Ultrasound System Solves Attenuation Problem

Published date: March 14, 2017

Technology description

Acoustic Radiation Force Impulse (ARFI) imaging is a type of ultrasound elastography with proven diagnostic value. It works by generating a shear wave and detecting differences in attenuation (scattering and absorption) to produce images of soft tissue. The technique is used to assess tumors of the pancreas, prostate, ovaries, deep muscle and kidneys.

Unfortunately, the technique is less successful in imaging other types of tissue, such as the cervix, that have high acoustic attenuation. UW–Madison researchers were driven to address this problem and augment their previously developed method for predicting the risk of preterm birth based on ultrasound measurements of cervical tissue
The researchers have enhanced their previous work and overcome the attenuation problem associated with ARFI. They have determined that in tissue with high acoustic attenuation, conventional focusing of ultrasound energy to the region of interest results in substantial acoustic force being misapplied above the intended region.

Their new system is based on an ultrasound transducer array with independently controlled elements. The system divides ultrasound energy into two separate angled beams that converge at the target region to generate push-pulses. A set of varying apodization functions can be applied to the separate beams to improve uniformity and intensity in the focal region.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an ultrasonic system that provides superior imaging of tissues with high acoustic attenuation, such as the cervix.

Application area

New software for ARFI ultrasound imaging, including cervical assessment

Advantages

Works with standard imaging hardware
Focuses acoustic forces in a desired target region
Reduces overall transducer heating

Provides control over the size of the focal region

Institution

Wisconsin Alumni Research Foundation

Inventors

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