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Glottal-opening and airflow pattern during production of voiceless fricatives: a new non-invasive instrumentation

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In the production of voiceless fricatives, the airflow passing through the vocal tract is controlled by reciprocal open-close patterns of the glottal and oral constriction. In order to observe such coordinated patterns, the authors have developed a combined method using a non-invasive (external-lighting and sensing) photoglottographic (ePGG) technique and a pressure-difference airflow mask. The former technique has the advantage of no restriction of phonetic environments (improvement from the standard PGG) and can be further combined with instrumentation of intraoral air pressure and/or of articulatory movements. Our PGG-airflow data are examined to address a question: It has been known that the glottis opens always wider for word-initial fricatives than for word-medial ones despite no obvious difference in acoustic and physiological requirements. It will be discussed whether the degrees of glottal opening during a fricative co-vary with other aerodynamic and articulatory controls in CVCV utterances with V = nonclose vowels.