

Abstract Submitted  
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**Fluid mechanics-informed clinical practice in gastroenterology<sup>1</sup>**

SHASHANK ACHARYA, Dept. of Mechanical Engineering, Northwestern University, SOURAV HALDER, Theoretical and Applied Mechanics, Northwestern University, GUY ELISHA, 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 upper gastrointestinal (GI) tract is a complex mechanical system that displays rich fluid/solid dynamics during the transport and breakdown of ingested contents. Recently, dilation catheters have been increasingly used to visualize the esophageal wall and measure fluid pressure during contractile activity. In this abstract, we report the development of three mechanics-based physiometers (or metrics) to quantify the physiological functioning of this organ system using data captured by such catheters. These metrics are used to understand the variation of mechanical work done during peristalsis and emptying of fluid into the stomach. Following the analysis of individual subjects, these metrics have been used to quantify differences in pumping activity and wall stiffness between several disease groups. In addition to providing mechanical insights between various disease states, these metrics can be used during surgical procedures to precisely quantify the extent of intervention needed to restore normal function in the upper GI tract.

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