Sound localization with bilateral cochlear implants investigated with a new localization method (B. Seeber, U. Baumann, H. Fastl)

To assess the localization ability of hearing impaired patients currently used audiological tests apply the method of identification. For that purpose in a set of loudspeakers the subject has to identify the perceived sound source direction and name or show the speaker from which the sound was presented. Although this method may be useful in clinical examinations due to its simplicity, the applicability of source identification studies in audiological and psychoacoustic research is limited, as identified sound directions are quantized to the position of the speakers in the setup. To overcome this limitation a new localization method was developed which allows an un−quantized, continuous scaling of perceived sound direction by a movable light spot. By turning the ball on a computer trackball the subject moves the spot of a laser pointer on a horizontal track to the perceived auditory direction. The light spot is projected onto a curtain which covers the loudspeakers. By using the trackball the new method can be handled fast and intuitively and is therefore usable also for patients of nearly all age groups.

Using the new localization method experiments with 4 bilateral cochlear implant patients were carried out to assess the ability and accuracy of sound localization. All subjects showed localization ability with varying accuracy. One bilateral supplied subject showed a localization accuracy of 5 degrees. For this subject the absolute localization error is about 6 degrees and the correlation between presented and perceived directions reaches 0.996. Using a single CI this subject was also able to differentiate the side of sound origin even with roving stimulus level.

From: Wullsteinsymposium 2002, Eigenverlag Universität Würzburg