

Use of a Parabolic Microphone to Detect Hidden Subjects in Search and Rescue

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Objectives

This study compares a parabolic microphone to unaided hearing in detecting and comprehending hidden callers at ranges of 322-2510 meters.

Methods

Eight subjects were placed 322-2510 meters away from a central listening point. The subjects were concealed, and their calling volume was calibrated. In random order, subjects were asked to call the name of a state for 5 minutes. Listeners with parabolic microphones and others with unaided hearing recorded the direction of the call (detection) and name of the state (comprehension).

Results

The parabolic microphone was superior to unaided hearing in both detecting subjects and comprehending their calls, with an effect size (Cohen's d) of 1.58 for detection and 1.55 for comprehension. For each of the 8 hidden subjects, there were 24 detection attempts with the parabolic microphone and 54-60 attempts by unaided listeners. At the longer distances (1529 meters to 2510 meters) the parabolic microphone was better at detecting callers (83% vs 51% $p < .00001$ by Chi Square) and comprehension (57% vs 12% $p < .00001$). At the shorter distances (322-1190 meters) the parabolic microphone offered advantages in detection (100% vs 83% $p = .000023$) and comprehension (86% vs 51% $p < .00001$), although not as pronounced as at the longer distances.

Conclusions

Use of a 66 cm (26 inch) parabolic microphone significantly improved detection and comprehension of hidden calling subjects at distances between 322 and 2510 meters when compared to unaided hearing. This study supports the use of a parabolic microphone in search and rescue to locate responsive subjects in favorable weather and terrain.