Phonak
Field Study News

Lyric™4: Improved reliability without compromise

The newest iteration of Lyric includes design modifications to internal components for improved reliability over previous models. The latest design optimizations resulted in an Early Device Removal rate that was easily within acceptable limits, extended average Days of Wear, and equivalent or better comfort and sound quality as compared to the Lyric3.

Standaert, L. / September 2020

Key highlights

- Twenty-seven current Lyric users were included in this validation study for the Lyric4 device
- Participants reported increased comfort and equivalent sound quality in both quiet and noise for Lyric4
- Average Days of Wear increased significantly with the Lyric4

Considerations for practice

- Insertion depth and sizing did not change from the Lyric3 to the Lyric4
- Ease of use of the SoundLync tool did not change
- End users who had a history of early device failure experienced longer Days of Wear during this study

Introduction

Since its original launch in 2008, the Lyric device has offered hearing impaired patients a 100% invisible, convenient, and reliable option to conventional daily wear hearing aids. Designed to be worn in the ear canal for several weeks or months at a time, this extended wear, non-custom hearing aid has gone through several iterations and product improvements in the last decade. These product improvements included a lower power circuit, which was introduced in 2014, and an expanded size offering in 2017.

Although the device is designed to be worn in the ear canal for up to 12 weeks, for some end users may experience early device failure (0–30 days). In an environment such as the ear canal, moisture and humidity can contribute to early device failure by damaging the battery or shorting out the electronics. There are other reasons as well that may cause the devices to fail sooner than expected, such as blockage or clogging of the medial (receiver) or lateral (microphone) port.

In 2019 and 2020, the Phonak Lyric research and development team incorporated improvements to the medial port and modified the electronic architecture and the encapsulation of the electronics, in an effort to improve reliability without compromising the sound quality that current Lyric users appreciate. The priority of the new Lyric4 (figure 1) was a more robust system.

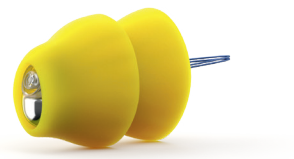

Figure 1: Lyric4 device

A validation study was conducted to provide documentation of the reliability and sound quality of the Lyric4 device.

Methodology

Participants

Twenty-seven experienced and current users of the Lyric3 device were recruited for this study. All participants had a hearing loss that was appropriate to a Lyric fitting. Experience ranged from 2 to 11 years, with a median of 7 years. There were 16 females and 11 males. Age of the participants ranged from 49-89, with a mean age of 73 years. Participants were included if they had experienced early device removals or reliability issues in the past.

Procedure

Prior to being fit with the Lyric4 devices, participants completed a 13 item subjective questionnaire regarding the comfort, sound quality and general speech understanding of their current Lyric3 devices. If they regularly used the SoundLync™ tool, they were also asked to rate the ease of use regarding mode and volume changes. Additionally, participants were asked if they had a history of sound quality issues such as feedback or intermittency with the use of Lyric3 devices.

The clinician documented the size and insertion depth of the current devices, removed them, and examined the participants' ears to ensure they were clear for re-fit. The size and insertion depth of the Lyric4 devices, as well as immediate comfort were documented. All participants were fit by a licensed and certified audiologist at Main Line Audiology Consultants in Narbeth, PA.

Participants were instructed to wear the devices until one of the devices stopped working, at which time they would inform the clinician.

At the end of 30 days of wear, participants completed the same 13 item questionnaire as they had with the Lyric3 devices, but with regards to the Lyric4 devices. All items on the subjective questionnaire were rated using a five-point scale, with 5 being the highest, or best, rating possible.

Participants were instructed to return to the clinic for device removal if a device was no longer working, or if they were having any issues that necessitated removal. If only one device failed, participants had the option of keeping the opposite device in until it failed, or having both removed at the same time.

The Early Device Removal (EDR) rate and Days of Wear (DOW) were calculated at the end of the study.

Results

Fitting

Out of 54 ears, one ear fit a size smaller than previously indicated, and one ear fit a size larger. There were no significant differences in insertion depth for any of the participants.

Subjective Ratings

Paired t-tests were used to analyze the subjective ratings of the current Lyric3 devices as compared to the Lyric4 devices (figure 2). Participants rated the Lyric4 devices significantly more comfortable than their previous devices ($p < .01$). While there were no other statistically significant differences between the two devices, participants tended to rate speech understanding in both quiet and noise slightly better with the Lyric4.

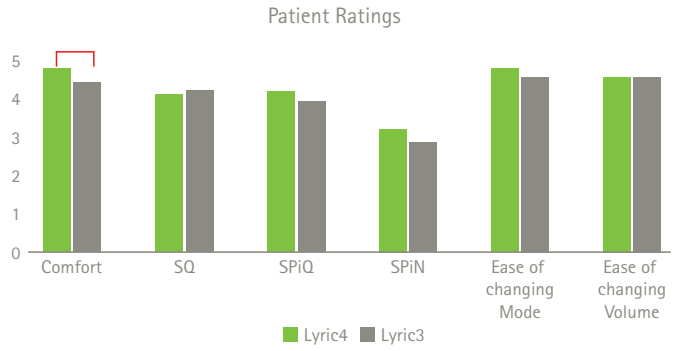

Figure 2. Participant ratings of long-term comfort, sound quality (SQ), speech understanding in quiet (SPiQ), speech understanding in noise (SPiN), and ease of changing mode and volume with the SoundLync tool. Rating scale was between 1 (unacceptable) to 5 (excellent). There was a significant difference in the long term comfort rating, with participants rating the Lyric 4 device more comfortable.

Participants who normally use the SoundLync tool reported no changes or differences in the ease of use between the two devices.

Reliability

Overall, there were a total of four early device removals:

- One participant had reported a device failure at DOW 14; this participant had experienced EDR in the past.
- One participant reported a device failure at DOW 30, and upon removal, it was discovered he had developed a medial bulge. The contralateral device was removed at this time as a precaution.
- One participant had previously worn Lyric monaurally, but wished to revisit a binaural fitting for the study. This participant reported intermittency in the ear not normally fit with Lyric and self-removed on day 26.

All other devices remained in the participants' ears for at least 31 days, with an average DOW of 70, with individual averages ranging from 34 to 110.

The average DOW for the Lyric3 was calculated for each participant using ALPS (Authorized Lyric Partner System) data for their previous ten fittings. The overall mean DOW for the 27 participants was 30 days, but ranged from 15 to 49 days, with a median of 30. All participants experienced more DOW with the Lyric4 as compared to their average DOW with the Lyric3, as seen in Figure 3.

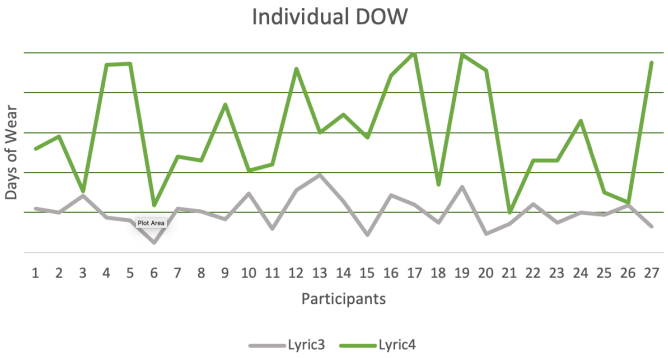

Figure 3. Individual DOW are shown for the Lyric3 (gray) and Lyric4 (green). The average DOW were calculated for each participant using data obtained through ALPS. DOW for each ear for the previous ten Lyric3 fittings were used. The mean of each ear was then used to calculate the overall average DOW for each participant. The difference ranged from 1.5 to 82 days, with a median of 31.2 additional DOW.

Discussion and conclusion

The changes made to the Lyric device were intended to improve the EDR rate, while maintaining the sound quality and comfort that current users appreciate. Preliminary data from this study indicates a 15% improvement in the EDR rate taken from aggregate ALPS data, however, this will be determined as the number of fittings and data obtained from fitters via ALPS increases.

Additionally, participants in this study experienced a significant improvement in DOW, as compared to their average DOW with previous Lyric3 fittings. It is important to note that the DOW calculated from ALPS for previous fittings includes scheduled removals, device failure, proactive removals, and other issues such as feedback, migration, or sound quality issues. Scheduled removals accounted for 66% of the removals and device failure accounted for 26%. As verified by the fitting audiologist, the scheduled removals are based on the average DOW that the

end user has experienced over time. It is also recognized that the DOW for the Lyric4 are based on one fitting, and as more data is acquired through ALPS, a definitive expected DOW will develop.

This Lyric4 validation study confirms that the comfort, sound quality and subjective speech understanding in both quiet and noise have not only been maintained, but in the case of comfort, have improved significantly over the current Lyric3 device. Participants were not blinded as to which device they were wearing, thus, participant bias toward newer devices cannot be ruled out. However, participants were not able to review their answers to the questionnaire regarding their Lyric3 devices, so they could not compare their answers.

With the new Lyric4, clinicians can feel confident that they will be able to offer their patients the sound quality they expect from Lyric, more comfort and improved reliability.

Author and investigator

Lisa Standaert, AuD has been with the Phonak Audiology Research Center since 2015. Her experience includes spending several years as a Phonak Technical Support audiologist, as well as diagnostic and rehabilitative audiology in clinic settings. Her research interests include eSolutions/ remote support and Lyric.