Electrical Property-Based Strain Measurement in Biological Tissues

ID: 2012-004

Executive Statement:

A novel method for measuring strain in biological tissues utilizing their inherent electrical properties, offering a low-cost, repeatable alternative to traditional techniques.

Technology Overview:

This technology leverages the piezoelectric and streaming potential effects in biological tissues, such as tendons, to measure strain through electrode arrays. Developed with federal funding, it aims to improve upon traditional strain measurement methods by using the electrical characteristics of soft tissues, presenting a significant advancement in athletic apparel, medical devices, biomechanics research, and surgical applications.

Key Advantages:

- Cost-effective compared to optical and ultrasound techniques
- Reduces systematic errors inherent in traditional strain measurement methods
- Utilizes the natural electrical properties of biological tissues for measurement
- Supported by National Science Foundation research
- Has undergone scientific validation and peer recognition through academic conferences and publications

Problems Addressed:

- High costs and complexity of current strain measurement techniques
- Systematic errors and limitations of external devices or markers in accurately measuring tissue strain

Market Applications:

- Athletic apparel incorporating strain measurement for performance optimization
- Medical devices for real-time monitoring of tissue strain in clinical settings
- Biomechanics research tools for in-depth study of tissue behavior under strain
- Surgical applications requiring precise measurement of tissue deformation