SINGLE SENSOR TENSIOMETER

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Inventors: Darryl Thelen, Dylan Schmitz, Stephanie Cone

Overview

The ability to measure the absolute stress that ligaments, tendons, or muscle experience in vivo has considerable value in medical research and rehabilitative medicine. Prior techniques used in research settings are highly invasive and include insertion of a "buckle transducer" in series with the tissue or the threading of a fiber optic sensor through the tissue and detecting changes in light transmission associated with tension. Tissue stress can often be inferred from measurements of force (e.g., torque) applied to a limb and using inverse dynamics to assess results of that applied force on the tissue. Tissue cross-sections can then be measured to convert the force to a stress value. This approach is cumbersome, however, and greatly restricts the availability of these measurements outside of laboratory environments. US patent 10,631,775, describes a method for characterizing relative stress in ligaments, tendons, and muscles using the propagation of a shear wave generated by a contact actuator as a shear wave passes between two spaced sensors.

The Invention

UW-Madison researchers have designed a compact shear wave sensor that employs a single sensor/actuator pair to provide a smaller skin contact footprint suitable for a wider variety of tissue measurements. Improved accuracy with a single sensor is obtained by employing a shaped wavelet excitation whose delay characteristics (group delay and frequency delay) offer more robust shear wave transit time measurements with reduced frequency dependent variability. This is an improvement over prior impulsive excitation which results in broadband excitation.

Additional Information

For More Information About the Inventors

- Darryl Thelen

Tech Fields

- Medical Devices : Diagnostics & monitoring tools

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846