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**Determining an Effective Shear Modulus in Tubular Organs for Fluid-Structure Interaction** ROBERT CHISENA, JAMES BRASSEUR, FRANCESCO COSTANZO, Penn State U, HANS GREGERSEN, JINGBO ZHAO, Aalborg Hospital — Fluid-structure interaction (FSI) is central to the mechanics of fluid-filled tubular organs such as the intestine and esophagus. The motions of fluid chyme are driven by a muscularis wall layer of circular and longitudinal muscle fibers. The coupled motions of the fluid and elastic solid phases result from a local balance between active and passive muscle stress components, fluid pressure, and fluid viscous stresses. Model predictions depend on the passive elastic response of the muscularis layer, which is typically parameterized with an average isotropic elastic modulus (EM), currently measured *in vivo* and *in vitro* with estimates for total hoop stress within a distension experiment. We have shown that this approach contains serious error due to the overwhelming influence of incompressibility on the hydrostatic component. We present a new approach in which an effective shear modulus, containing only deviatoric contributions, is measured to overcome this serious error. Using *in vitro* measurements from pig intestines, we compare our new approach to the current method, showing vastly different predictions. We will also report on our current analysis which aims to determine the influence of residual stress on the EM measurements and comment on it use in FSI simulations.

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