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The use of fundamental frequency information by cochlear implant patients with residual low-frequency hearingStephanie Herf^a, Julie Liss^a, Anthony Spahr^b and Michael Dorman^a^aArizona State University, Dept. of Speech and Hearing Science, Box 87-0102, Tempe, AZ 85287-0102, USA^bArizona State University, Lattie F. Coor Hall, Room 3462, Tempe, AZ 85287, USA

Recent studies have demonstrated significant benefits of complementing the electric hearing provided by a cochlear implant (CI) with residual low-frequency acoustic hearing. It has been suggested that the benefit of low-frequency hearing (<250 Hz) is due to improved representation of fundamental frequency (F0). It was hypothesized that removing F0 information would negatively impact speech perception in bimodal CI patients (EAS) more so when they are using both modes of perception. It was further hypothesized that these patients' more effective use of F0 information would result in higher intelligibility scores and less unpredicted lexical boundary errors (LBEs) in a speech transcription task. Six EAS patients transcribed normal and F0-flattened phrases. Results indicate EAS patients demonstrated a significant benefit from the residual low-frequency acoustic hearing and perform better in this mode. Five of the 6 EAS patients were able to transcribe the normal phrases with greater accuracy than the flat F0 phrases in both conditions. These patients correctly parsed lexical boundaries and transcribed phonemic targets with greater accuracy in the bimodal condition. These results demonstrate the importance of pitch and low frequency spectral information in the perception of speech.