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Field Study News

Click'nTalk

Improved speech intelligibility during telephony in noise

Summary

Phone calls with a mobile phone can be quite challenging for hearing instrument users, particularly when speech intelligibility is compromised by background noise. Furthermore, the proper and stable positioning of the cell phone speaker in relation to the hearing instrument (HI) microphone has always been a problem.

Phonak now offers the simplest, most convenient mobile phone solution on the market. Click'nTalk was developed for active HI wearers who want to benefit from a bilateral digital quality signal without background noise, while maintaining full mobility and normal phone positioning.

Sixteen adult HI wearers participated in this study to investigate Click'nTalk and its advantages for mobile phone use. Results show that Click'nTalk significantly improved speech intelligibility while reducing noise at the phone during mobile phone use with HI.

Introduction

It is often quite difficult to achieve optimum and stable positioning of the cell phone near the HI microphones. Not only is it necessary to hold the mobile in a very unnatural position over the microphones of a Behind-The-Ear (BTE) HI but there is also the danger of inadvertent activation or adjustment of operating elements of a In-The-Channel (ITC) HI when positioning the mobile phone. Because of these problems, HI wearers often use the cell phone without HI, even though speech intelligibility is very poor without amplification (Nielson et al., 1981; Van Noorden and Ekberg, 1990).

Therefore, Click'nTalk was invented to provide improved speech intelligibility through a bilateral signal accomplished by the wireless digital transfer of the phone signal to the HI when using a cell phone. Click'nTalk consists of a wireless transmitter inside a small plastic housing, which can simply be clicked into the cell phone plug. The highly robust digital transmission of the Hearing Instrument Body Area Network (HiBAN) allows an increase of mobility with the cell phone within the range of 25 cm, whereas conventional mobile phones allow a stable field of only about 0.5 cm for

microphone and around 4 cm for mobile phones with a T-coil. Click'nTalk is powered by the electrical supply of the mobile phone and therefore does not need separate batteries. The automatic HI program allows separate fine-tuning of the microphone and gain settings in iPFG. To examine whether Click'nTalk provides significant improvement in speech intelligibility using a cell phone, the following study was performed at the University of Applied Science in Oldenburg, Germany.



Picture 1: Click'nTalk attached to mobile

Goal of the Study

Two issues were examined in this study: First, the evaluation of speech intelligibility in noise via mobile phone together with HI's. Secondly, spontaneous acceptance, usability and benefit in daily life were assessed.

Set-up of the Study

Sixteen experienced adult test subjects with a moderate to severe HL participated in the study. They were provided with binaural HI's fitted with the default settings. First prototypes of Click'nTalk were used to determine eventual system optimization and reliability with the already existing accessories. The spontaneous acceptance and the subjective evaluation of the Click'nTalk in daily life were determined by various questionnaires which had to be completed while performing a phone call on a noisy street and in a noisy restaurant. The improvements of speech intelligibility in noise were evaluated using the Göttinger sentence test in noise comparing the HI without and with Click'nTalk. Adaptive measurements of the Speech-Reception-Threshold (SRT: signal to noise ratio for 50% intelligibility) were performed with subjects using the ear they normally use for telephoning. With the mobile phone, subjects had to call the computer which directly provided the speech material and the language simulating noise via the mobile phone. For all measures, the same mobile was used with equal settings for loudness to avoid irregularities of the wireless mobile connection.

Results

Compared to the reference measures without accessory, Click'nTalk achieved a significant improvement of speech intelligibility in noise with the Göttinger sentence test via mobile phone (Fig. 1).

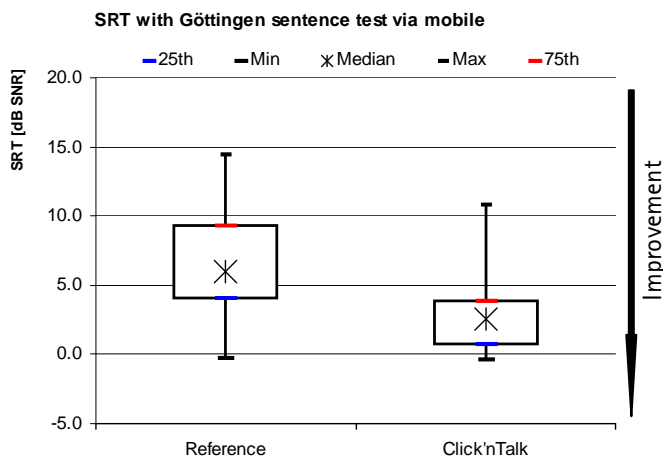


Fig. 1: Significantly improved speech intelligibility with Click'nTalk in the Göttinger sentence test in noise compared to a reference measure without the accessory. Squares highlight medians, rectangles represent 25-75% confidence interval and lines depict non-outlier ranges. * $p < 0.01$

To subjectively evaluate speech intelligibility in noise, subjects had to perform a phone call on a noisy street and in a noisy restaurant. They were then asked to rate speech intelligibility compared to their previous mobile solution. Results showed a very good spontaneous acceptance of Click'nTalk overall. The link and the bilateral connection were rated as very stable, therefore providing sufficient audibility and mobility. When performing a phone call on a noisy street, 82% of the subjects claimed to understand more or clearly more with Click'nTalk compared to the previous solution. 9% indicated to have equal speech intelligibility while 9% understood less compared to the previous situation. Performing a phone call with the aid of Click'nTalk in a noisy restaurant, 73% understood more or clearly more while 18% perceived equal speech intelligibility compared to the previous solution. Again, 9% suspected less speech intelligibility with Click'nTalk. This rating occurred because the Click'nTalk devices were first prototypes which were not finalized yet and behaviour of Click'nTalk in combination with the HI had to be evaluated. Further, subjects challenged the accessory with movements outside the HIBAN network which resulted in the disconnection of the link between the mobile and the HI's. However, the handling of Click'nTalk was described as very easy and Click'nTalk reliably recognized incoming calls. Further, weak points were clearly identified and solved in the final product. Subjects were further asked to rate the amount of the phone conversation they understood on the street and in the noisy restaurant. Results showed that 18.75% of subjects understood everything, 43.75% mostly and 6.25% half of the communication (Fig. 2). Evaluating speech comprehension in a noisy restaurant while performing a phone call showed that 18.75% of the test subjects understood everything, 43.75% mostly everything

and 6.25% only a little bit of the communication because of problems with the connection (Fig. 3).

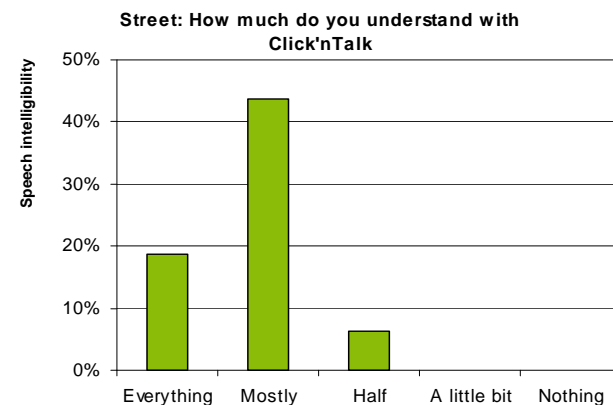


Fig. 2: High benefits of Click'nTalk during telephony on a noisy street.

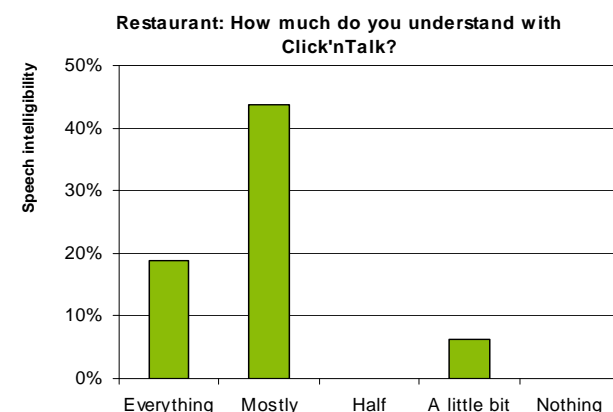


Fig. 3: Very good and good speech comprehension in a noisy restaurant while performing a cell phone call with Click'nTalk.

Conclusion

Until now, HI wearers had the options to perform phone calls either without HI, via T-coil or a special telephone program or just by placing the telephone receiver near the HI microphones. While other solutions deal with problems of distance and/or humming, they now have the ability to use Click'nTalk which provides a bilateral signal for significantly increased speech intelligibility in noise thanks to the stable HiBAN link between Click'nTalk and HI. Click'nTalk can be used for both CORE BTE and ITC HI, and the accessory simply needs to be clicked onto a mobile phone. Furthermore, the easy handling and positioning of Click'nTalk leads to a fast spontaneous acceptance and a very positive overall impression.

References

- Nielson et al., (1981). Portable telephone communication device for the hearing impaired. *United States Patent*
- Van Noorden L., Ekberg J. (1990). Integrated Broadband Communication (IBC) requirements of people with special needs. *Int J Rehabil Res* 13(2):137-49

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