Benefits of telephone conversations for children and adults
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Abstract
Children are not just small adults. This is also true when using their hearing devices while listening to a phone as adults and children benefit from different approaches. Two main approaches and their benefits especially when making use of bilingual hearing skills have been investigated in our studies - one with children and one with adults. Three different coupling methods between the phone and the hearing aid have been used: acoustic coupling (adult study), inductive coupling (adult study) and a digitally coded inductive coupling system (adult study). Both studies used objective speech tests whereas the speech material was presented via a phone receiver.

For children aged 2 to 9 years the presentation of the phone signal to both ears was compared to a non-auditory presentation significantly improved speech understanding by 18.5%. For the older children, 6-14 years, the improvement was 32% on average which was statistically significant. The adult subjects with moderate to severe hearing loss had an improvement in speech intelligibility about 3.5% using the acoustic coupling. In both ears but with a marked increase in speech perception which is highly dependent on the correct receiver position. This uncertainty could be overcome using a novel DECT phone where an inductive coupling method based on digitally coded signals was programmed as a new habituation behavior regarding the positioning of the phone receiver resulting in an additional improvement of the speech intelligibility and an easier handling.

Introduction
Hearing on the telephone is a common challenge for hearing aid wearers.

- Several surveys report that many hearing aid wearers are dissatisfied when using the telephone with a hearing aid.

- The difficulty which they face when using the phone is thought to be a large number of factors: lack of visual clues, reduced hearing bandwidth, reduced availability of speech material, presence of (background) noise and difficult coupling problems for the phone to the hearing aid.

A number of modern approaches to overcome these problems are available and have been tested in recent studies (Latzel, 2012; Keasing et al., 2013; Pirsig, 2017).

These trials did not show significantly improved speech intelligibility especially when listening to a telephone speech signal with or without a hearing aid device.

- An acoustic coupling system that requires a classic hearing aid to couple the signal to the hearing aid.
- A DECT phone with a “bluetooth” hearing aid.

The results suggest that the phone technology is not suitable for hearing aid users.

Researchers used three different speech listening tests to see if there was a difference between the traditional and the wireless phone.

Research Questions
- How does speech recognition test on the phone in children and in adults compare when using a monaural versus binaural hearing aid?
- How do children compare to adults in terms of speech recognition when using a monaural versus binaural hearing aid?
- How do adults compare to children in terms of speech recognition when using a monaural versus binaural hearing aid?
- What are the reasons for this difference?
- How do adults compare to children in terms of speech recognition when using a monaural versus binaural hearing aid?