

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Viscoelastic and ultrasonic measurements of canine tissue** MIKLOS KISS, University of Wisconsin, Department of Medical Physics, Madison, WI, TOMY VARGHESE, University of Wisconsin, Departments of Medical Physics and Biomedical Engineering, Madison, WI — Mechanical properties, of biological tissues, such as the complex modulus, are of interest for assessing the performance of elastographic methods that evaluate the stiffness characteristics of tissue. Determination of the mechanical properties of biological tissues is often limited by proper geometry of the sample, as well as homogeneity of the stress-strain relationship. Viscoelastic measurements were performed on in vitro canine liver tissue specimens, using a dynamic testing system, from 0.1 – 100 Hz, and ultrasonic attenuation measurements were performed from 6 – 9 MHz . Both normal tissues as well as thermal lesions prepared by immersion heating at several temperatures were tested. Experiments were conducted by uniaxially compressing tissue samples and measuring the load response. The resulting moduli spectra were then fit to both the Kelvin-Voigt model, as well as the Kelvin-Voigt fractional derivative model. The data agree well with the models and in comparing the results from the normal tissue with that of the thermal lesions, the concept of a complex modulus contrast is introduced and its applications to elastography are discussed.

Miklos Kiss  
University of Wisconsin, Department of Medical Physics, Madison, WI

Date submitted: 30 Nov 2004

Electronic form version 1.4