

International Conference and Expo on **Audiology and Hearing Devices**

August 17-18, 2015 Birmingham, UK

Effectiveness of transient noise reduction algorithms marketed by three hearing aid manufacturers

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Transient noise reduction (TNR) algorithms implemented in hearing aids are not well-understood or studied. The purposes of this study were to examine the amount of noise reduction provided by 3 TNR algorithms and the spectra characteristics of speech at the hearing aid outputs. Eight different transient noises were recorded in real-life environments approximately 1 meter away from the sources. Three hearing aids were programmed to have 1) flat frequency responses with linear amplification, 2) flat frequency responses with 3:1 amplification, and 3) NAL prescription for people with mild to moderately-severe hearing loss, when they were worn on a manikin. Transient noises and HINT sentences were then presented at 0° azimuth of the manikin in a sound field. Hearing aid outputs were recorded in the TNR ON or OFF condition. The levels of the recorded transient noises were calculated and the spectral characteristics of the recordings were compared in the ON and OFF conditions. Results showed that one hearing aid consistently provided high levels of noise reduction for all 8 noises but it reduced the high frequency energy in most of the recordings. The second hearing aid was inconsistent in reducing the noises and it only reduced the high frequency energy in a few recordings. The third hearing aid provided negligible amount of noise reduction or high frequency reduction. No consistent effect of compression or frequency response was observed. These results highlight the need to design consistently effective TNR algorithms without affecting the spectral characteristics of the signal.

Biography

King Chung is an Associate Professor of Audiology at Northern Illinois University. She has been leading students onto humanitarian research and service trips every summer. Past destinations include Taiwan, Hong Kong, Brazil, China, and Cambodia. A researcher at heart, she publishes information on the hearing systems in the visited countries/regions and the hearing status of individuals tested during the trips to raise the awareness of the great demand for hearing services in different countries. The long term goal is to facilitate the provision of frequent and high quality hearing services to underserved and unserved populations around the world.

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