

UNILATERAL HEARING LOSS: LOCALIZATION

REFERENCE	DESIGN	RECRUIT-MENT	CASE DEFINITION	SUBJECTS	ASSESSMENT TOOLS	RESULTS	AUTHOR'S CONCLUSIONS
Humes LE, Allen SK, Bess FH. Horizontal sound localization skills of unilaterally hearing-impaired children. <i>Audiology</i> . 1980;19(6): 508-18.	<p>Case-control</p> <p>Four conditions for localization with and without noise using pure tones and cafeteria noise</p> <p>Signals were 500 ms* pure tones presented at 60 dB* SPL*</p> <p>Four conditions: 500 Hz* and 3 kHz* in quiet and 60 dB SPL cafeteria noise</p>	Not reported	<p><i>Normal:</i></p> <p>(1) Pure tone air and bone .25-4 kHz \leq15 dB HL* bilaterally.</p> <p>(2) Air-bone gap <10 dB at all frequencies.</p> <p>(3) Normal tympanograms.</p> <p>(4) Acoustic reflex in each ear by contralateral presentation of 100 dB HL at 1 kHz.</p> <p><i>UHL:</i></p> <p>(1) Better ear normal hearing.</p> <p>(2) Mean PTA* is provided for the group in graph form with description.</p> <p>Six subjects had sensorineural loss, 2 subjects had mixed loss with predominant component sensorineural.</p>	<p>Total: N = 24</p> <p>Three groups of 8 subjects each:</p> <p>(1) Normal hearing adults, mean age 25.5 years (22-30 years).</p> <p>(2) Normal hearing children, mean age 9.6 years (6-12 years).</p> <p>(3) Children with UHL, mean age 10.9 years (8-15 years).</p>	<p>One of 13 free field speakers presented the signal at each trial (speakers numbered from 1-13).</p> <p>Subject was asked to identify which speaker produced the sound.</p> <p>Subject kept head at 0° azimuth.</p> <p>Subject reported speaker number from which they thought the tone came.</p> <p>Tester seated outside test chamber recorded response.</p>	<p>Control children performed better than UHL children for all conditions.</p> <p>Generally, the greater the degree of UHL, the poorer the localization ability.</p> <p>Background noise had no main effect on localization for all conditions and groups.</p> <p>The 500 Hz signal was easier to localize than the 3 kHz signal for all groups.</p> <p>Age had only slight or no main effect for all signals.</p>	<p>Children with UHL exhibited greater difficulty in sound localization than controls along horizontal plane.</p> <p>The greater the UHL, the more difficulty children had localizing sounds.</p> <p>One UHL subject with the lowest degree of UHL (thresholds at 30 and 60 dB HL at .5 and 3 kHz, respectively) performed at normal levels.</p> <p>Because data suggested UHL children have trouble localizing sounds, they might have a decline in communicative efficiency in many everyday situations.</p>

ms = milliseconds; dB = decibel; SPL = sound pressure level; Hz = hertz; kHz = kilohertz; HL = hearing level; PTA = pure tone average

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Newton VE. Sound localisation in children with a severe unilateral hearing loss. <i>Audiology</i> . 1983;22(2): 189-98.	Case-control	Not reported	<p><i>Normal:</i> Air conduction threshold ≤ 20 dB* HL* at 250 and ≤ 5 dB HL at 500-8 kHz*</p> <p>Normal tympanograms</p> <p><i>UHL:</i> * Normal hearing in better ear; no measurable hearing or air conduction threshold ≤ 70 dB HL in poorer ear</p>	<p>Total: N = 84</p> <p>44 UHL (mean age = 12.8 years); most identified at about 5 years through school screenings.</p> <p>40 controls (mean age 23.4 years).</p>	<p>Compared UHL group to controls in sound localization along a similar transverse plane in an anechoic chamber using:</p> <p>(1) 500 Hz* pure tone.</p> <p>(2) 500 Hz narrow-band noise.</p> <p>(3) High-pass (>3 kHz) noise.</p> <p>All at 65 dB SPL.*</p>	<p>Greater variance in localization errors among the UHL group for all stimuli.</p> <p>UHL group localized high-pass noise the best of all stimuli.</p> <p>UHL group showed greater difficulty localizing pure tones than either noise stimuli.</p>	<p>Subjects who acquired UHL congenitally or early in life before they began to rely on binaural cues might have performed better than those who acquired UHL later in life.</p> <p>Nine UHL subjects with superior performance had UHL for >8 years; However, duration of UHL is not necessarily related to better localization ability.</p> <p>Previous studies suggested the pinna reflects sounds above 4 kHz and that those frequencies play an important role in monaural sound localization; this study might support that idea because subjects in the study with UHL performed better with high-pass noise than the other stimuli.</p>

dB = decibel; HL = hearing level; kHz = kilohertz; UHL = unilateral hearing loss; Hz = hertz