

Elbow Tendon/Ligament Loading Device

Tech ID: 34626 / UC Case 2025-460-0

ABSTRACT

Researchers at the University of California, Davis have developed a portable biomechanical loading system equipped with integrated sensing assemblies that offers real-time, objective monitoring of connective tissue loading in the elbow and shoulder during therapeutic exercises.

FULL DESCRIPTION

This technology provides biomechanical loading systems designed to apply controlled mechanical forces to the musculoskeletal connective tissues of the elbow and shoulder, specifically tailored for rehabilitation and therapy. It features a handle and elongate member configured to hold weights and integrate a sensing assembly that measures the applied load. The sensing assembly utilizes elastic elements coupled with strain sensors to detect tensile and compressive forces, producing electrical signals indicative of force magnitude and characteristics. These signals are wirelessly transmitted to an external computing device, such as a smartphone or tablet, for real-time feedback, data logging, and biomechanical parameter analysis. The modular design enables use of various weights, supports multiple arm positions, enables isometric and isotonic loading, and facilitates progressive rehabilitation protocols in clinical, athletic, or home environments.

APPLICATIONS

- ▶ Sports medicine and athletic injury rehabilitation (e.g., tennis elbow, golfer's elbow, UCL injuries).
- ▶ Physical therapy clinics and outpatient rehabilitation centers.
- ▶ Home-based rehabilitation and telehealth physical therapy programs.
- ▶ Orthopedic and musculoskeletal diagnostics and treatment monitoring.
- ▶ Fitness and strength training facilities requiring precise biomechanical load monitoring.
- ▶ Research and development in biomechanics and rehabilitation sciences.
- ▶ Wearable and portable medical device markets focused on movement and load monitoring.

FEATURES/BENEFITS

- ▶ Measures tendon and ligament loads directly and objectively during exercise for precise rehabilitation tracking.
- ▶ Adapts for various settings with a compact, portable, and modular design.
- ▶ Integrates strain-based sensors to detect both tensile and compressive loads.
- ▶ Sends data wirelessly to external devices for real-time monitoring and record-keeping.
- ▶ Enables tailored, progressive loading through adjustable weight and lever configurations.
- ▶ Supports multi-modal load sensing for comprehensive feedback.
- ▶ Enhances compliance and precision in rehabilitation by providing objective data.

CONTACT

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INVENTORS

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OTHER INFORMATION

KEYWORDS

biomechanical loading,
elbow rehabilitation,
force sensing, isometric
exercises, monitoring
system, shoulder
rehabilitation, strain
sensors, tendon loading,
wireless communication,
wearable device

CATEGORIZED AS

- ▶ **Medical**
 - ▶ Rehabilitation
- ▶ **Sensors & Instrumentation**
 - ▶ Physical Measurement

RELATED CASES

- ▶ Minimizes reliance on subjective effort estimates and eliminates the need for large, costly laboratory equipment.
- ▶ Precisely controls and monitors both isometric and isotonic tendon loading in non-clinical environments.
- ▶ Consolidates equipment needs to target different musculotendinous regions with one adaptable device.

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PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Method of Inhibiting Proteins to Dramatically Increase Muscle Mass and Strength](#)
- ▶ [Achilles Loading Device](#)

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