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**Viscoelastic properties of myocardium tissue with surface and shear wave methods**

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Considerable interest in the elastic properties of soft tissue has increased in medicine due to their clinical relevance for monitoring various diseases as well as a biomarker for cancer. A recent emerging field is the use of acoustic radiation force for imaging and estimating the elastic properties of tissue. Newly developed imaging modalities include shear wave elasticity imaging, supersonic shear wave imaging, acoustic radiation force impulse imaging, and vibro-acoustography. In these new methods, the shear wave is used to estimate the elasticity of tissue. We have developed a novel surface wave method for non-invasively estimating the elasticity of tissue [X. Zhang et al., *J. Acoust. Soc. Am.*, vol. 122, 2522-2525, 2007]. In this method, a localized ultrasound radiation force is remotely and non-invasively applied inside the tissue. The surface wave speed is used to estimate the elasticity of tissue. This method has been further developed and applied to estimate the viscoelasticity of animal myocardium tissue. In this abstract, we report our recent results of in vitro studies on animal myocardium tissue. Both the surface wave and shear wave are measured and analyzed. Noninvasive characterization of viscoelastic properties of myocardium tissue may be a very important tool for assessing heart function.