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Vocal Fold Trauma: Deleterious Compensatory Behaviors in Response to Benign Lesions[1] MOHSEN MOTIE-SHIRAZI, BYRON ERATH, Clarkson University — Abnormally high vocal fold (VF) contact pressures result in the formation of benign lesions such as polyps and nodules, which may produce highly asymmetric VF motion, disrupt glottal aerodynamics, and prevent VF closure. In response, compensatory behaviors, such as increasing the subglottal pressure, are often performed to maintain acoustic output. It is hypothesized that increased subglottal pressure leads to a deleterious cycle of higher contact pressure, and subsequently, additional VF trauma. The objective of this work is to quantify VF contact pressures during this common compensatory behavior. Four-layer synthetic VF models are fabricated and investigated in a hemilaryngeal configuration with the wall contact pressure measured at the midpoint of the VF contact zone. Three sizes of lesions are modeled by inserting a spherical ball in the mid anterior-posterior direction of the superficial lamina propria layer, below the epithelium. Contact pressure and radiated acoustic sound pressure level (SPL) are first measured in normal models with no lesion and then compared to those with a lesion, where the subglottal pressure is adjusted to match the radiated SPL between the two cases. Results demonstrate that localized lesion stiffness and compensations via subglottal pressure significantly alter the VF kinematics, producing much higher contact pressures that increase with lesion size.

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