

SENSITIVITY TO SPECTRAL PEAKS AND NOTCHES IN COCHLEAR IMPLANT LISTENERS

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This study determines the feasibility of cochlear implant (CI) listeners to localize sounds in vertical planes by determining their sensitivity to spectral peaks and notches from an equal-loudness background. Five listeners with a monopolar twelve-electrode implant participated in this study. Three places (low = electrodes 4-6, mid = 7-9, and high = 10-12) and three bandwidths (1, 2, and 3 electrodes) were tested. All conditions were tested without and with level roving.

It was found that the listeners were always sensitive to spectral peaks, without or with level roving, at any bandwidth and place. In most cases, increasing the bandwidth beyond two electrodes showed no significant increase in the threshold. Two and three electrode peaks without level roving required a change of less than 8% of the dynamic range of the electrodes ($\cong 50 \mu\text{A}$). Level roving significantly increased this threshold by 7% ($\cong 40 \mu\text{A}$). Listeners were much less sensitive to spectral notches, normally requiring changes of 17% of the dynamic range ($\cong 80 \mu\text{A}$) to be detected. Listeners could very rarely detect notches with level roving. The effect of place was highly variable between listeners. This variability was correlated with intensity discrimination thresholds without a background.

These results have comparable trends to those found in a similar study for normal hearing (NH) listeners; however, peak and notch detection seems worse in CI listeners compared to NH listeners (Moore *et al.*, JASA, 1989). Nonetheless, listeners are sensitive to peaks (without and with level roving) and notches (without level roving) and it should be possible to develop a vertical plane sound localization strategy for CI listeners.

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