

Effect of frequency region on sensitivity to interaural delay in high-frequency clicks

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Laback et al. (2005) and Majdak et al. (2005) showed that bilateral cochlear implant (CI) listeners lateralize pulse trains based on interaural time differences (ITD) in the fine structure. For three out of four CI listeners, the highest pulse rate showing effects of fine structure ITD was higher than in normal hearing (NH) subjects listening to an acoustic simulation of electric stimulation. This study attempted to verify that the NH listeners' performance was not underestimated by a potentially unfavorable choice of the center frequency of the stimulus (4590 Hz) based on the following hypothesis: if the ringing of the auditory filters limits ITD perception at higher pulse rates, the maximum pulse rate showing significant effects of ITD will increase with increasing center frequency.

Rectangularly gated pulse trains carrying ongoing ITD were bandpass filtered, simulating electric hearing. Lateralization discrimination was tested at different pulse rates (200 to 800 pulses per second) and center frequencies (4590, 6490, 9180 Hz). The maximum pulse rates showing significant effects of ITD did not vary with center frequency. It is concluded that the auditory filters of NH listeners do not limit ITD perception in pulse trains for center frequencies down to 4590 Hz. Thus, the comparison between NH and CI listeners in the cited studies appears not to be confounded by the cochlear filters.

References: Laback, B., Majdak, P., Baumgartner., W.D. (2005), 28th Midwinter Meeting of the Association for Research in Otolaryngology. Majdak, P., Laback, B., Baumgartner., W.D. (2006), *J. Acoust. Soc. Am.* 120, 2190-2201.