

Augmenting Ankle Stiffness Using Cable Driven Exoskeleton to Prevent Ankle Sprain

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Research Question

- Can increasing lateral ankle stiffness using a cable-driven actuators reduce the likelihood of ankle sprains in healthy adults?
- Can this method potentially benefit population affected by Chronic Ankle Instability (CAI)?

Methods

- We recruited a healthy individual with no gait impairments to perform perturbed walking while wearing our exoskeleton.
- The perturbations were provided using a robotic platform to simulate ankle sprain.
- The exoskeleton simulated three stiffness conditions: LOW, MODERATE, and HIGH.

Experiment Setup

Fig. 1. **A:** Cable-driven actuator. **B:** A participant wearing the exoskeleton.

Fig. 2. **A:** Stepping protocol using robotic platform **B:** Representative stepping trial data showing ankle rotation w.r.t. platform at various stiffness.

Results

Fig. 3. Averaged lateral ankle deflection at various exoskeleton stiffness conditions.

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