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Computational Investigation of Dynamic Glottal Aperture Effects on Respiratory Airflow JINXIANG XI, University of Arkansas at Little Rock, HONG YAN, HAIBO DONG, Wright State University — The periodic movement of the glottal aperture (vocal folds) during tidal breathing has been long recognized as a factor in altering the airflow dynamics in the tracheobrnchial region. The potential influence from these altered flow structures on the transport and deposition of inhaled particles is not known. However, studies devoted to this dynamic physiological feature are scarce due to the complex anatomy in of the larynx and numerical challenges in simulating dynamic geometries. In this study, a high-fidelity immersed boundary solver is used to investigate this problem. A 3D human oral-larynx-lung model is firstly reconstructed from MRI data. The role of the vocal fold movement and associated airflow characteristics such as vortex shedding, Coanda effect etc. during inhalation and exhalation are then numerically studied.

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