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Modeling of digestive processes in the stomach as a Fluid-Structure Interaction (FSI) phenomenon[1] SHASHANK ACHARYA, Dept. of Mechanical Engineering, Northwestern University, WENJUN KOU, PETER J. KAHRILAS, JOHN E. PANDOLFINO, Feinberg School of Medicine, Northwestern University, NEELESH A. PATANKAR, Dept. of Mechanical Engineering, Northwestern University — The process of digestion in the gastro-intestinal (GI) tract is a complex mechanical and chemical process. Digestion in the stomach involves substantial mixing and breakup of food into smaller particles by muscular activity. In this work, we have developed a fully resolved model of the stomach (along with the esophagus) and its various muscle groups that deform the wall to agitate the contents inside. We use the Immersed Boundary finite-element method to model this FSI problem. From the resulting simulations, the mixing intensity is analyzed as a function of muscle deformation. As muscle deformation is controlled by changing the intensity of the neural signal, the material properties of the stomach wall will have a significant effect on the resultant kinematics. Thus, the model is then used to identify the source of common GI tract motility pathologies by replicating irregular motions as a consequence of varying the mechanical properties of the wall and the related activation signal patterns. This approach gives us an *in-silico* framework that can be used to study the effect of tissue properties muscle activity on the mechanical response of the stomach wall.

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