

Abstract Submitted
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Phonation aeroacoustic source strength estimation from sound pressure measurements MICHAEL KRANE, ARL Penn State, ELIZABETH CAMPO, ARL Penn State (now at 3M), MICHAEL MCPHAIL, ARL Penn State — An experimental characterization of monopole and dipole source spectra in a model of the human upper airway is presented. The airway model is a life-scale, vertical, straight duct of square cross section, into which two model vocal folds are placed. Five microphones are positioned in the duct, two below and two above the vocal folds, with a fifth microphone placed at the “mouth.” Time-mean subglottal pressure and volume flow rate are measured using a micromanometer and ball-element meter, respectively. In addition, pressure on either side of the model vocal folds are measured using Kulite XCS-093 pressure transducers, and the motion of the model vocal folds is captured using high-speed video. Cross-correlations between the microphone pairs are used to estimate the right- and left-running acoustic wave amplitude spectra above and below the model vocal folds. From these spectra and theoretical matching conditions at the inlet and outlet of the vocal fold constriction, source spectra are constructed. These are compared to independent estimates of source spectra obtained from the difference of the Kulite transducer pressures and the motion of the model vocal folds. Acknowledge support from NIH R01 DC005642 (MK, MM) and ARL E&F program (EC).

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