

**ACOUSTICS2008/1640**  
**Emergence of Sound Localization Acuity in Children who are**  
**Fitted with Bilateral Cochlear Implants**

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Sound localization was investigated in children who are born deaf and hear with either monaural or bilateral cochlear implants (CIs). Using a 2AFC discrimination task with stimuli to the right/left, in a sound proof booth, loudspeaker locations varied along the horizontal plane between +/-70 deg. Minimum audible angle (MAA) thresholds were estimated adaptively. In study 1, 4-14 year-old children who received two CIs in sequential procedures participated. They were first tested while functioning monaurally, then at 3- and 12-months following activation of bilateral hearing. Following bilateral activation, MAA thresholds were significantly lower, especially after 12 months. In study 2 children were 2.5 years old, with 6-20 months of bilateral experience. MAAs were typically better when children had  $\geq 12$  months of exposure to bilateral stimulation. Overall, these findings suggest that binaural hearing abilities can be established in an auditory system that is strictly stimulated with electrically pulsed signals, but that unlike a normal auditory system, here a year of exposure may be required before localization acuity is better under bilateral than monaural conditions. These findings are especially relevant to considerations of localization in absence of fine-structure, a cue that is discarded by the speech processors utilized in CIs.