

ACOUSTICS2008/1535
Comparative study of Vibro-acoustography and B-mode
Ultrasound in prostate imaging

Azra Alizad^a, Farid Mitri^a, Brian Davis^b, James Greenleaf^a and Mostafa Fatemi^a

^aDep. of Physiology and Biomed. Eng., Mayo Clinic College of Medicine, 200 First Street SW, Rochester, MN 55905, USA

^bDep. of Radiation Oncology, Mayo Clinic College of Medicine, 200 1st St. SW, Rochester, MN 55905, USA

Vibro-acoustography (VA) is an imaging modality that uses the radiation force of ultrasound to vibrate tissue at a low frequency and records the resulting acoustic field to produce an image that represents object characteristics at both ultrasound as well as low (audio) frequencies. Currently, B-mode ultrasound is used for prostate imaging. This imaging method has some limitations, including the speckle noise, which limit its ability in detection of lesions and calcifications. The purpose of this study is to explore the potentials of VA for prostate imaging. VA, B-mode ultrasound, and radiography were performed on 12 excised human prostate samples and the resulting images were compared. VA system parameters were, center frequency 3MHz, $\Delta f = 50$ kHz, image area 5x5 cm, pixel size 0.2x0.2mm. Images evaluated in terms of visibility of anatomical and pathological structures and contrast. Results showed that prostate anatomical structures, mass lesions, and calcifications were visible in the VA images taken at different depths, and VA image quality was superior to B-mode. VA images exhibited significant contrast between the central and peripheral zones with enhanced borders. It is concluded that, with further development, VA may become suitable modality for in prostate imaging.