DISPARITY OF EMERGENCE OF SOUND LOCALIZATION ABILITIES IN BILATERALLY IMPLANTED AND HEARING TODDLERS

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The purpose of this study was to examine the emergence of sound localization skills in toddlers with bilateral cochlear implants (BCI) and compare them with their normal hearing (NH) peers using a novel Reaching for Sound (RfS) method.

PARTICIPANTS

Twenty-four 34-month-old toddlers with normal hearing (NH):
- Recruited through both registry list
- No history of hearing loss, ear infections, or other developmental delays
- Symmetrical screening performed

PROCEDURE

Experimental Design:
Training consists of a randomized right-left-discrimination task, with blocks of trials in which only two targets, at equal separation from midline, are visible. The following trials apply:
- Testing begins with the widest angular separation (60°).
- The child must pass the criterion of 4/5 correct trials before proceeding to a smaller separation of 30°.
- If the child passes at 30°, then testing is also conducted at 15°.
- If the child does not pass at 30°, then testing is conducted at 45°. If 30° then 45°, repeated, followed by 15°.

LOCALIZATION TESTING

- Children who pass the training (pass criterion of 1.5) proceed to localization testing.
- A total of 3 trials are conducted (60°, 45°, 30°), repeated, followed by 15°.
- A block of 18 trials with 2 repetitions per location are randomly presented.

Stimulus: The phrase, “When I hide I...” followed by three bursts of white noise presented at a level of 60 dB SPL.

Task: An experimenter positions a small puppet above the center loudspeaker to draw the child’s attention. Once the child’s eyes and head are facing forward, the experimenter initiates the trial by playing a sound from one of the loudspeakers. The child’s task is to reach into the correct hole and obtain the hidden objects that end after the child reaches (either correctly or incorrectly) into a hole, or if it becomes clear that a reach is not forthcoming.

TESTING APPARATUS

DISCRIMINATION RESULTS

LOCALIZATION DATA

LOCATING DATA

TASK DIFFICULTY

SUMMARY & CONCLUSIONS

REFERENCES

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REFERENCES


COMBINED RESULTS

- Combined data for BCI and NH children
- RMS errors ranged from 0.00 to 35.99 with an average of 44.36 in the BCI group and from 0.00 to 35.59 with an average of 15.34 in the NH group.
- Percent correct for the BCI group ranged from 11.11% to 97.09% with a group average of 27.17.
- Percent correct for the NH group ranged from 14.18% to 100% with an average of 13.34.

- RMS Errors
- Percent Correct
- BCI Group
- NH Group
- Overall
- Summary
- Conclusions