

Abstract Submitted
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Synchronized measurements of glottal jet velocity, vocal fold surface motion, and pressure¹ PAUL TRZCINSKI, ADAM NICKELS, JEFF HARRIS, ZACHARY YOAS, BENJAMIN BECK, MICHAEL KRANE, Penn State University — Synchronized measurements of glottal jet velocity, vocal fold surface motion, and pressure were performed in a model of the human upper airway. The glottal jet velocity was measured in the cross plane of a 2.54 cm square duct and downstream of molded rubber vocal folds, using time-resolved particle image velocimetry (PIV). The three-dimensional vocal fold deformation was obtained using digital image correlation (DIC). Additionally, pressure was measured in the duct at seven locations along the model vocal tract. This set of measurements allowed for the characterization of glottal jet-vocal fold interactions and relation of those interactions to the acoustic pressure. Preliminary analysis of this data set includes a correlation analysis between vocal fold vibration patterns and both the fluid motion and acoustic pressure. Motion of the vocal fold is optimally decomposed, in a least squares sense, using Proper Orthogonal Decomposition (POD) to elucidate the dominant vibration modes. This is a first step in understanding the energy transfer in the fluid-structure interaction process.

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