

Abstract Submitted
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A finite element study on the cause of vocal fold vertical stiffness gradient BIAO GENG, QIAN XUE, XUDONG ZHENG, University of Maine, Orono — Vertical stiffness variation (VSV) on the vocal fold medial surface was recently reported and was hypothesized to be an important feature for phonation as it can promote the divergent angle during vibration. However, the underlying mechanism of such feature remains unclear. In our opinion, there are three primary mechanisms that could contribute to the overall stiffness variation, including the material variation in the cover layer, the superior-inferior asymmetry of the vocal fold structure and the presence of the conus elasticus. The current study aims to use the finite element method to quantify the contribution of these three mechanisms to the VSV. The preliminary results showed that the material variation and structural asymmetry can have a significant effect on the VSV, however, the presence conus elasticus had nearly negligible effect. The structural asymmetry due to the subglottal angle caused about 15%~20% increase in VSV when the subglottal angle beyond 40, and its effect was more significant at small subglottal angles.

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