

Abstract Submitted
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The development of supraglottal flow structures during speech¹

BYRON ERATH, Purdue University, MICHAEL PLESNIAK, George Washington University — During voiced speech, periodic vocal fold oscillations create a pulsatile jet that emanates from the glottis and is convected through the supraglottal tract. Unsteadiness in the supraglottal jet trajectory (superior to the vocal folds) has been observed in a variety of laryngeal flow investigations, contributing to sound production due to vortex pairing which occurs within the jet as well as the impingement of the deflected jet on physiological structures. However, there is confusion in the literature concerning the mechanisms which contribute to the flow variability. Instabilities in the supraglottal jet include the Kelvin-Helmholtz instability, as well as the hypothesized presence of jet 'flip-flopping', the tendency of the glottal jet to detach from one vocal fold wall and reattach to the opposing wall mid-cycle. The morphology of the supraglottal flow field is investigated using phase-averaged PIV measurements acquired in the anterior-posterior midplane of the superior vocal fold tract of a dynamically controlled 7.5 time life-size vocal fold model. Flow parameters are scaled to match physiological values. The relevant fluid flow phenomena that impact the supraglottal jet trajectory are identified.

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