Clinical take-home evaluation of music pre-processing scheme for cochlear implant users

Wim Buyens[a b c], Bas van Dijk[a], Marc Moonen[b], Jan Wouters[c]

[a] Cochlear Technology Centre Belgium, Schaliënhoevedreef 20 I, 2800 Mechelen
[b] Department of Electrical Engineering (ESAT-STADIUS), KULeuven, Kasteelpark Arenberg 10, 3001 Heverlee
[c] Department of Neurosciences (ExpORL), O&N 2, KULeuven, Herestraat 49 bus 721, 3000 Leuven

A cochlear implant (CI) is a medical device that provides auditory sensations to people with severe-to-profound hearing loss by electrically stimulating the auditory nerve using an electrode array implanted in the cochlea. Speech performance in noise varies across subjects, but most of them reach good speech understanding in quiet environments. However, the perception of music is generally unsatisfactory for CI users. In an attempt to improve music enjoyment for CI users, a music pre-processing scheme has been designed in which vocals, bass and drums are emphasized using sound separation techniques(*). After encouraging results from experiments in the lab with pop/rock music excerpts, the scheme has been implemented as an application on a mobile device. With the application, internally stored music can be played, the balance between vocals/bass/drums and other instruments can be adjusted and the preferred setting can be stored for each song. This mobile device is being used in a take-home study with post-lingually deafened CI subjects with following objectives:

1. To assess the improvement in music enjoyment with the music pre-processing scheme with different styles of music in comfortable listening environment (take-home study)
2. To determine the relationship between the preferred parameter settings in the music pre-processing scheme and the subject's speech/pitch perception.
3. To determine other effects that influence the preferred parameter settings (CI experience, music listening habits, music enjoyment …).

The description of the take-home experiment and the (interim) results with post-lingually deafened CI subjects will be shown in the presentation.

(*) presented at the B-Audio meeting, November 2013, Brussels