0.0001$), where longer times were associated with lower rated ease. Moreover, a significant relationship was found when comparing time difference and rated ease between the two Roger installation/attachment methods (Spearman $r=0.548$, $P=0.0003$), where larger time differences were positively associated with larger differences in rated ease between the two methods.

Discussion and conclusion

Overall the majority of clinician's experienced both a subjective benefit and objective benefit (reduction in time taken to install a Roger receiver) with RogerDirect relative to the attachment of an integrated external receiver.

Given that a large majority of HCPs (81%) found the installation of RogerDirect either 'Far Easier' or 'Easier' than the traditional attachment of an external receiver, this would suggest that the clinicians would be more willing to utilise Roger. This was reinforced when the clinicians were asked about the anticipated benefits of Roger. The greatest perceived benefit was 'faster and easier fitting', and included 'easier to demo' and 'smaller size'. The greatest perceived benefit by the HCPs for their clients was the smaller size, followed by robustness and ease of use. These predicted benefits are in line with studies that found adults tend not to use remote microphone systems because of their relatively large transmitting/receiver components as well as the aesthetics and complexity of the device (Jerger et al., 1996, Fitzpatrick et al., 2010).

RogerDirect clearly breaks down some of the barriers commonly associated with adoption of remote microphone technology. Hopefully this will create further opportunity for more clients to enjoy the significant benefits that Roger delivers.

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Authors and investigators



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Charlotte worked clinically for two years before joining the Phonak team as an Audiologist. As part of her

Honours and Masters Degree she undertook research at the Centre of Brain Research at Auckland University researching pathological markers in the Auditory Cortex of Alzheimer's patients. Charlotte has a particular passion for both clinical and lab based research, in particular the relationship between hearing loss and incident dementia. She is currently continuing her research from her Master's thesis at the Eisdell Moore Centre of Research at Auckland University.



David is the Director of Phonak and Operations NZ, where he has worked for over 10 years. An interest in music and helping people made Audiology a natural career choice, and David graduated from the Master of Audiology course at University of Auckland, New Zealand in 1999. David worked clinically for 10

years, in both public and private settings, and in both NZ and overseas. David has a special interest in advanced hearing instrument and wireless communication technology, the selection of these based on client and family needs and supporting verification and evaluation of these features in the clinical setting.